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Maritimes Region

Canadian Science Advisory Secretariat
Science Advisory Report 2026/046

STOCK ASSESSMENT FOR ATLANTIC COD (*GADUS MORHUA*) ON EASTERN GEORGES BANK IN 2025

CONTEXT

The Fisheries Management Branch of Fisheries and Oceans Canada (DFO) has requested a review of resource status for eastern Georges Bank Atlantic Cod (*Gadus morhua*) in support of the decision-making process for the 2027 fishery. This Fisheries Science Advisory Report is from the regional peer review meeting of June 16–18, 2026 on the Stock Assessment of Atlantic Cod and Haddock on Eastern Georges Bank. Additional publications from this meeting will be posted on the [Fisheries and Oceans Canada \(DFO\) Science Advisory Schedule](#) as they become available.

SCIENCE ADVICE

Status

- The 2025 spawning stock biomass (SSB, 8,469 mt) is at 33% of the limit reference point (LRP; 26,847 mt), placing the stock in the critical zone with a very high probability (>99%).

Trends

- The 2025 SSB is 8,469 mt, which represents a minor increase from the series low of 8,273 mt in 2022.
- Fishing mortality (F) has remained below 0.05 since 2017 and the 2025 estimate is 0.03.
- In three of the last four years, recruits per unit of SSB have been the highest observed since 1978, despite record low SSB. However, this has not resulted in sustained increases in the number of adult fish (ages 3+).
- Apparent mortality for fish aged 4+ continues to be high.

Ecosystem and Climate Change Considerations

- The most commonly identified contributors to natural mortality (M) for Atlantic Cod in this region are high bottom-water temperatures and predation. Both have undergone substantial changes in recent years.
- The presence of older fish in deeper waters within the eastern Georges Bank management area indicates earlier post-spawning movement off the bank relative to the timing of the DFO Winter Ecosystem Research Vessel Survey. Although the mechanism for this shift has not been identified, it is likely related to ecosystem changes (e.g., temperature, predation, competition).

Stock Advice

- Projections of SSB for 2027 and 2028 are provided under various fishing scenarios. Given the long-term projection of biomass, it is unlikely that the SSB will exceed the LRP within two generations (2033), even in the absence of fishing. There is no fishing level which will improve stock outlook under current productivity dynamics.
- Catch advice for 2027 is 353 mt ($F=0.05$). This is based on F preventable decline (F_{pd}), which corresponds to the maximum F associated with a very low probability ($<5\%$) of preventable decline (i.e., decline relative to $F=0$ scenario) in two generations (2033).

BASIS FOR ASSESSMENT**Assessment Details****Year Assessment Approach was Approved**

2025 (Andrushchenko et al. 2026)

Assessment Type

Full assessment

Most Recent Assessment Date

1. Last Full Assessment: June 2025 (DFO 2025)
2. Last Interim-Year Update: July 2024 (DFO 2024)

Stock Assessment Approach

1. Broad category: single stock assessment model
2. Specific category: age structured state-space model

Ecosystem and Climate Change Assessment Approach

Implied and Linked: Ecosystem variables are indirectly accounted for in the advice. For example, the model incorporates unexplained changes in the numbers at age (thought to principally reflect changes in M), without clear knowledge of the specific environmental factors or mechanisms that might affect M over time. Changes in oceanographic conditions were considered in the context of data inputs and projection assumptions.

Stock Structure Assumption

Atlantic Cod on eastern Georges Bank is a single stock spanning United States of America (US) and Canadian waters. There is some mixing with adjacent stock units. In Canada, the stock is assessed as eastern Georges Bank (DFO statistical unit areas 5Zejm).

Reference Points

- Limit Reference Point (LRP): SSB below which surplus production is not significantly greater than zero (Andrushchenko et al. In Prep¹)

¹ Andrushchenko, I.V., Barrett, T.J., Hebert, N., Clark, C.M., and Way-Nee, E. In Prep. 5Z Cod Assessment Framework: Projections and Reference Points. DFO Can. Sci. Advis. Sec. Res. Doc.

