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Catch levels for the scoping of the ecosystem sustainability of catches in 2024-2025

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Abstract

The Roadmap is the framework that NAFO is implementing to deliver an ecosystem approach for the management of NAFO fisheries and ecosystems. One element of the Roadmap is the evaluation of the ecosystem sustainability of catches. This involves the comparison of total catches by functional guild at the ecosystem level, with a corresponding Ecosystem Reference Point. The reference point has been defined as twice the Total Catch Index (2TCI), above which total catches are associated with a high risk of ecosystem overfishing. In order to use this type of analysis to inform incoming management decisions on harvesting levels, it is necessary to evaluate how the total future catches would compare with 2TCI, if the scientific advice provided were to be followed. This scoping exercise requires approximating what the incoming catches would be expected to be under already approved quotas for the current year (i.e. ongoing fishing at the time of analysis), and under the maximum catches that are consistent with approved quotas for the following year (i.e. fisheries with multi-year advice) or the scientific advice being provided for decisions on the following year fisheries. This analysis summarizes the procedure used and the results obtained for approximating the 2024 and 2025 catches in the Grand Bank (3LNO) and Flemish Cap (3M) Ecosystem Production Units (EPUs) based on recent catches, already approved fishing quotas by NAFO and coastal states, and the NAFO Scientific Council (SC) advice provided in 2024.

Introduction

The Roadmap is the framework that NAFO is implementing to deliver an ecosystem approach for the management of NAFO fisheries and ecosystems (Koen-Alonso et al., 2019). Within the Roadmap, sustainability of fisheries catches is achieved through a nested series of assessment aimed at evaluating sustainability at different levels of ecological organization. Within these assessments, Tier 1 is focused at sustainability at the ecosystem level, Tier 2 is focused on sustainability at the multispecies level (e.g. species interactions), and Tier 3 is focused on sustainability at the stock level (i.e. traditional stock-assessment) (Koen-Alonso et al., 2019).

The current implementation of Tier 1 includes two distinct elements, a) the evaluation of the sustainability of total catches by functional guild at the Ecosystem Production Unit (EPU) spatial scale, and b) the production of Ecosystem Summary Sheets (ESSs) to provide a synoptic view on the ecological state of EPU and the general performance of the management measures within the ecosystem unit (NAFO, 2022b; NAFO, 2023).

The evaluation of the ecological sustainability of total catches relies on comparing the total catch by functional guild with the corresponding Ecosystem Reference Point adopted by NAFO and defined as twice the estimated

Total Catch Index (2TCI) (Koen-Alonso et al., 2022; NAFO, 2022a; NAFO, 2022b). Total catches above this Ecosystem Reference Point correspond to a high risk of Ecosystem Overfishing (Koen-Alonso et al., 2022; NAFO, 2022b).

While the examination of total catches against 2TCI is useful to examine if high risk of Ecosystem Overfishing has occurred, the analysis is constrained by the last year with full catch data available. The utility of this type of analysis for NAFO management decisions would be much higher if a forward looking version of this analysis associated with the incoming NAFO Scientific Council (SC) stock advice could be produced.

While formally predicting future catches and Catch/TCI Ratios is neither straightforward nor trivial, it is possible to provide a simple scoping of these catches based on standing TAC decisions, levels and distribution of catch in the most recent years, and assuming that incoming management decisions will follow the SC stock advice. This scoping would constitute a simple approximation to the order of magnitude of the current and near future catches, and can be used to provide reasonable values for the expected catch levels against the 2TCI Ecosystem Reference Point.

The objective of this document is to summarize the process used to develop the approximation of catches to be used by SC for the scoping of the ecosystem sustainability of catches in 2024-2025 for the Grand Bank (3LNO) and Flemish Cap (3M) EPUs.

Material and Methods

The approximation of catches followed the general protocol developed by WGESA for producing this scoping of catches (Table 1) (NAFO, 2023).

Table 1. Schematic considerations for the compilation of catch information and their use for a scoping exercise done in year t for catch levels expected in year t (current year) and t+1 (year to come).

