

**SUBMISSION TO THE**  
**NUNAVUT WILDLIFE MANAGEMENT BOARD**  
**FOR**

**Information:**

**Decision:**

**Recommendation: X**

**Issue: Total allowable catch levels for Greenland Halibut in Subarea 0 for the 2025 and 2026 fishing seasons.**



**Figure 1.** Greenland Halibut (*Reinhardtius hippoglossoides*).

**Background**

A fishery for Greenland Halibut (GHL) exists outside of the Nunavut Settlement Area (NSA) in Northwest Atlantic Fishery Organization (NAFO) Subarea (SA) 0, which is divided into a northern region, Division 0A (Baffin Bay) and a southern region, Division 0B (Davis Strait). The commercial fishing season for GHL starts on January 1<sup>st</sup> and ends December 31<sup>st</sup>. A map illustrating NAFO Subareas and Divisions relevant to the GHL fishery can be found in Appendix 1.

The GHL stock in SA 0 is part of a transboundary stock shared between Canada (Divisions 0A and 0B) and Greenland (Divisions 1A to F offshore). At the request of both countries, the NAFO Scientific Council (SC) provides advice on stock status and sustainable harvest levels. NAFO does not regulate this stock; Canada and Greenland are responsible for regulation in their own domestic waters. Canada and Greenland have a longstanding informal agreement that the Total Allowable Catch (TAC) levels established on NAFO SC advice be divided 50/50 between the two countries.

For the 2024 fishing season, the SA 0 GHL TAC was set at 16,502.5 tonnes (t). A breakdown of the current TAC between NAFO Divisions is shown in Table 1.

**Table 1.** Breakdown of the current Total Allowable Catch (TAC) in tonnes (t) between NAFO Divisions.

<b>Fishing Area</b>	<b>Fleet/Interest</b>	<b>2024 Allocation (t)</b>
NAFO Division 0A	Nunavut Special Allocation	8,604.99
	Inshore fisheries development	100.00
	<b>Total 0A Quota</b>	<b>8,704.99</b>
NAFO Division 0B	Nunavut Special Allocation	3,840.59
	Nunavik Special Allocation	402.82
	Enterprise & Special Allocation Holders	2,654.09
	Fixed Gear Competitive	900.00
	<b>Total 0B Quota</b>	<b>7,797.50</b>

In 2023, the SA 0 TAC was fully harvested.

The Division 0A GHL fishery is a commercial fishery entirely designated to Nunavut (NU) interests. In 2006 and in accordance with the decision making process set out in the Nunavut Agreement (NA), the Nunavut Wildlife Management Board (the Board) motioned to allocate 100 t of the Division 0A offshore quota for inshore fisheries development within the NSA; the motion was supported by the Minister of Fisheries and Oceans Canada (the Minister) and was allocated for the 2006 fishing season. Since the initial decision, the 100 t inshore quota has consistently been maintained and deducted from the Division 0A offshore quota. In the Board's 14 September 2023 letter to DFO Minister LeBouthillier, the Board noted the importance of surveying and assessing the utilization of the 100 t Division 0A inshore allocation. DFO has initiated conversations with Board staff on this topic and is committed to working together to optimize inshore fisheries development opportunities.

### **Science Information**

In February 2024, Canada and Denmark (on behalf of Greenland) requested that the Scientific Council (SC) provide an overall assessment of GHL stock status and trends in the total stock area throughout their range and to specifically advise on TAC levels for 2025 and 2026. Further, it was requested that the stock status should be evaluated in the context of management requirements for long-term sustainability and the advice provided should be consistent with NAFO's Precautionary Approach (PA) Framework.

For the first time, a population model (Stochastic Production in Continuous Time, SPiCT model) was accepted by NAFO SC for the SA 0+1 (offshore) GHL stock and used to assess the status of this stock during the June 2024 NAFO SC meeting. Inputs to this model included landings data and a standardized index of exploitable stock biomass from annual survey data.

Stock assessment surveys were not conducted in 2018, 2020 or 2021 because the survey vessel was decommissioned in winter 2018 and the replacement vessel was completed in spring 2022. A survey was completed in 2019 using a commercial vessel, but it was not considered comparable to previous surveys. The lack of calibration between the previous survey vessel (*RV Paamiut*) and new survey vessel (*RV Tarajoq*) means that data from the two vessels cannot be used together to explore long-term trends in stock dynamics, which has created uncertainty about stock status. Science continues to explore a model-based approach to combine the two survey time series.

Based on model results, NAFO SC provided risk-based harvest level scenarios for SA 0+1 (offshore) GHL for 2025 and 2026 in the assessment report found in Appendix 2. Harvest level scenarios describe future projections of the standing stock biomass (B) under different fishing mortality levels (fishing pressure, F). These harvest level scenarios are used by DFO Fisheries Management to develop options to provide TAC advice and recommendations to the Minister.

