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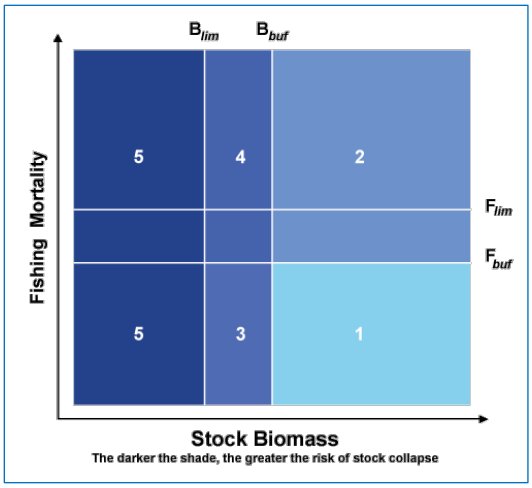
Risk Based Management Strategies (RBMS)



International agreements such as the United Nations Fish Stocks Agreement (UNFSA) and the FAO Code of Conduct for Responsible Fisheries call for the rebuilding of depleted stocks through application of the precautionary approach.

Several stocks under NAFO's purview have been under long term moratoria and NAFO would like to see continued recovering and growth of these stocks to ensure their long term sustainability and to promote associated economic opportunities

Many Contracting Parties have domestic legislation or policies which require the identification of limit reference points and recovery targets and in 2007 NAFO had adopted a Conservation Plan and Rebuilding Strategy for 3NO Cod that identified a limit reference point of 60,000t (FC Doc. 07/8).

In 2010 a Working Group of fishery Managers and Scientists on Conservation Plans and Rebuilding Strategies (WGFMS-CPRS) was established (FC Doc. 10/11). The objective of the WG was to review the interim 3LNO American plaice (FC Doc. 11/21) and the existing 3NO Cod (FC Doc. 07/8) Conservation Plans and Rebuilding Strategies. Specific plans for each stock are laid out in the NAFO Conservation and Enforcement Measures.

In 2012 it was agreed that CPRS for these stock would continue to be developed, as well as the efforts be made for other stocks including 3NO Witch flounder and initial development for 3LN Redfish, 3M Cod and 3L Northern shrimp.

During 2013 Terms of Reference for a Joint Fisheries Commission-Scientific Council Working Group on Risk-based Management Strategies were developed (FC Doc. 13-18). This group would also incorporate work for the GHL Management Strategy Evaluation. The group will consider enhancing the application of risk-based assessment approaches when evaluating management strategies as well as broader use of the Precautionary Approach framework.

In responding to requests for advice and recommendations from the Commission, considering the associated advice of Scientific Council, the Working Group shall:

Review, update and further develop a general framework including management objectives and performance statistics for the elaboration of management strategies, conservation plans and rebuilding strategies for all NAFO managed stocks.

Evaluate, and as appropriate update and develop new ones where none exist, all management strategies, conservation plans and rebuilding strategies implemented in NAFO with respect to the Precautionary Approach framework, management objectives and performance statistics.

Develop alternative strategies for stocks that may not be suited to formulaic rules and/or for stocks where reference points do not exist or cannot be developed.

Consider all matters related to use of the NAFO Precautionary Approach framework.

Consider risk management approaches in the review, update and future development of Conservation Plans and Rebuilding Strategies.

As of 18 May, 2017 the Fisheries Commission amalgamated with the General Council and became the Commission due to the entry into force of the Amended Convention.

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.

[1] - Low probability (~ 20%), but actual level to be specified by managers
[2] - Very low probability (~ 5-10%), but actual level to be specified by managers
[3] - Foreseeable future (5-10 years), but actual time horizon to be specified by managers

NAFO PAF reference points for Fishing Mortality (*F*) and Stock Biomass (*B*) (from FC Doc. 04/18, NAFO, 2004)).

Reference Point	Description
F_{lim}	Fishing mortality rate with low probability[1] of being exceeded. F_{lim} cannot be greater than F_{msy}. If F_{msy} cannot be estimated, then an appropriate surrogate may be used instead.
F_{buf}	Fishing mortality rate below F_{lim} required in absence of analyses of the probability that current, or projected, F exceeds F_{lim}. In absence of such analyses, F_{buf} specified by managers and should satisfy requirement for a low probability[1] that any F estimated to be below F_{buf} will actually be above F_{lim}. The more uncertain the stock assessment, the greater the buffer zone should be. In all cases, a buffer is required to signify the need for more restrictive measures.
When B is above B_{buf} and F is above F_{buf}, a flexible fishing mortality rate should be selected by managers to achieve desired management objectives, subject only to the constraints defined by the limit and buffer reference points. In particular, a target F should be chosen to ensure that there is a low probability[1] that F exceeds F_{lim}, and a very low probability[2] that B will decline below B_{lim} in foreseeable future[3].	
B_{lim}	B below which stock productivity is likely to be seriously impaired. Should have very low probability[2] of being violated.
B_{buf}	B above B_{lim} required in absence of analyses of probability that current, or projected, B is below B_{lim}. In the absence of such analyses, B_{buf} to be specified by managers and should satisfy requirement that there is a very low probability[2] that any B estimated to be above B_{buf} will actually be below B_{lim}. The more uncertain the stock assessment, the greater the buffer zone should be. In all cases, a buffer is required to signify the need for more restrictive measures.

1 - Low probability (~ 20%), but actual level to be specified by managers
2 - Very low probability (~ 5-10%), but actual level to be specified by managers
3 - Foreseeable future (5-10 years), but actual time horizon to be specified by managers