1. Stocks assessed by SC:
    a. Catch: current TAC (or recent maximum catch if deemed appropriate) for year t, and maximum catch advice recommended by SC for year t+1, noting that this catch advice needs to be done solely considering the stock assessment and without influence by TCI information.
    b. Stock area: if the stock area expands beyond the EPU, the catch should be allocated to the EPU based on the fraction of the total catch for the stock that was taken in the EPU in the year t-1 (the latest full year for which information is available).
2. Stocks without assessment or catch advice:
    a. Catch: Level observed in the EPU in year t-1 (the latest full year for which information is available).
    b. Stock area: not applicable.
3. Stocks assessed by Coastal State:
    a. Catch: Current quota decision (or recent maximum catch if deemed appropriate) for year t, and maximum catch advice from the relevant authority for year t+1. If only the quota decision for year t is available, the quota decision should be assumed for year t+1. If the quota decision for year t and the catch advice for year t+1 are not available at the time of the scoping exercise, the level of catch observed in the EPU in year t-1 should be used instead.
    b. Stock area: if the stock area expands beyond the EPU, the catch should be allocated to the EPU based on the fraction of the total catch for the stock that was taken in the EPU in the year t-1 (the latest full year for which information is available). If the quota decision for year t and catch advice for year t+1 are not available at the time of the scoping exercise, the use of level of catch observed in the EPU in year t-1 makes stock area scaling unnecessary.

Information of catches and NAFO quotas was obtained from the NAFO Secretariat and includes a compilation and curation of the best available information at the time of analysis, including catch estimates produced by

the NAFO Joint Commission-Scientific Council Catch Estimation Strategy Advisory Group (CESAG). Data on quotas for Canadian-managed stocks was obtained from publicly available information in the Fisheries and Oceans Canada website (https://www.dfo-mpo.gc.ca/fisheries-peches/decisions/fm-2024-gp/index-atl-eng.html and links within).

Results

The results from the approximation of the 2024 and 2025 catches for the scoping exercise on the ecological sustainability of catches is provided in Table 2.

Table 2. Catch for 2023, fishing quotas information for 2023-2025, and approximated catches for 2024 and 2025 for the scoping of the ecosystem sustainability of catches in the Grand Bank (3LNO) and Flemish Cap (3M) Ecosystem Production Units. All catches are in t. NDF indicates "No Directed Fishing". Some managed stocks may be grouped in "Others" if there catches in the 2020-2023 period are

	Catch	**Approximated Catch**		**Total Allowable Catch (TAC) or Quota**			
	2023	**2024**	**2025**	**2023**	**2024**	**2025**	**Notes**
Grand Bank (3LNO) EPU							
American plaice	566	566	566	NDF	NDF	NDF	The catch in 2023 was used to scope catches in 2024-2025
Atlantic halibut	1475	1475	1475				The catch in 2023 was used to scope catches in 2024-2025
Atlantic herring	6873	9485	9485	9485	9485		DFO TACs for 2023-2024 for Herring management stocks in 3LNO: Bonavista Bay/Trinity Bay (6290t), Conception Bay/Southern Shore (945t), St. Mary's Bay/Placentia Bay (2250t). The TAC for 2024 was assumed for 2025
Capelin	6209	6209	6209	14533	14533		DFO 2J3KL TAC for 2023 and 2024, 2025 assumed equal to 2023-2024. CSAG report indicates that catch comes from 3L. Catch in 3L=6209t assumed equal for 2024-2025
Cod	5317	5399	5399	12999			DFO 2J3KL Catch Quota for 2023 12999t), with 2023 catch in 3NO=329 t (by-catch). 3NO Cod stock is under moratorium (NDF). Fraction in 3L of the 2023 2J3KL quota (0.39) plus 2023 3NO catch used to scope 2024-2025.
Greenland halibut	7501	7501	7323	11227	11228	10960	The fraction of the 2023 TAC caught in 3LNO in 2023 (0.67) was used to allocate the catch based on the 2024 TAC. The NAFO TAC is defined as 0.741 of the TAC estimated by SC due to quota allocation practices.

