Northwest Atlantic
Fisheries Organization

NAFO PA framework

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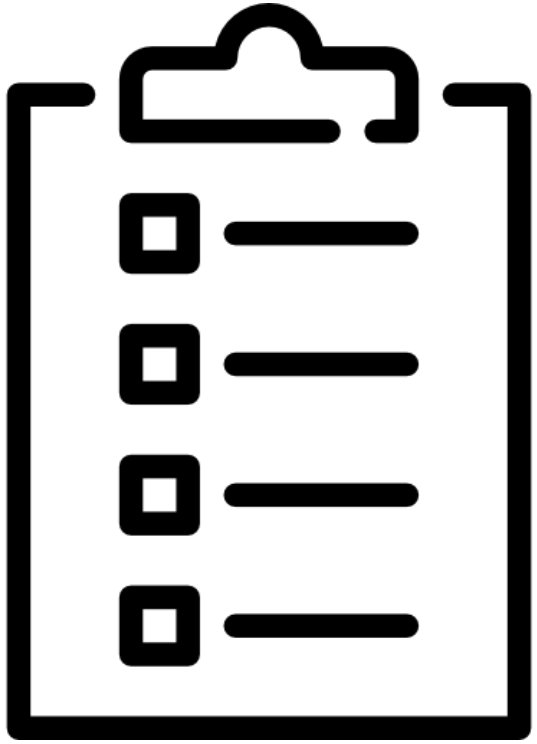
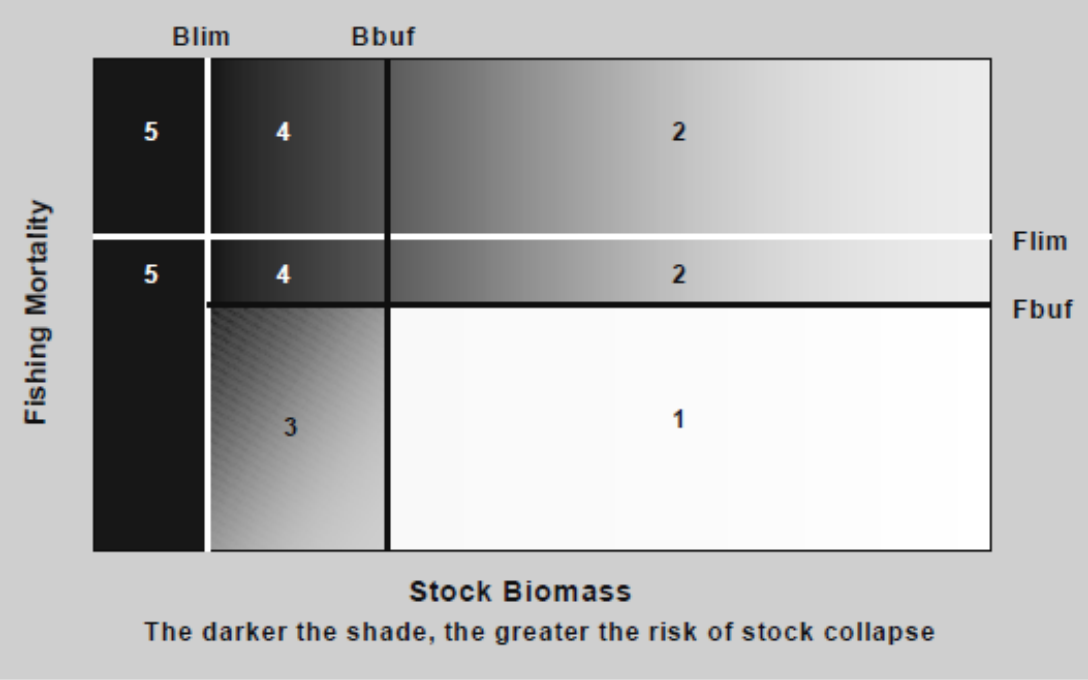
Overview



- Main issues of the original NAFO PA framework.
- NAFO Convention Objectives and NAFO PA workshop conclusions.
- Development and testing of new PA framework.
- The new PA framework structure.