NAFO SC advice for catch levels for 2025 and 2026 is as follows:

#### ***[NAFO SC] Recommendation for 2025 and 2026:***

*In the projection period the probability of being below  $B_{lim}$  is very low (<1 %), and the probability of exceeding  $F_{lim}$  is projected to be below 30 % for any catch less than 90 % of current TAC.*

*Scientific Council therefore recommends that catch should not exceed 90 % of current TAC.*

The TAC recommendation as developed by NAFO SC was based on the NAFO PA Framework. The risk that the probability of  $F$  exceeding  $F_{lim}$  (i.e. the probability that the fishery is overfishing the stock) is less than 30 %. In the NAFO PA Framework, a very low probability is operationally defined as 10 %, and a low probability as 30 % (Appendix 3). Keeping the performance statistic  $P < 30$  % helps prevent a healthy stock from entering a bad stock state in the future.

### **Consultation**

The Eastern Arctic Groundfish Stakeholder Advisory Committee (EAGSAC) was created as one of a series of measures to ensure the fisheries governance regime for groundfish in the NAFO SA 0 is publicly accountable, predictable and transparent. It provides a forum for discussion and an opportunity for members to provide advice and recommendations to DFO on the management and policies related to SA0 Greenland halibut. EAGSAC membership includes Co-management Organizations, Rights Holders, Commercial Fishery Associations, Commercial Fishers, Environmental Organizations and Other Government Organizations.

An EAGSAC meeting was held on August 14, 2024, for members to share their views on the published NAFO SC science advice pertaining to SA 0 GH L TAC levels for the 2025 and 2026 fishing seasons. A meeting summary, including members' views can be found in Appendix 4. Members were also invited to provide their views to the Department in writing.

The majority of EAGSAC members are supportive of the TAC remaining at the 2024 level of 16,502.5 t, with some seeking a return to the 2022 TAC level of 18,185 t. The majority of members have also recommended that TAC be set only for one year (2025) to provide an opportunity for science advice to be updated by the NAFO SC and better inform a 2026 TAC decision. It should be noted that while an update to NAFO SC advice may be requested, NAFO SC may not have capacity to conduct a full assessment during the June 2025 stock assessment meeting.

### **Recommendation**

TAC decisions consider many factors including: conservation; science advice; economic impacts; co-management and stakeholder views; land claim obligations and international considerations.

Potential options when the science is advising a decrease in harvest levels:

- Implement a TAC in line with science advice, which recommends that catch should not exceed 90% of the global harvest level for SA0 + 1 (offshore) of 33,305 t. This results in a global harvest level of 29,970 t, and a TAC of 14,985 t for Canada.
- Maintain the previous year's TAC (i.e. 16,502.5 t).
- Implement a TAC reduction other than that advised by NAFO SC.

As per Article 15, Part 3.4 of the *Nunavut Agreement*, DFO is seeking the advice of the NWMB for management decisions with respect to:

1. The TAC for Greenland Halibut in SA0 (offshore);
2. TAC distribution between OA and OB; and
3. The allocation of quota between fleets, including the inshore quota for fisheries development.

**Prepared by:** Alexis Burt, FM Biologist, Jeff Adam, Senior Regional FM Officer, and Kevin Hedges, Research Scientist, Arctic Region, Fisheries and Oceans Canada.

**Date:** August 28, 2024

### **Appendices**

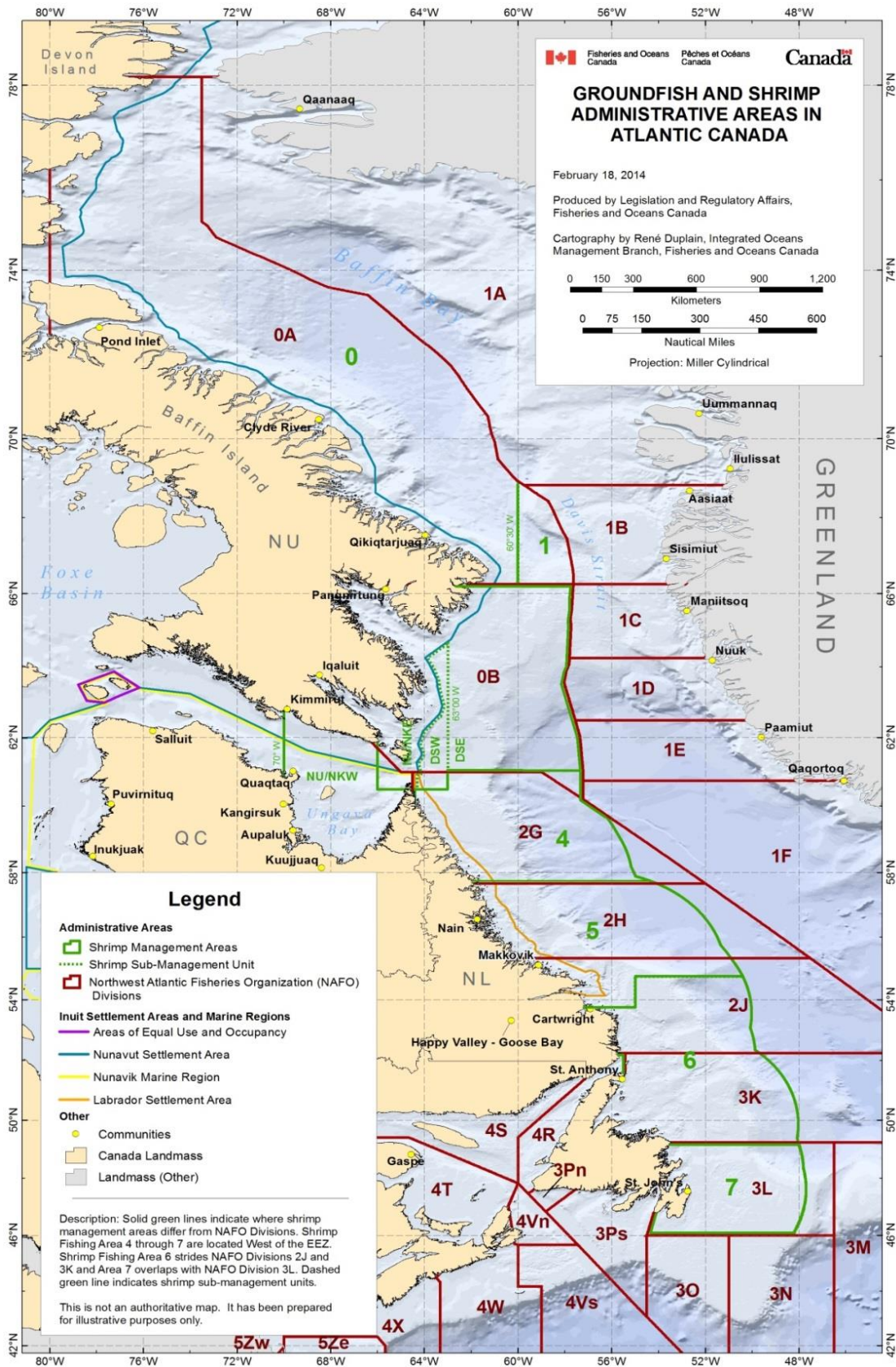
**Appendix 1** – Map of groundfish and shrimp administrative areas in Atlantic Canada