							The approximated 2025 catch was based on this consideration and used the TAC estimated by SC with the candidate Management Procedure (MP) from the new Management Strategy Evaluation (MSE) for this stock which is expected to be in place for the 2025 fishing year.
Haddock	41	41	41				The catch in 2023 was used to scope catches in 2024-2025
Lobster	198	198	198				The catch in 2023 was used to scope catches in 2024-2025
Mackerel	0	0	0				The catch in 2023 was used to scope catches in 2024-2025
Other	5647	5647	5647				The catch in 2023 was used to scope catches in 2024-2025
Redfish	11998	21821	3721	38100	38100	20000 (3O) and NDF (3LN)	The TACs for 2023 were 3LN =18100t and 3O=20000t. Catches in 3O have been well below the TAC, with CSAG catch estimate being 3721t in 2023. The scoping for 2024 was done using the TAC for 3LN and the 2023 catch level for 3O, while the 2025 scoping was done assuming the 2023 catch in 3O and the 2024 SC advice of NDF.
Sandlance	0	0	0				The catch in 2023 was used to scope catches in 2024-2025
Scallop	7	7	7				The catch in 2023 was used to scope catches in 2024-2025
Silver hake	5323	5323	5323				The catch in 2023 was used to scope catches in 2024-2025
Snow crab	31750	36403	36403	32224	36403		DFO 3LNO TAC for 2024 (36403t) was used for scoping catch in 2025.
Shrimp	0	0	0	NDF			The 3LNO shrimp stock is under moratorium (NDF). The catch in 2023 was used to scope catches in 2024-2025
Squid	2	2	2	34000	34000		TAC for Areas 3+4. Catches have been far below the TAC. The catch in 2023 was used to scope catches in 2024-2025
Surf clam	15441	14756	14756	14756	14756		DFO 3LNO TAC for 2024 (14756t) was used for scoping catch in 2025.
Thorny skate	1940	4500	3460	4500	4500		The 4500t catch decision point from Footnote 12 in NAFO Quota Table for 2024 was used to scope catches for 2024, and the 2024 SC advice of no increase

							from the 2019-2023 average catches (3460t) was used for scoping the 2025 catches.
White hake	499	1000	1000	1000	1000		The 2024 TAC was used to scope the 2025 catch.
Witch flounder	290	1367	1395	1295	1367		The 2025 catches was scoped assumed F=75%Fmsy from the 2024 SC advice.
Wolffish	6	6	6				The catch in 2023 was used to scope catches in 2024-2025
Yellowtail flounder	3192	15560	15810	20000	15560	15810	The 2024 and 2025 TACs were used for scoping catches.
Flemish Cap (3M) EPU							
American plaice	104	128	128				The catch in 2023 was used to scope catches in 2024-2025
Atlantic halibut	146	146	146				The catch in 2023 was used to scope catches in 2024-2025
Atlantic herring	12	12	12				The catch in 2023 was used to scope catches in 2024-2025
Cod	6029	11708	10913	6100	11708	10913	The 2025 catch was scoped based on the 2024 SC advice with F=0.56Fmsy.
Greenland halibut	2236	2236	2946	11227	11228	10960	The fraction of the 2023 TAC caught in 3M in 2023 was used to allocate the catch based on the 2024 TAC. The NAFO TAC is defined as 0.741 of the TAC estimated by SC due to quota allocation practices. The approximated 2025 catch was based on this consideration and used the TAC estimated by SC with the candidate Management Procedure (MP) from the new Management Strategy Evaluation (MSE) for this stock which is expected to be in place for the 2025 fishing year.
Haddock	0	0	0				The catch in 2023 was used to scope catches in 2024-2025
Mackerel	0	0	0				The catch in 2023 was used to scope catches in 2024-2025
Other	133	259	259				The catch in 2023 was used to scope catches in 2024-2025
Redfish	9735	17503	17503	11171	17503	17503	The 2025 catch was scoped based on the 2024 SC advice with $F=F_{TAC}$
Shrimp	0	0	0	NDF			The 3M shrimp stock is under moratorium (NDF). The catch in 2023 was used to scope catches in 2024-2025

Silver hake	0	0	0				The catch in 2023 was used to scope catches in 2024-2025
Snow crab	0	2	2				The catch in 2023 was used to scope catches in 2024-2025
Thorny skate	38	54	54				The catch in 2023 was used to scope catches in 2024-2025
White hake	0	14	14				The catch in 2023 was used to scope catches in 2024-2025
Witch flounder	42	110	110				The catch in 2023 was used to scope catches in 2024-2025
Wolffish	50	50	50				The catch in 2023 was used to scope catches in 2024-2025
Yellowtail flounder	0	0	0				The catch in 2023 was used to scope catches in 2024-2025

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