‘Original’ NAFO PA framework- issues/ challenges

Original NAFO PA



Management Strategies and Courses of Action (Time horizons and acceptable risk levels specified by managers)	
Zone 1	**Safe Zone**: Select and set fishing mortality from a range of F values that have a low[1] probability of exceeding F_{lim} in a situation where stock biomass (B) has a very low[2] probability of being below B_{lim}. In this area, target reference points are selected and set by managers based on criteria of their choosing (e.g. stable TACs; socio-economic considerations).
Zone 2	**Overfishing Zone**: Reduce F to below F_{buf}.
Zone 3	**Cautionary F Zone:** The closer stock biomass (B) is to B_{lim}, the lower F should be below F_{buf} to ensure that there is a very low[2] probability that biomass will decline below B_{lim} within the foreseeable future[3].
Zone 4	**Danger Zone:** Reduce F to below F_{buf}. The closer stock biomass (B) is to B_{lim}, the lower F should be below F_{buf} to ensure that there is a very low[2] probability that biomass will decline below B_{lim} within the foreseeable future[3].
Zone 5	**Collapse Zone**: F should be set as close to zero as possible.

Issues/ challenges

- Management actions only based on avoiding limit reference points.
- Lack of clear targets in the framework.
- No clear MP/HCR to inform level of fishing.
- Low levels of risk (<10%) are difficult to measure

Amended NAFO Convention

Amended NAFO Convention - Objective

Article II – Objective

The objective of this Convention is to ensure the long term ***conservation*** *and* ***sustainable use of the fishery resources*** *in the Convention Area and, in so doing, to* ***safeguard the marine ecosystems*** *in which these resources are found.*

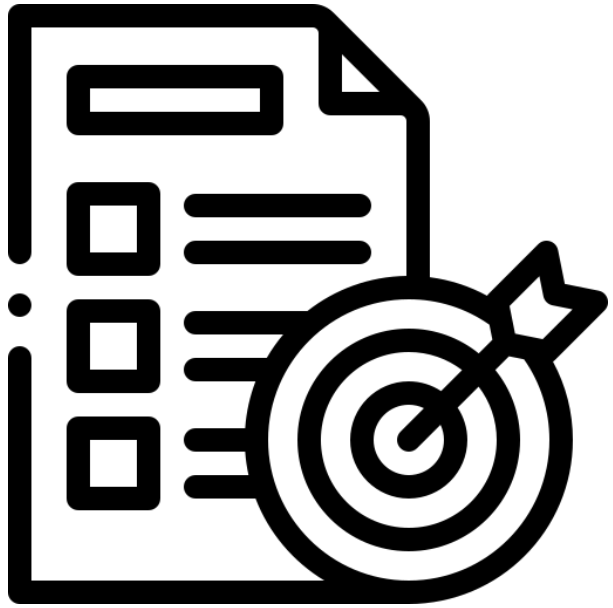
Article III – General Principles

(b) adopt measures based on the best scientific advice available **to ensure that fishery resources are maintained at or restored to levels capable of producing maximum sustainable yield**;

(c) **apply the precautionary approach** in accordance with Article 6 of the 1995 Agreement;

(f) **prevent or eliminate overfishing** and excess fishing capacity, and **ensure that levels of fishing effort do not exceed those commensurate with the sustainable use of the fishery resources**;

Applying the NAFO Convention – PA Framework



PA framework objectives

1. low risk of stock depletion (i.e., B<Blim);
2. rebuild stocks to BMSY;
3. maintain stocks above BMSY more often than not.
4. maintain average catches around MSY in the long-term.
5. Low risk of overfishing (fishing above Flim)

PA workshop conclusions

NAFO PA Workshop (August 2022).