**Appendix 2** – NAFO SC summary sheet

**Appendix 3** – NAFO SC PA Framework Testing scs24-13

**Appendix 4** – Meeting summary of EAGSAC member views on 2025 and 2026 Greenland Halibut TAC

Appendix 1



**Greenland halibut in Subareas 0+1 (offshore)**

Advice June 2024 for 2025-2026











**Recommendation for 2025 and 2026**

In the projection period the probability of being below  $B_{lim}$  is very low (<1%), and the probability of exceeding  $F_{lim}$  is projected to be below 30% for any catch less than 90% of current TAC.

Scientific Council therefore recommends that catch should not exceed 90% of current TAC.

**Management objectives**

Canada and Denmark (on behalf of Greenland) requested that the Scientific Council provide an overall assessment of status and trends in the total stock area throughout its range. Stock status should be evaluated in the context of management requirements for long-term sustainability and the advice provided should be consistent with NAFO's Precautionary Approach Framework.

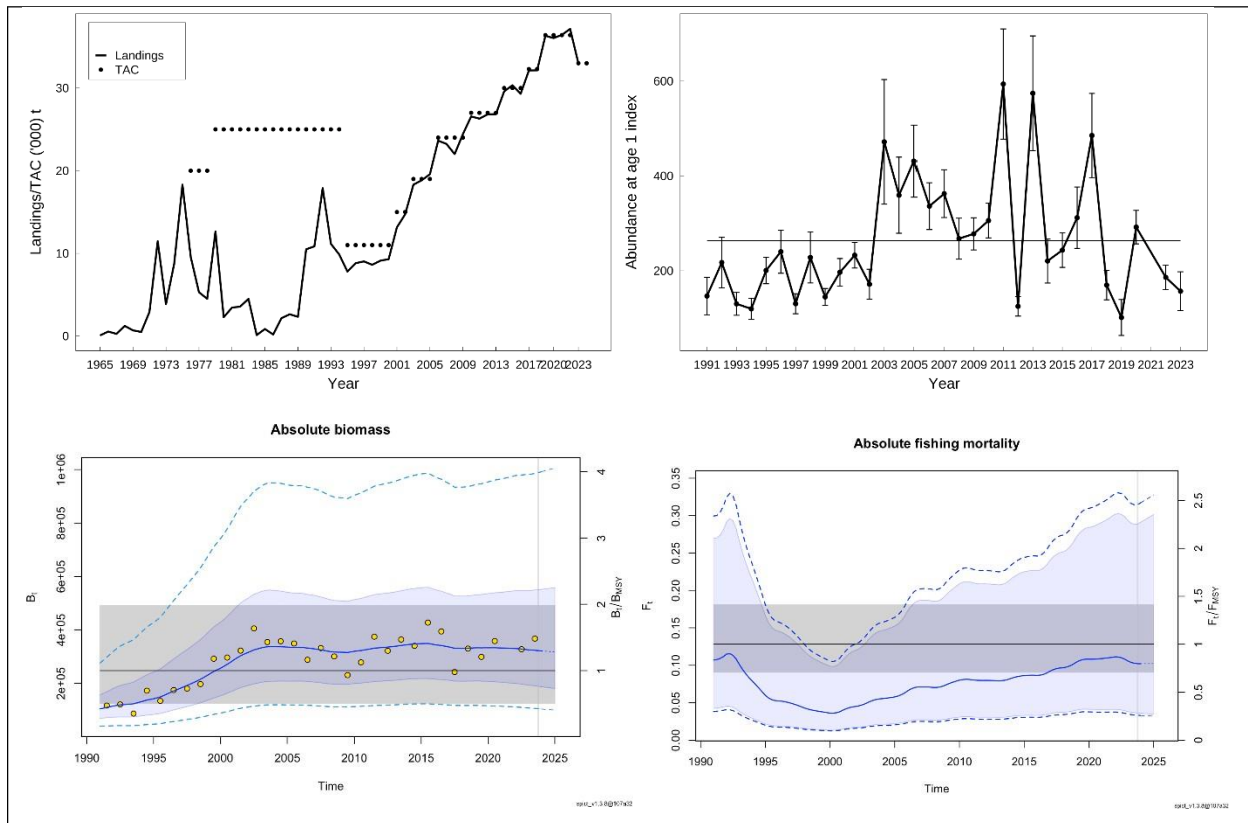
Convention Principle	Status	Comment	
Restore to or maintain at $B_{msy}$		$B > B_{msy}$	 OK
Eliminate Overfishing (Stock)		$F < F_{lim}$	 Intermediate
Eliminate Overfishing (Ecosystem)		TCI undefined	 Not accomplished
Apply Precautionary Approach		$B_{lim}$ and $F_{lim}$ defined	 Unknown
Minimize harmful impacts on living marine resources and ecosystems		Directed fishery, VME closures in effect, Effectiveness of bycatch regulations uncertain	
Preserve marine biodiversity		Cannot be evaluated	

