



ESTUARY AND GULF OF ST. LAWRENCE (DIVISIONS 4RST) CAPELIN (*MALLOTUS VILLOSUS*) STOCK ASSESSMENT IN 2025

CONTEXT

The Fisheries Management Branch of Fisheries and Oceans Canada (DFO) requested that the state of the 4RST Capelin stock ([Integrated fishery management Plan](#) [IFMP]) be assessed to provide harvest advice for the 2026 and 2027 fishing seasons.

This Fisheries Science Advisory Report is from the regional peer review meeting of February 17-18, 2026, on the Estuary and Gulf of St. Lawrence (4RST) Capelin (*Mallotus villosus*) Stock Assessment in 2025. 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 stock status of 4RST Capelin in 2025 is uncertain due to the absence of approved Reference Points.

Trends

- The mature biomass index in the northern Gulf of St. Lawrence (GSL) has remained low since 2013, whereas the southern GSL has shown a higher biomass index since the 2010s.
- The fishing mortality index remained at or below 0.25 in all but one year (2024) in the northern GSL where almost all fishing takes place. The fishing mortality index is lower than expected natural mortality and levels considered sustainable for species with a rapid life cycle.

Ecosystem and Climate Change Considerations

- Expected long-term reduction in the availability of Capelin preferred thermal habitat caused by increasing water temperatures is likely to impact stock productivity.

Stock Advice

- The 2025 stock status of 4RST Capelin is uncertain. However, given that the fishing mortality index has remained low relative to the species' biology, and that the mature biomass index has fluctuated without a clear trend in the northern GSL since 2013 while increasing in recent years in the southern GSL, harvest levels within the range observed since 2013 (1,224–11,825 t) are unlikely to impact the stock during the 2026 and 2027 fishing seasons.

BASIS FOR ASSESSMENT

Assessment Details

Year Assessment Approach was Approved

The assessment approach was adopted during the 2026 stock assessment (Boudreau et al. In prep.¹).

Assessment Type

Full Assessment

Most Recent Assessment Date

1. Last Full Assessment: 2024 (DFO 2024, Boudreau et al. 2026)
2. Last Interim-Year Update: 2023 (DFO 2023)

Stock Assessment Approach

1. Broad category: Index-based (trends in empirical indices only)
2. Specific category: Index-based (including fishery-dependent and fishery-independent indices)

The assessment approach adopted consists of the evaluation of recent trends in mature biomass indices for the northern and southern GSL and a comparison of fishing mortality index with values considered sustainable for short-lived forage species like Capelin.

Ecosystem and Climate Change Assessment Approach

The effects of the ecosystem on the stock were considered outside the stock assessment framework.

Stock Structure Assumption

Capelin found in the Arctic and Atlantic Oceans are divided into three distinct clades including the Northeast/Central Atlantic clade, the Arctic clade and the Northwest Atlantic clade (Dodson et al. 2007). Within the Northwest Atlantic clade, three distinct haplotypes have been identified but all are found across the Newfoundland and Labrador Shelf, the GSL, and into the St. Lawrence Estuary (Cayuela et al. 2020). Previous attempts to examine the stock structure of Capelin in the Northwest Atlantic including the GSL have highlighted multiple instances of phenotypic variation between spawning sites for traits such as spawning behavior, diet, colour, morphology, number of vertebrae and other life history traits. The structure of Capelin populations in the Estuary and GSL is not clearly defined, and Capelin in Divisions 4RST are currently managed as a single stock.

Reference Points

- Limit Reference Point (LRP): N/A.
- Upper Stock Reference (USR): N/A.

¹ Boudreau, M., et al. In preparation. Capelin in the Estuary and Gulf of St. Lawrence (NAFO Divs. 4RST) in 2025. DFO Can. Sci. Advis. Sec. Res. Doc.

- Removal Reference (RR): N/A.
- Target Reference Point (TRP): N/A.

Data

- Capelin annual landings (1960 to 2025);
- Capelin catches in weight (kg) and number in the bottom trawl surveys conducted in the northern and southern GSL (1990 to 2025);
- Biological samples collected in the bottom trawl surveys (1990 to 2025)