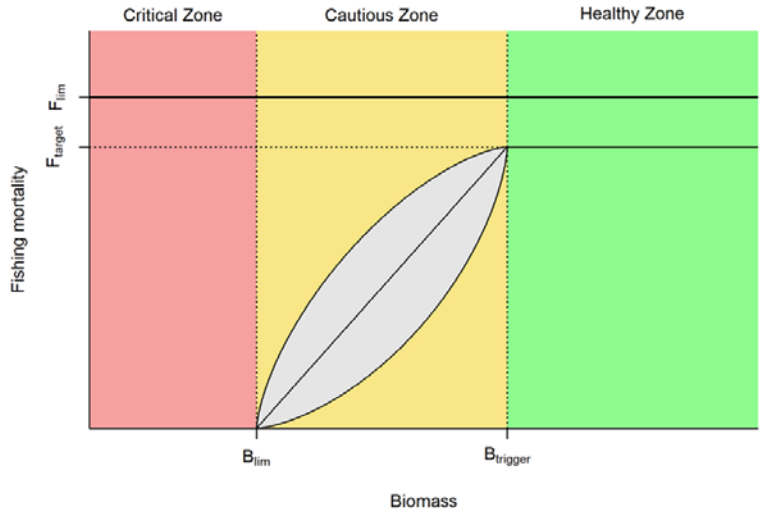
Workshop Conclusions summary:

- 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 (Blim and Flim) 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 Ftarget as well as the possible implementation of an intermediate biomass reference point or multiple biomass reference points that are between Blim and Bmsy**.
- 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**.

Development and testing of the revised PA framework

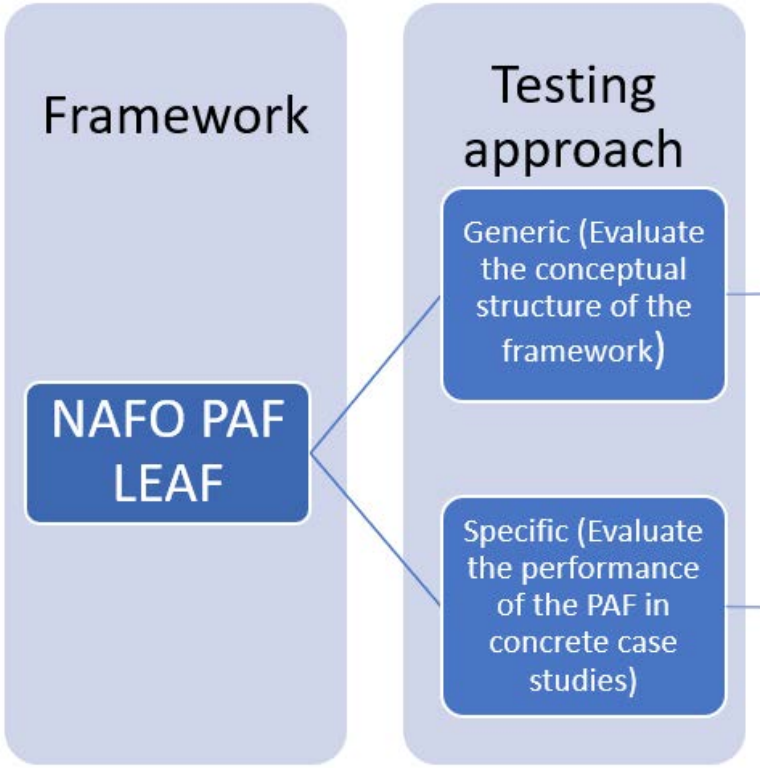
Development of the revised PA framework.

- A small set of revised PA Frameworks were developed based on the conclusions of the workshop.
- These framework options were applied in an illustrative way to selected NAFO stocks, and the SC advice produced under the different framework options was examined.
- Concept of "leaf" approach selected for testing and further development.