**Management unit**

The Greenland halibut stock in Subareas 0+1 (offshore) is part of a larger population complex distributed throughout the Northwest Atlantic.

**Stock status**

Median biomass is above  $B_{msy}$  ( $B/B_{msy} = 1.3$ ) and the probability of being below  $B_{lim}$  is less than 1%. Fishing mortality is below  $F_{msy}$  ( $F/F_{msy} = 0.78$ ) and the probability of being above  $F_{lim}$  is 34%.



## Reference points

$B_{lim}$  is 30%  $B_{msy}$  and  $F_{lim}$  is  $F_{msy}$  (SCS 04/12).

## Projections

Medium-term projections were carried forward to the year 2026 for catch scenarios with catch = TAC = 33 305t for 2024. Constant removals were applied from 2025-2026 at several levels of  $F$  ( $F=0$ ,  $F_{status\ quo}$ , 75%  $F_{msy}$ , 85%  $F_{msy}$  and  $F_{msy}$ ) or catch (TAC and 90% TAC). At the end of the projection period, the risk of biomass being below  $B_{lim}$  was less than 1% in all cases.

For the  $F_{status\ quo}$  projections, the probability that  $F > F_{lim} = F_{msy}$  in 2025-2026 was 34%, and with  $2/3 F_{msy}$  the probability was 23%. At 75%  $F_{msy}$ , the probability that  $F > F_{lim}$  was 30%. Projected at the level of 85%  $F_{lim}$ , the probability that  $F > F_{lim}$  was 39% and for  $F_{msy}$  projections, this probability increased to 50%. For biomass projections, in all scenarios for 2025-2026 the probability of biomass being below  $B_{lim}$  was less than 1%. The probability that biomass in 2026 is less than biomass in 2024 is between 19 and 70% for all projections.

Projections with Catch 2024 = 33305 t		
Year	Yield ('000t)	Projected relative Biomass (B/Bmsy) median (80%CL)
F =0		
2024	33.3	1.3 (0.91-1.84)
2025	0	1.28 (0.89 - 1.85)
2026	0	1.4 (1.02-1.92)
Fstatusquo = 0.102		
2024	33.3	1.3 (0.91-1.84)
2025	32.33	1.28 (0.89-1.85)
2026	32.04	1.27 (0.87-1.86)
2/3Fmsy= 0.085		
2024	33.3	1.3 (0.91-1.84)
2025	27.23	1.28 (0.89- 1.85)
2026	27.39	1.28(0.91-1.88)
75%Fmsy = 0.096		
2024	33.3	1.3 (0.9-1.85)
2025	30.51	1.28 (0.89- 1.86)
2026	30.4	1.26 (0.89-1.87)
85%Fmsy = 0.109		
2024	33.3	1.3 (0.91-1.84)
2025	34.42	1.27 (0.89-1.85)
2026	33.91	1.26 (0.86-1.85)
Fmsy = 0.128		
2024	33.3	1.3 (0.91-1.84)
2025	40.21	1.28 (0.89-1.85)
2026	38.92	1.24 (0.83-1.84)
TAC = 33 305		
2024	33.3	1.3 (0.91-1.84)
2025	33.3	1.28 (0.89-1.85)
2026	33.3	1.27 (0.86-1.85)
90% TAC = 29 975		
2024	33.3	1.3 (0.91-1.84)
2025	29.97	1.28 (0.89-1.85)
2026	29.97	1.28 (0.88-1.86)