Maritimes Region

- Upper Stock Reference (USR): Not yet determined
- Removal Reference (RR):
 - RR in critical zone: $F=0.05$ (F associated with a very low likelihood (<5%) of preventable decline).
 - RR in healthy or cautious zone: Not yet determined.
- Target Reference Point (TRP): Not available

Data

- DFO Winter Ecosystem Research Vessel (RV) Survey (1987–2025)
- US National Marine Fisheries Service (NMFS) Spring RV Survey (1978–2025; except 2020 and 2023)
- US NMFS Fall RV Survey (1978–2024; except 2020)
- Canadian fishery data (1978–2025)
- US fishery data (total removals 1978–2025; catch-at-age 1978–2020)

Data changes since most recent assessment: Due to changes in timing and coverage on the 2025 NMFS Fall Survey, an analysis was conducted to determine the impact of this 2025 survey data point on the model output and performance. The analysis is documented in Andrushchenko et al (In Prep²) and the decision was made to exclude the 2025 NMFS Fall Survey data point for this assessment.

² Andrushchenko, I.V., Hebert, N., and Way-Nee, E. In Prep. Eastern Georges Bank Cod (*Gadus morhua*) Assessment to 2025. DFO Can. Sci. Advis. Sec. Res. Doc.

ASSESSMENT

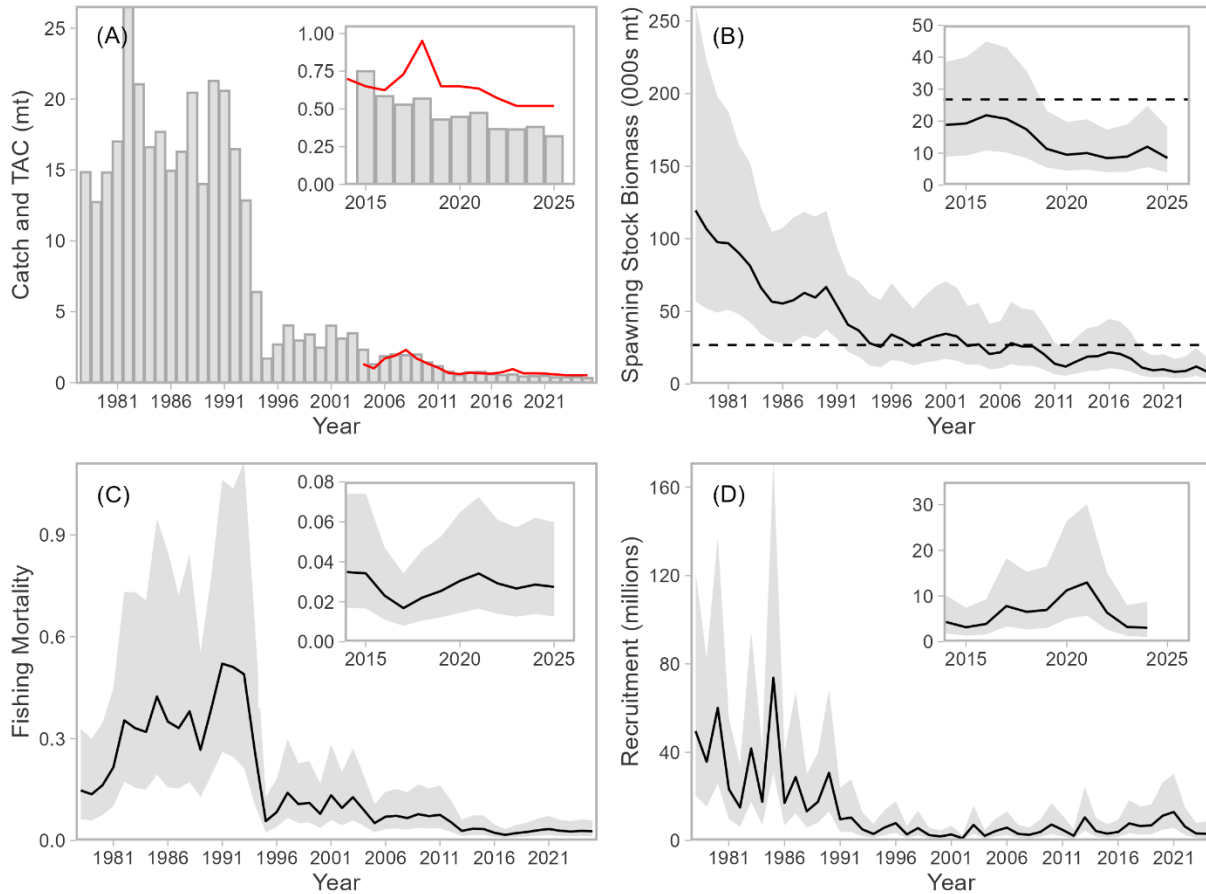


Figure 1. (A) Catch (bars) and total allowable catch (TAC, red solid line) for eastern Georges Bank Atlantic Cod, (B) spawning stock biomass (000s mt, solid black line) in relation to the 2026 limit reference point (26,847 mt, black dashed line), (C) instantaneous fully-selected fishing mortality (solid black line), and (D) recruitment (numbers in millions, solid black line) for the eastern Georges Bank model. Insets are included in all panels to provide a magnified view of recent years in time series. In panels B–D, the grey shading around the solid line represents 95% confidence intervals.