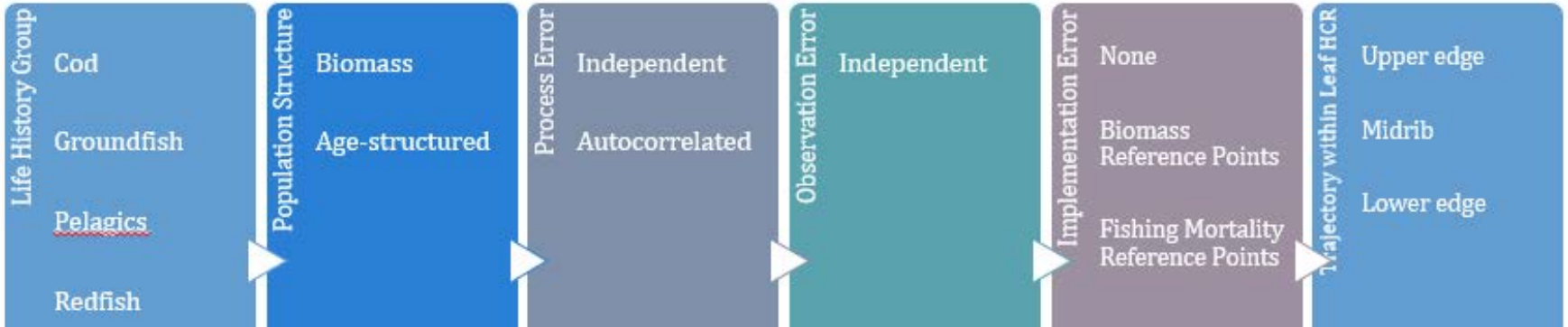


PAF testing approaches

- Conceptual ‘leaf’ framework endorsed (2023)
- SC evaluated the proposed Precautionary Approach Framework (PAF) by implementing two simulation exercises.



Management Objectives
Very low risk of stock depletion
Rebuild stocks to B_{MSY}
Maintain stocks above B_{MSY} more often than not
Maintain catches at approximately MSY in the long-term
Low risk of overfishing (fishing above F_{lim})
Good fishery performance (low interannual TAC variation, low yield loss while in the Cautious Zone)
Good stock recovery performance (good/rapid growth over time, good/short recovery times)