Catch2024= 333	yield ('000t)		P (F> Flim)			P(B<Blim)			P(B>Bmsy)			P(B2026 < B2024)
	2025	2026	2024	2025	2026	2024	2025	2026	2024	2025	2026	
F=0	0	0	34%	<1%	<1%	<1%	<1%	<1%	83%	81%	91%	19%
F statusquo	32.33	32.04	34%	34%	34%	<1%	<1%	<1%	83%	81%	79%	60%
2/3 Fmsy	27.23	27.39	34%	23%	23%	<1%	<1%	<1%	83%	81%	81%	53%
75 % Fmsy	30.51	30.4	34%	30%	30%	<1%	<1%	<1%	83%	81%	80%	58%
85% Fmsy	34.42	33.91	34%	38%	39%	<1%	<1%	<1%	83%	81%	78%	63%
Fmsy	40.21	38.92	34%	50%	50%	<1%	<1%	<1%	83%	81%	76%	70%
TAC	33.3	33.3	34%	36%	37%	<1%	<1%	<1%	83%	81%	79%	62%
90%TAC	29.97	29.97	34%	29%	29%	<1%	<1%	<1%	83%	81%	80%	57%

**Assessment**

A Stochastic Production model in Continuous Time (SPiCT) was used for the assessment of this stock. Input to this model include landings data and a standardized index of exploitable stock biomass from combined survey data.

The next assessment is expected to be in 2026.

*Human impact*

Mainly fishery related mortality has been documented. Other sources (e.g. pollution, shipping, oil-industry) are undocumented.



### *Biology and Environmental interactions*

No specific studies were reviewed during this assessment.

### **Ecosystem sustainability of catches**

The impact of bottom fishing activities on VMEs in Subarea 0 was assessed in 2016. Three areas have been designated as marine refuges, that exclude bottom contact fisheries: Disko Fan, Davis Strait and Hatton Basin. Areas in Subarea 1 have also been closed to bottom fishing to protect benthic habitats.

Greenland halibut is included in the piscivore guild. There is no EPU nor TCIs defined for this region. The ecosystem sustainability of catches cannot be evaluated. Greenland shark is a bycatch species of concern in the Subareas 0+1 (offshore) fishery given its low reproductive rate, slow growth rate and limited ecological information.

### **Fishery**

Catches were first reported in 1965. Catches increased from 1989 to 1992 due to a new trawl fishery in Division 0B with participation by Canada, Norway, Russia and Faeroe Islands and an expansion of the Division 1CD fishery with participation by Japan, Norway and Faeroe Islands. Catch declined from 1992 to 1995 primarily due to a reduction of effort by non-Canadian fleets in Division 0B. Since 1995 catches have been near the TAC and increasing in step with increases in the TAC, with catches reaching a high in 2022. Catches decreased to 32 990t following a decreasing TAC in 2023.

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
TAC	30	30	32.3	32.3	36.4	36.4	36.4	36.4	33.3	33.3
SA 0	15.4	14.1	15.9	16.0	18.3	17.9	19.1 <sup>2</sup>	18.3	16.4	
SA 1	14.9	15.2	16.2	16.2	18.0	18.1	17.3	18.8	16.6	
Total STACFIS <sup>1</sup>	30.3	29.3	32.1	32.2	36.3	36.0	36.4	37.2	33.0	

<sup>1</sup> Based on STATLANT, with information from Canada and Greenland authorities to exclude inshore catches.

<sup>2</sup> STACFIS estimate using 1.48 conversion factor for J-cut, tailed product.

<sup>3</sup> Based on official catches from the Greenland Office of Fisheries Licences (GLFK) because STATLANT were not available.

### **Sources of information**

SCR Docs. 24/013, 019, 020, 021, 022; SCS Doc. 24/14.

**NAFO Precautionary Approach Working Group (PA-WG)****13 May 2024. 09:00 Halifax time****Webex****Chair: Fernando González-Costas****1. Opening.**

The meeting was opened by the Chair, Fernando González-Costas (European Union), at 09:00 hours (UTC/GMT -3 hours in Halifax, Nova Scotia) on Monday, 13 May 2024.

The Chair welcomed representatives from Canada, the European Union, Japan, the Russian Federation, and the United States of America, as well as an invited expert on Precautionary Approach Framework on Fisheries Management. A full participants list is presented in Appendix I.

**a) Appointment of Rapporteurs.**

The NAFO Secretariat (Dayna Bell MacCallum and Jana Aker) was nominated as rapporteur of the meeting.

**b) Adoption of Agenda**

The agenda was adopted as circulated (Appendix II).

**2. Performance Statistics for the Management Objectives**

The PA-WG reviewed the management objectives as approved by the WG-RBMS at the April 2024 meeting (COM SC Doc. 24-01). Performance statistics to measure these management objectives were presented by Mariano Koen-Alonso on behalf of the technical team and discussed by the group. The PA-WG approved the performance statistics to measure the management objectives outlined in Table 1, noting that these are the starting point to carry out the testing, but the final framework and risk levels to be established will be determined in the WG-RBMS meeting in August 2024.

**Table 1.** The management objectives and associated performance statistics for the testing of the precautionary approach framework. In addition to standard symbols like B and F to indicate stock biomass and fishing mortality respectively, and the related reference points and/or relevant indicators like  $B_{lim}$ ,  $B_{trigger}$ ,  $B_{msy}$ ,  $F_{lim}$ ,  $F_{msy}$ , and MSY, some general notation used throughout this table includes t to indicate year, t=1 or  $t_1$  to indicate the first year of the actual projection period after the burnout period, t=x or  $t_x$  to indicate the year x of the projection period, T to indicate the final year of the projection period, which is initially defined as 50 years for the generic testing and 25 years for the specific testing, and  $t_{Btr}$  to indicate the year when the biomass reaches  $B_{trigger}$  ( $B_{t_{Btr}} \geq B_{trigger}$ ) after starting from a depleted stock state. HCR is used to indicate harvesting under a given harvest strategy from the proposed PA framework, and F=0 is used to indicate no harvesting.