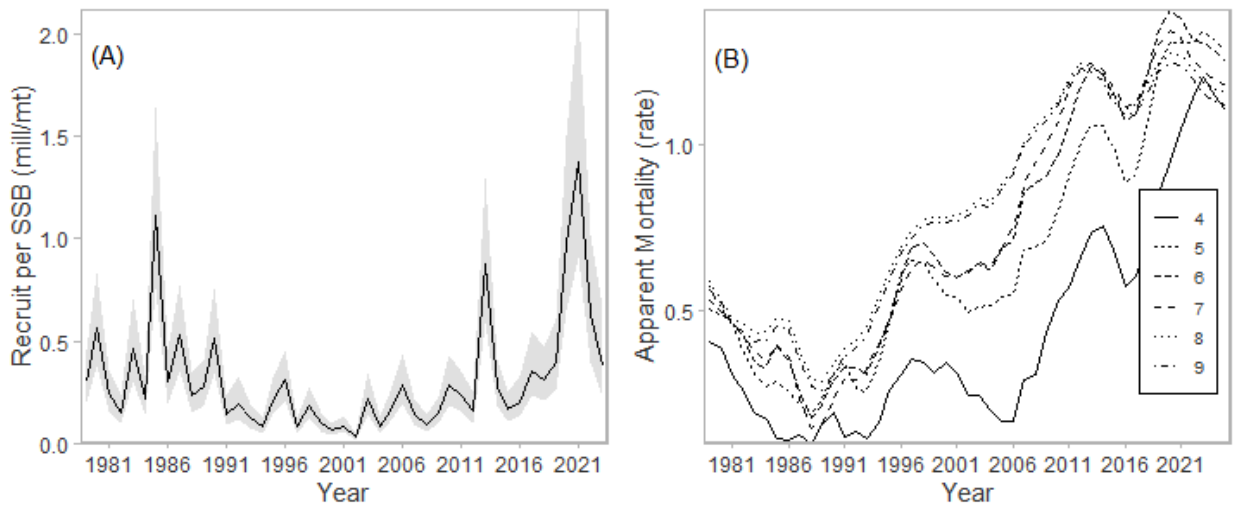


Figure 2. (A) Recruitment rate represented by solid black line (recruitment in millions over spawning stock biomass [SSB] in metric tonnes). Grey shading represents 95% confidence intervals. (B) Instantaneous rate of apparent mortality at each age due to natural mortality and process error for ages 4+.

Stock Status and Trends

Biomass

Following a notable decrease in estimated SSB in the early 1990s, the stock declined gradually and reached a series low in 2022 (8,327 mt). SSB then increased slightly due to a strong year-class moving through the population but declined again to 8,469 mt in 2025. A temporary increase in SSB during the mid-2010s appears to have been caused by an influx and subsequent departure of fish from outside of the assessment unit (Figure 1B).

Fishing Mortality

Estimated F was higher in the 1980s (0.15–0.60) but declined throughout the 2000s and 2010s to a series low in 2017 (<0.02). Since then, F has remained below 0.05. The 2025 value is estimated at 0.03 (Figure 1C). Factors other than fishing mortality are currently the primary limits to stock productivity of eastern Georges Bank Atlantic Cod (Figure 2B).

Recruitment

Recruitment has remained low since the mid-1990s (Figure 1D). In recent years, recruits per SSB have been the highest observed since 1978, despite record-low SSB (Figure 1B, Figure 2A). However, the higher recruitment has not resulted in sustained increases in the number of adult fish (ages 3+).

Natural Mortality

Apparent mortality (combined annual M and unexplained changes in the numbers at age) for fish aged 4+ continues to be estimated at a high rate, especially for ages 6+ (Figure 2B). There are signs of a recent decrease from a record high level, but mortality remains the main factor limiting productivity for this stock.

Current Status

The estimated 2025 median SSB (8,469 mt) is at 32% of the LRP (26,847 mt), and there is a very high (>0.99) probability that the stock remains in the critical zone.