ASSESSMENT

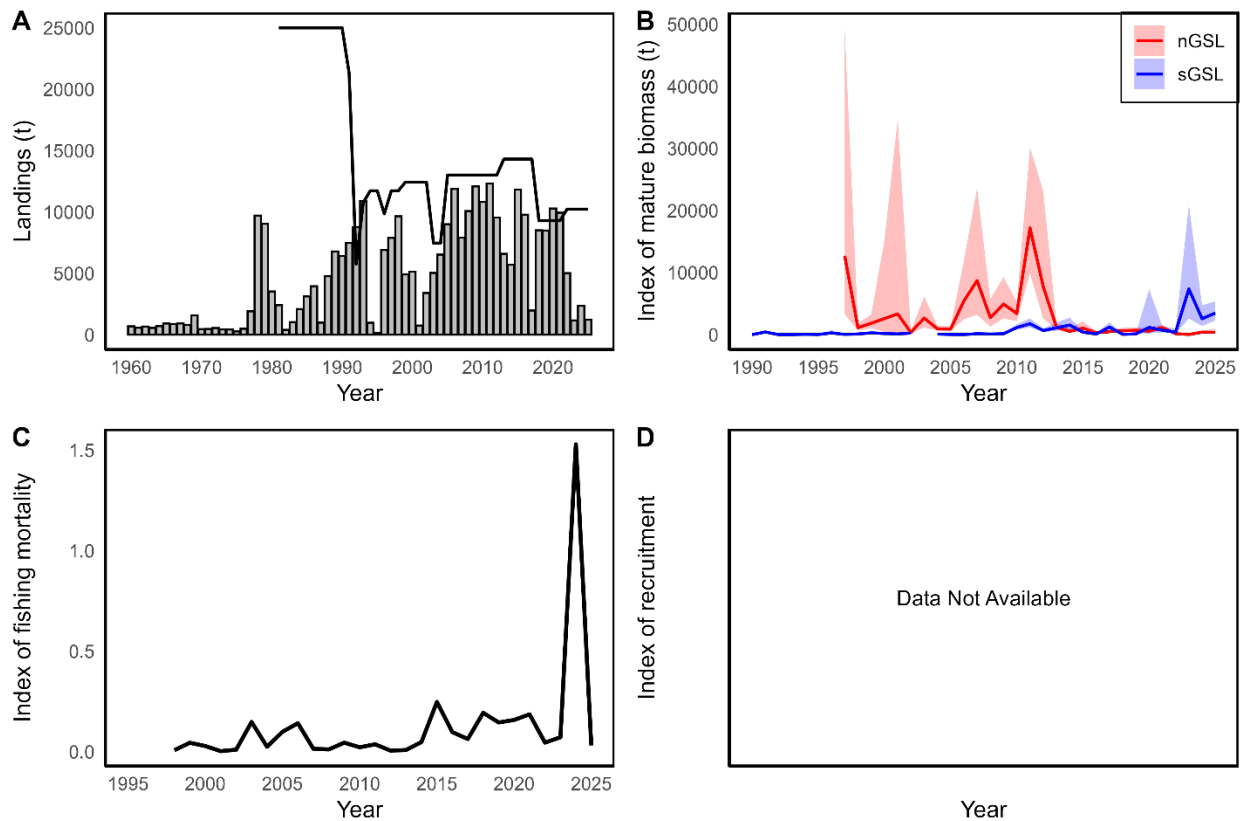


Figure 1. (A) Reported landings (bar) and total allowable catch (line) in metric tons; (B) index of mature biomass (with 95% CI, metric tons) in the northern (nGSL) and southern (sGSL) Gulf of St. Lawrence; (C) index of fishing mortality; and (D) index of recruitment (currently unavailable).

Stock Status and Trends

Mature Biomass Index

The mature biomass index in the northern GSL was highly variable from 1997 to 2012, then remained low relative to this period (Figure 1B). Mature biomass index in the southern GSL was generally low until 2009 and has since fluctuated around a higher average. The scale of these two indices cannot be compared.

Index of Fishing Mortality

The annual index of fishing mortality (Figure 1C) was based on the ratio of landings that year to the mature biomass in the northern GSL the previous year, where almost all fishing occurs, and assuming cautious survey catchability ($q = 0.01$). Although 4RST Capelin landings have varied significantly over the 1998-2025 period (Figure 1A), the index of fishing mortality has remained at relatively low levels (<0.25) throughout most of the series (Figure 1C) and is unlikely to pose a risk to a very short-lived small pelagic species (Patterson 1992). Furthermore, there is evidence that landings are smaller than the estimated consumption of Capelin implying that fishing mortality is considerably lower than natural mortality due to predation (Savenkoff et al. 2004, Ouellette-Plante et al. 2022). The fishing mortality index in 2024 reached the highest value in the time series. This value has larger uncertainty associated with incomplete survey coverage in 2023.

Current Status

The stock status of 4RST Capelin in 2025 is uncertain due to the absence of approved Reference Points.

History of Landings and Total Allowable Catch

The commercial fishery for 4RST Capelin is co-managed by DFO's Newfoundland and Labrador, Gulf, and Quebec regions under the 2020 [IFMP](#). The majority of the commercial fleet is based on the west coast of Newfoundland (NAFO Division 4R). Fishing seasons are generally short and coincide with the inshore Capelin spring spawning migration. The total allowable catch (TAC) for 4RST Capelin has rarely been limiting and landings have historically been market-driven (Figure 1A, Table 1). All licence holders in 4R are required to have their catch monitored at dockside and the return of logbooks is mandatory. Preliminary landings were 2,357 t and 1,224 t in 2024 and 2025 respectively.