Management goal	Management Objectives from RBMS Report	Operational management objective by SC PAWG	Performance Statistics	Criteria
Prevention of bad stock states arising later when the stock is in the Healthy Zone.  (test runs start with non-depleted stocks)	Very low risk of stock depletion	Very low risk of stock depletion	$P(B_t < B_{lim}) \leq 0.10$	Median of the proportion of years in the projection period (t=1 to T) where the stock is below $B_{lim}$ .  A very low probability is operationalized as 10% based on the current NAFO PA.  In addition to the PS itself, the distribution of these probabilities, at least for some base cases, is required to inform on the type or distribution (e.g. a wide vs narrow).
		Risk of stock falling below $B_{trigger}$	$P(B_t < B_{trigger}) \leq 0.30$	Median of the proportion of years in the projection period (t=1 to T) where the stock is below $B_{trigger}$ .  A low probability is operationalized as 30%.  Include results for F=0 for better informing the results in terms of actual performance of the HCR vs intrinsic variability of the stock dynamics.



Management goal	Management Objectives from RBMS Report	Operational management objective by SC PAWG	Performance Statistics	Criteria
	Maintain stocks above $B_{msy}$ more often than not	Maintain stocks above $B_{msy}$ more often than not	$P(B_t/B_{msy} > 1) \geq 0.75$	Median of the proportion of years where $\frac{B_t}{B_{msy}}$ is greater than 1 over the projection period (t=1 to T).  Since 50% is neutral, the idea of “more often than not” essentially covers the 51-99% range, so it has been operationalized here as the middle of that range (75%) until a value can be agreed upon at the PAWG and RBMS.
	Low risk of overfishing	Low risk of overfishing	$P(F_t/F_{msy} < 1) \geq 0.70$	Median of the proportion of years where $\frac{F_t}{F_{msy}}$ is less than 1 over the projection period (t=1 to T).  A low probability is operationalized as 30% based on the recent NAFO MSEs.
Recovery to a good stock state when the stock is in the Critical or Cautious Zone.  (test runs start with depleted stocks)	Rebuild stocks to $B_{msy}$	Rebuild stocks to the vicinity of $B_{msy}$	$P(\bar{\mu}(B_{T-10:T}) > B_{trigger}) \geq 0.80$	Proportion of scenario runs where the average biomass ( $\bar{\mu}$ ) in the last 10 years of the projection period (T-10 to T) is greater than $B_{trigger}$ .  A low probability [of not rebuilding to the vicinity of $B_{msy}$ ] is operationalized as 20% based on the current NAFO PA.
	Good stock recovery performance	Monitor short term growth	$P(B_{t=5} > B_{t=1}) \geq 0.75$	Proportion of scenario runs where $B_{t=5} > B_{t=1}$  Since 50% is neutral, the idea of “more often than not” has been operationalized as 75%.
		Monitor med term growth	$P(B_{t=15} > B_{t=1}) \geq 0.75$	Proportion of scenario runs where $B_{t=15} > B_{t=1}$  Since 50% is neutral, the idea of “more often than not” has been operationalized as 75%.
		Monitor long term growth	$P(B_{t=25} > B_{t=1}) \geq 0.75$	Proportion of scenario runs where $B_{t=25} > B_{t=1}$  Since 50% is neutral, the idea of “more often than not” has been operationalized as 75%.

Management goal	Management Objectives from RBMS Report	Operational management objective by SC PAWG	Performance Statistics	Criteria
		Time to recovery (absolute)	$Count(t_1: t_{Btr})$	Median of the number of years ( $t_{Btr}$ ) to reach $B_{trigger}$  This metric has no fixed success criterion as it depends on the specific stock life-history.
		Time to recovery (relative)	$Ratio\left(\frac{Count_{\square}^{F=HCR}(t_1: t_{Btr})}{Count_{\square}^{F=0}(t_1: t_{Btr})}\right) \leq 1.2$	Median of the ratio between the number of years ( $t_{Btr}$ ) to reach $B_{trigger}$ under the HCR vs under F=0.  This metric has no fixed success criterion; it has been arbitrarily set here as 20% or less from F=0 until a value can be agreed upon at PAWG/RBMS.
		Time to recovery (additional years)	$t_{extra} = Count_{\square}^{F=HCR}(t_1: t_{Btr}) - Count_{\square}^{F=0}(t_1: t_{Btr})$	Median of the number of additional years ( $t_{extra}$ ) to reach $B_{trigger}$ under the HCR vs under F=0.  This metric has no fixed success criterion.
Sufficiently acceptable fishery performance across stock states within the Cautious and Healthy zones.	Maintain approximately MSY catches in the long-term	Maintain approximately MSY catches in the long-term	$P\left(0.8 \geq \frac{Median(C_{T-10:T})}{MSY} < 1.2\right) \geq 0.80$	Proportion of the scenario runs where the ratio between the median catch in the last 10 years of the projection and MSY is within the 0.8MSY-1.2MSY range.  A low probability [of not maintaining catches approximately to MSY] is operationalized as 20% based on the current NAFO PA.
(test runs start with depleted stocks)	Good fishery performance	Measure the inter-annual TAC variation	$Median\left(\frac{ C_{t+1}-C_t }{C_t}\right) \leq 0.20$	Median of the medians of the absolute inter-annual variability in the TAC during the entire projection period.  The value of 20% is being set based on recent NAFO MSE practice.