The eastern Georges Bank Atlantic Cod stock has declined since the 1990s and remains in the critical zone. Despite signs of improved recruitment and growth in the early 2020s, the productivity of the stock remains low with the annual rate of apparent mortality (combined annual M and unexplained changes in the numbers at age) for older ages remaining high (>1 ; i.e., annual mortality $>60\%$). There is a very high probability that SSB remains in the critical zone in the projections under all fishing scenarios, including in the absence of fishing. Stock outlook is not expected to change in the future unless productivity improves.

History of Landings and Total Allowable Catch

Combined Canada/US removals (landings and discards) in 2025 were 317 mt, with a TAC of 452 mt (Table 1). Canadian removals decreased from 327 mt in 2024 to 297 mt in 2025, which is the lowest in the time series. US removals decreased from 51 mt in 2024 to 20 mt in 2025, and is the lowest in the time series.

Table 1. Canadian and US removals (landings and discards) and total allowable catch (TAC) for eastern Georges Bank Atlantic Cod. All removals and TAC are for calendar year (Jan 1–Dec 31) in metric tonnes (mt). Values in the 2004–2019 column are the annual average between 2004 and 2019.

Year	2004– 2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Combined TAC (mt)	1,244	624	730	951	650	650	635	571	520	520	452
Canada removals (mt)	912	440	488	517	396	377	431	326	329	327	297
US removals (mt)	346	97	38	49	31	67	41	38	32	51	20

Ecosystem and Climate Change Considerations

The model indicates that a high number of adult fish are disappearing in excess of the number accounted for by fishery removals. During the framework, this disappearance was primarily attributed to M. The most commonly identified contributors to M for Atlantic Cod in this region are high temperature and predation (NEFSC 2023). Both of these have undergone substantial changes in recent years, with bottom temperature anomalies registering record highs on Georges Bank throughout the 2010s and the grey seal population which increased considerably over the past several decades.

The presence of older fish in deeper waters within the area indicates earlier movement off the bank after spawning. Although the mechanism for this shift has not been identified, it is likely related to ecosystem changes (e.g., temperature, predation, competition).

From 2015 to 2017, abundance increased suddenly across ages and is interpreted as movement of fish into and then out of Georges Bank from adjacent areas.

During the current assessment, potential interactions between oceanographic conditions (temperature, salinity) and survey timing were discussed. Spring bottom temperature anomalies on eastern Georges Bank have remained cooler in the last two years, and it is unclear whether these conditions will persist in the future. These changes were considered in the context of fish availability to surveys and migration patterns.

Projections and Stock Advice

Given the long-term projection of biomass, it is highly unlikely that the estimated SSB will exceed the LRP within two generations (2033), even in the absence of fishing. Consequently, there is no fishing level which will improve stock outlook under current productivity dynamics.

Projections of SSB for 2027 and 2028 are provided under various fishing scenarios (Table 2). Projections assume that the 2026 TAC (473 mt) is removed in full during the 2026 fishing year, which equates to an F of 0.052. Projected SSB for 2028 is 5,742 mt. Catch advice is only provided for 2027 where removals of 353 mt ($F=0.05$) correspond to the maximum F associated with a very low probability (<5%) of preventable decline (i.e., decline relative to $F=0$ scenario) in two generations (2033).

Table 2. Projected spawning stock biomass (SSB), catch advice for 2027, fishing mortality (F), and associated probability of preventable decline under the various fishing scenarios. Fpd is F associated with <5% of preventable decline. Frecent is the median F of the last six years. mt=metric tonnes.

F Scenario	SSB (mt) 2027	Catch Advice (mt) 2027	F 2027	SSB (mt) 2028	Probability of Preventable Decline
Fpd	5,123	353	0.050	5,742	4.98%
Frecent	5,123	225	0.032	5,798	3.10%
No Fishing	5,123	0	0.000	5,891	0%

SOURCES OF UNCERTAINTY

Prior to 2010, the DFO Winter Ecosystem RV Survey did not extend into deeper waters within the eastern Georges Bank management unit. As a result, the current assessment assumes that the survey design prior to 2010 produced an index that was representative of total population trends at that time. It is uncertain whether this assumption is true and what the implications are on the model outputs. Accounting for the movement of fish within the eastern Georges Bank management unit requires further work.

Projections make assumptions about how various aspects of stock dynamics are expected to unfold in the near future and are informed by recent trends (e.g., growth, recruitment, mortality).

The absence of US fishery age composition since 2020 means the model assumes that the US fishery selectivity has not changed since then. It is uncertain if this assumption is true; however, the impact on assessment results is expected to be minimal, given the relatively small contribution of the US fishery to the total removals.

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SOURCES OF INFORMATION

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