Table 1. Management year landings by NAFO Division, total landings and Total Allowable Catch (TAC) are listed in metric tons.

| Year | 4R | 4S | 4T | Total landings | TAC |
|-------------------|--------|-------|-------|----------------|--------|
| Average 1960-1980 | 1,245 | 103 | 338 | 1,686 | - |
| Average 1981-1990 | 2,810 | 137 | 244 | 3,191 | 25,000 |
| Average 1991-2000 | 5,730 | 332 | 210 | 6,273 | 11,940 |
| Average 2001-2010 | 6,643 | 721 | 380 | 7,745 | 11,776 |
| 2011 | 9,890 | 974 | 1,449 | 12,314 | 13,000 |
| 2012 | 8,914 | 478 | 147 | 9,539 | 13,000 |
| 2013 | 6,350 | 236 | - | 6,587 | 14,300 |
| 2014 | 5,683 | 20 | - | 5,703 | 14,300 |
| 2015 | 11,361 | 107 | 357 | 11,825 | 14,300 |
| 2016 | 9,326 | 78 | 373 | 9,777 | 14,300 |
| 2017 | 1,945 | 19 | 1 | 1,965 | 14,300 |
| 2018 | 8,141 | 356 | 6 | 8,503 | 9,295 |
| 2019 | 7,575 | 427 | 484 | 8,486 | 9,295 |
| 2020 | 7,972 | 1,858 | 547 | 10,341 | 9,295 |
| 2021* | 8,013 | 1,841 | 186 | 9,977 | 9,295 |
| 2022* | 4,953 | 117 | 10 | 5,079 | 10,225 |
| 2023* | 1,141 | 12 | 2 | 1,155 | 10,225 |
| 2024* | 1,773 | 582 | 1 | 2,357 | 10,225 |

| Year | 4R | 4S | 4T | Total landings | TAC |
|-------|-------|-----|----|----------------|--------|
| 2025* | 1,089 | 131 | 4 | 1,224 | 10,225 |

*Preliminary data

Ecosystem and Climate Change Considerations

The effects of the ecosystem on the stock were considered outside of the stock assessment approach and were not used to condition the stock indices.

Capelin is a cold water species associated with the cold intermediate layer (CIL) in the GSL. Expected long-term reduction in the availability of Capelin preferred thermal habitat caused by increasing water temperatures is likely to impact stock productivity.

Capelin can be an important prey for species such as Greenland Halibut (*Reinhardtius hippoglossoides*), Atlantic Cod (*Gadus morhua*), marine mammals and seabirds. The impacts of the lower Capelin biomass in the northern GSL on its main predators remain uncertain.

Stock Advice

Projections are unavailable.

Given that the fishing mortality index has remained low relative to the species' biology, and that the mature biomass index has fluctuated without a clear trend in the northern GSL since 2013 while increasing in recent years in the southern GSL, harvest levels within the range observed since 2013 (1,224–11,825 t) are unlikely to impact the stock during the 2026 and 2027 fishing seasons.

PROCEDURE FOR INTERIM YEAR UPDATES

The stock is fully assessed every two years. No stock status update will be published in the interim year.

SOURCES OF UNCERTAINTY

Capelin are a highly migratory and widely distributed species with pronounced annual fluctuations in stock abundance and size structure. Its life-history characteristics along with the absence of a targeted survey complicates its assessment and creates several sources of uncertainty:

1. Main stock status indicators

Stock indicators are derived from bottom trawl surveys with unspecified and potentially variable catchability of pelagic fish across space and time. Bottom trawls sample only part of the cold intermediate layer (CIL) where Capelin reside and shifts in vertical distribution of Capelin relative to the trawl can alter catchability. Changes in CIL thickness or temperature may also influence the observed abundance. Uncertainty could be reduced by incorporating independent but concurrent data sources such as acoustic recordings, food availability, predator diets, and environmental DNA. While the fishing mortality index uses the mature biomass index in its calculation, commercial fishing is unlikely to pose a risk to the stock, providing the assumptions underlying the absolute biomass index hold true.

2. Mature biomass available to the fishery

Indices represent stock status in August–September, whereas the fishery begins at least six months later. Mortality between late fall and the fishing season may create discrepancies

between estimated stock status and mature biomass available to the fishery. Implementing a directed capelin survey before fishing begins in key areas (4R–4Sw) would improve estimates of vulnerable biomass and understanding of spatio-temporal distribution.

3. Lack of age data

Age data are unavailable due to difficulty distinguishing true growth annuli from false annuli. This limits the ability to assess cohort contributions to mature biomass and precludes cohort analyses for the trawl surveys, thereby reducing confidence in stock status determination. Age data would help with the estimation of mortality by tracking cohorts from late summer to the fishing season.

4. Incomplete coverage of trawl surveys

Incomplete bottom trawl survey coverage in the northern GSL in 2023, particularly in historically high-density areas, was proposed as one explanation for the elevated fishing mortality index observed in 2024. Although the spatio-temporal model used to estimate mature biomass can compensate for missing coverage, its performance in unsampled areas should be evaluated to clarify potential limitations.

5. Stock structure and movements

4RST capelin are managed as a single stock, although fishing is concentrated in the northeastern GSL, and the fishing mortality index is calculated using only the mature biomass index in the northern GSL. Given capelin's long-distance migrations, movement among GSL regions may influence mature biomass available to the fishery. Otolith chemistry (core and margin composition) could help identify cross-regional connectivity patterns.

LIST OF MEETING PARTICIPANTS

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SOURCES OF INFORMATION

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