Management goal	Management Objectives from RBMS Report	Operational management objective by SC PAWG	Performance Statistics	Criteria
		Catch during the maximum recovery window	$\frac{\sum_{1:t_{max}} C_y}{t_{max}}$	<p>Median of the average catch during the period of time associated with the maximum recovery time window.</p> <p>Maximum recovery time window (<math>t_{max}</math>) is the longest period of time observed across HCR scenarios (e.g. upper edge, middle, and lower edge of the NAFO HCR leaf) to recover the stock to <math>B_{trigger}</math>.</p>

**2025 and 2026 Greenland Halibut (GHL) Total Allowable Catch (TAC)  
Eastern Arctic Stakeholder Advisory Committee (EAGSAC) Member Views  
Meeting Discussion Summary**

August 14, 2024

Chair – Jeff Adam, Senior Regional Fisheries Management Officer, Arctic Region (AR), Fisheries and Oceans Canada (DFO)

EAGSAC Member Participants

Commercial Fishery Associations:

- Nunavut Fisheries Association (NFA) – Derek Butler, representing:
  - Arctic Fishery Alliance (AFA)
  - Baffin Fisheries Coalition (BFC)
  - Cumberland Sound Fisheries Ltd (CSFL)
  - Qiqiktaaluk Corporation (QC)
- Northern Coalition (NC) – Alastair O’Rielly, representing:
  - Makivik Corporation
  - Labrador Fishermen’s Union Shrimp Company Ltd.
  - Torngat Fish Producers Co-operative Society Ltd.
  - Nunatsiavut Group of Companies
- Atlantic Groundfish Council (AGC) – Steve Devitt, representing:
  - EcoSound Fisheries
  - Ueushuk Fisheries
  - Harbour Grace Shrimp Co. Ltd
  - Ocean Choice International
  - Mersey Seafoods Ltd
  - Clearwater Seafoods Ltd (CW)
  - Nordic Ltd.

Commercial Fish Harvesters

- QC – Jerry Ward
- CW – Catherine Boyd

Government Organizations

- Government of Newfoundland and Labrador – Jake Rice
- DFO – Kevin Hedges, Research Scientist
- DFO – Kate Johnson, International Fisheries Policy

Environmental Non-Government Organizations

- Oceans North – Brynn Devine

Observers

- DFO – Sandra Moore (FM-AR), Alexis Burt (FM-AR), Dirk Algera (RM-NCR)

## **Purpose of Meeting:**

For EAGSAC members to share their views on the Northwest Atlantic Fisheries Organization (NAFO) Subarea 0 (GHL) TAC level for 2025 and 2026. The meeting also afforded EAGSAC members an opportunity to ask DFO Science questions and seek clarification on the GHL SA0+1 (offshore) NAFO Scientific Council (SC) advice for 2025 and 2026.

## **Discussion:**

### Science advice

DFO Science (Kevin Hedges) provided answers and clarifications to stakeholder questions and comments regarding the NAFO SC advice.

- CW asked for more information regarding the stochastic surplus production model in continuous time (SPiCT model) used for developing the science advice, current and future data used for the model, and the next stock assessment.
  - DFO Science responded that the SPiCT model was adopted and accepted by the NAFO SC this past June. Every year new surveys will be conducted by both Canada and Greenland (separately) and new data will be inputted into the SPiCT model. There is a four year agreement with Greenland for Canada to continue using the *R.V. Tarajoq* to conduct annual surveys in SA0.
  - Development of a model-based calibration between the *R.V. Paamiut* and *R.V. Tarajoq* survey time series is ongoing, and once completed will aid in stock assessment efforts. The intent will be to update the single reconciled time series accordingly.
  - The fall 2024 survey data will be reviewed by NAFO SC in May 2025, used in the SPiCT model together with Greenland survey data, and model results will be presented at the NAFO SC meeting in June 2025. An updated report will be produced by NAFO SC in 2025, as the next full NAFO SC stock assessment is scheduled to occur in 2026.
  
- NFA referenced the July 8<sup>th</sup> presentation on the unpublished NAFO SC advice provided to EAGSAC members by DFO Science. NFA asked if the performance statistics for over fishing in the precautionary approach (PA) framework (slide 7) were weighted. NFA enquired how the NAFO PA framework, which is currently under review, might be different from the Canadian PA framework, and if any updates on the review were available.
  - DFO Science stated the performance statistics are not weighted, with three equal criteria for being in the safe zone.
  - DFO Science is not aware of any updates at this time regarding the NAFO PA framework review. The NAFO PA framework is likely to become more aligned with the DFO PA framework.
  
- NC expressed that the SPiCT model is new, unproven, based on little data (plus data gaps exist in the time series), has wide confidence intervals, and while it includes catch data, catch per unit effort (CPUE) from industry is not included, which could be significant. All these items lead to uncertainty in the science advice. NC asked DFO Science to address these concerns.
  - DFO Science responded that the confidence intervals are broad but were accepted by the NAFO SC. There was no debate on the confidence in the model, which is well structured and was accepted by NAFO SC. Confidence in the data will increase over time as more length and age data are collected. More data will be added over time, and science personnel are constantly

looking for ways to improve the science work and modelling.