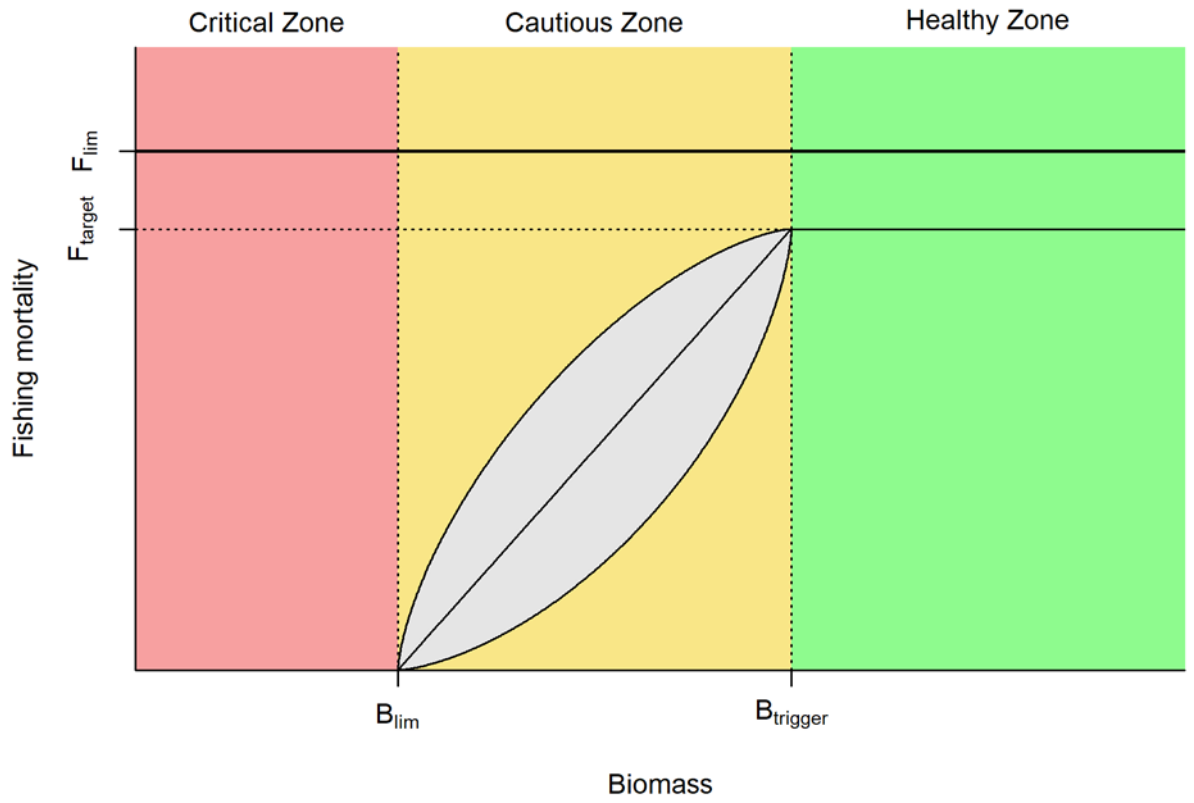
Testing Results

The proposed PAF reasonably meets most of the main objectives proposed:

- promoting stock biomass to stabilize at higher levels and away from Blim.
- was fairly effective in rebuilding stocks to the Healthy Zone.
- but it fell short in terms of maintaining stocks above Bmsy more often than not.

Revised PA Framework

Precautionary Approach Framework Basic structure



Framework	F limit (F_{lim})	F target (F_{target})	B trigger ($B_{trigger}$)	B limit (B_{lim})
Reference Point	Fmsy	$0.85*F_{msy}$	$0.75*B_{msy}$.	$0.3*B_{msy}$

Precautionary Approach Framework (PAF) Management actions

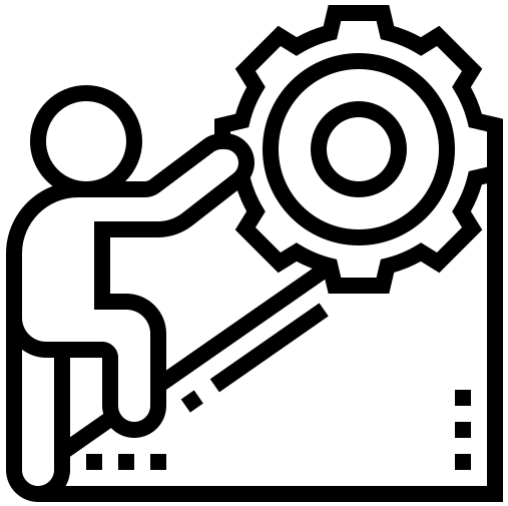
PA Zone	F levels	Objective
Healthy Zone ($B>B_{trigger}$)	A range of F at above and below F_{target}.	keeping the stock in the healthy zone
Cautious Zone ($B_{lim}<B<B_{trigger}$)	F should be within the leaf (potential harvest space).	avoid falling below Blim and promote stock growth.
Critical Zone ($B<B_{lim}$)	F should be as low as possible. Range of options and associated risk.	rebuild the stock out of the Critical Zone.

Framework provides flexibility to managers to set exploitation levels in the different biomass zones.

Precautionary Approach Framework (PAF) Provision of SC Advice

	Yield			$P(F>F_{lim})$			$P(B<B_{lim})$				$P(F>F_{target})$			$P(B<B_{trigger})$				$P(Bt+3 > Bt)$	(Bfuture-Bcurrent)/Bcurrent
F in y+1 and following years	Yield y (50%)	Yield y+1 (50%)	Yield y+2 (50%)	y	y+1	y+2	y	y+1	y+2	y+3	y	y+1	y+2	y	y+1	y+2	y+3		
Critical Zone																			
F=0	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
F=X% current*	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
F current	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Cautious Zone																			
F lower edge leaf	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
F midrib leaf	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
F upper edge leaf	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Healthy Zone																			
$F=0.75F_{msy}$	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
$F_{target}=0.85F_{msy}$	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
$F_{lim}=F_{msy}$	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%

Implementation / Next Steps



- Estimation of reference points for all stocks.
- Implementation of the new PAF in stocks evaluated only with surveys information.
- Implementation of the new PAF in stocks with very specific biological characteristics (redfish, small pelagics).
- The Commission and the SC, through WG-RBMS, will consider potential refinements of the Framework.