- NC followed up by asking, given the low probability of risk (at current harvest levels), should harvest levels be reduced based on outputs with so many gaps, and given the model underestimates biomass and overestimates mortality? NC also noted survey results for the last two years have been very positive, and do not indicate “red flags”.
  - DFO Science responded there are three criteria taken into account to determine the safe zone of the stock, which are the probability of  $F > F_{lim}$  (probability of overfishing, where decline in stock biomass would be expected), probability of  $B < B_{lim}$  (comparable to the probability of being in the Critical Zone in the DFO PA Framework), and probability of  $B > B_{msy}$  (probability of being above  $B_{msy}$ , the point where maximum productivity is achieved, which is used to inform the Upper Limit Reference in the DFO PA Framework). Most of the harvest level scenarios exceeded the 30 % threshold for  $F > F_{lim}$ . The table in the NAFO SC advice provides risk-based advice. The one line ( $F > F_{lim} < 30\%$ ) is “singled out” and used in the “Grey box”, but information is provided for a range of harvest level scenarios.
  - The level of risk is not a Science decision, it is a Fisheries Management decision. The higher the TAC, the more the standing stock biomass will decrease. If harvest levels are set above the 75 %  $F_{msy}$  threshold, then TAC level decreases should be expected in the future. A key consideration is how much stability is desired in the TAC long term. A small decrease in TAC now might avoid a large decrease in a few years.
- NFA referenced slide 2 from the July 8<sup>th</sup> presentation and asked about risk based advice for the future.
  - DFO Science explained that when the request for advice was written and submitted to NAFO SC there had been no accepted model for this stock (i.e. SPiCT) and it was assumed that science advice would continue to be based on biomass and abundance indices. With the acceptance of the SPiCT model, future stock status projections can be developed, and risk-based advice can be provided.

#### **TAC Views presented:**

- Disagreement with the harvest level advice provided by NAFO SC in 2024 (NFA, NC):
  - NFA and NC will likely request a roll-over of the 2024 TAC level for 2025 and 2026 at a minimum. NC noted a case could be made to increase the TAC to previous higher levels.
- Additional science work in terms of incorporating more data and using the model-based calibration for stock assessment was requested, including having a full stock assessment at the NAFO SC meeting in 2025 (AGC, NFA, CW, QC), not just the scheduled interim update.
- AGC, NC, NFA, and the Government of Newfoundland and Labrador will provide written submissions to DFO regarding the TAC level for 2025 and 2026.
- CW will likely endorse the TAC level submission from AGC. Additionally, based on further science work (gathering more data, modelling, model-based calibration) occurring over the next year, CW recommends the TAC be set for one year (2025) only.

- NC provided the following views:
  - Dr. Hedges' explanation of the science advice offered important insights, particularly on interpreting the risk analyses presented in Table 1.3. This shows that the probability of the Biomass exceeding Bmsy is about 80% in all scenarios tested, that the risk of the Biomass falling below Blim is less than 1% in all scenarios tested and that the probability of fishing at the current TAC exceeding Flim is 34%, slightly above NAFO's PA guidance, but based on minimal and roughly estimated data, application of a new, unproven and data-poor assessment model with extensive confidence intervals. The advice of the NAFO SC appears to be based on something other than expert opinion or conclusive analyses and complies with NAFO's PA framework values by the narrowest margins with low confidence. This does not justify the industry forfeiting a further \$20 to 30 million in much needed revenue.
  - Projections derived from the model show the high level of uncertainty and further illustrate why quota reductions are not warranted. An excerpt from the NAFO SC advice on Page 70 reads: "For biomass projections, in all scenarios for 2025-2026, the probability of biomass being below Blim was less than 1%. The probability that biomass in 2026 is greater than biomass in 2024 is between 19 and 70% for all projections." Again, this demonstrates that quota reductions are not justified.
  - Since December 2022, Blue Matter, a fisheries consulting firm, has been working to interpolate the missing survey values for 2018, 2020, and 2021. Unfortunately, this work has not yet been completed due to contract/budget issues; however, it will likely have a material impact on the stock assessment.
  - NC believes that the NAFO SC's recommended TAC reduction was inappropriate and unjustified, based on an improper interpretation of the PA. The NAFO SC did not have any information to assess the stock and asserted that the absence of data constituted a risk to the stock. Applying this new population model with limited and highly qualified survey estimates, the absence of any environmental and ecosystem data, and wide-ranging confidence intervals do not make a compelling case for the quota reductions of the past two years. It absolutely does not justify further reductions in the TAC. Accordingly, the NC recommends reinstating the 2022 quota of 36,400 tons for 2025.
  - Recent survey results for 2022 and 2023 have been positive. To further mitigate the very low risk of stock decline at current fishing levels, it is advisable to review the 2024 fall survey results, together with additional data that may be available (i.e. analysis by Blue Matter) before setting the TAC for 2026.

**Action:**

- Meeting summary will be provided.
- Written submissions from EAGSAC members due to the Department by Friday, August 23, 2024.