Thank you

Key NAFO PAF documents

- NAFO Precautionary Approach Framework. 2004. NAFO/FC Doc. 04/18.
- Convention on Cooperation in the Northwest Atlantic Fisheries. 2017 (ISBN 978-0-9959516-0-0).
- Achieving NAFO Convention Objectives with a Precautionary Approach Framework. Precautionary Approach Working Group (PA-WG). NAFO SCS Doc. 22/02.
- Report of the NAFO Joint Commission–Scientific Council Precautionary Approach Framework Workshop. 2022. NAFO/COM-SC Doc. 22-07.
- Report of the NAFO Joint Commission-Scientific Council Working Group on Risk-Based Management Strategies (WG-RBMS) Meeting. 2023. NAFO/COM-SC Doc. 23-03.
- Report of the NAFO Precautionary Approach Working Group (PA-WG). 2024. NAFO SCS Doc. 24/05 .
- Report of the NAFO Joint Commission-Scientific Council Working Group on Risk-Based Management Strategies (WG-RBMS) Meeting. 2024. NAFO/COM-SC Doc. 24-03.

Key NAFO specific MP documents

- NAFO (2003) An assessment of stock status of the Greenland halibut resource in NAFO subarea 2 and divisions 3KLMNO based on extended survivors analysis with short and medium-term projections of future stock development. Serial no. N4883. NAFO SCR doc. 03/64 (Revised).
- NAFO (2008) Management strategy evaluation for Greenland halibut (Reinhardtius hippoglossoides) in NAFO Subarea 2 and Divisions 3LKMNO. Serial. No. N5225. NAFO SCR Doc. 08/25.
- NAFO (2010) Report of the fisheries commission working group on Greenland halibut management strategy evaluation (WGMSE).
- NAFO (2017) Joint commission-scientific council working group on risk-based management strategies (WG-RBMS) meeting, 15-17 september. Serial no. N6768 NAFO/COM-SC doc. 17-11.
- NAFO (2024) Joint commission-scientific council working group on risk-based management strategies (WG-RBMS) meeting, 08–10 August. Serial no. N7571 NAFO/COM-SC doc. 24-03.
- NAFO (2014). Report of the Fisheries Commission and Scientific Council Joint Working Group on Risk-Based Management Strategies 5-7 February 2014. Serial No. 6282 NAFO FC/SC Doc. 14/02
- NAFO (2015). Report of the NAFO Joint Fisheries Commission-Scientific Council Working Group on Risk-Based Management Strategies (WG-RBMS) 22–24 April 2015. Serial No. N6470 NAFO FC/SC Doc. 15/02.
- NAFO (2018). NAFO Scientific Council Flemish Cap (NAFO Div. 3M) Cod Stock Benchmark Assessment Meeting. Serial No. N6841 NAFO SCS Doc. 18/18.
- NAFO (2019). Report of the NAFO Joint Commission-Scientific Council Working Group on Risk-Based Management Strategies (WG-RBMS) Meeting 21 September 2019. Serial No. N7001 NAFO COM-SC Doc. 19-05.

Key NAFO specific MP documents

- NAFO (2014). Report of the Fisheries Commission and Scientific Council Joint Working Group on Risk-Based Management Strategies 5-7 February 2014. Serial No. 6282 NAFO FC/SC Doc. 14/02
- NAFO (2021). Report of the NAFO Joint Commission-Scientific Council Working Group on Risk-Based Management Strategies (WG-RBMS) Meeting 24–26 August 2021. Serial No. N7210 NAFO/COM-SC Doc. 21-04.
- NAFO (2022). Report of the NAFO Joint Commission-Scientific Council Working Group on Risk-Based Management Strategies (WG-RBMS) Meeting 17–18 August. Serial No. 7336 NAFO/COM-SC Doc. 22-03.