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Quebec Region

Canadian Science Advisory Secretariat
Science Advisory Report 2026/040

NORTHERN CONTINGENT ATLANTIC MACKEREL (*SCOMBER SCOMBRUS*) STOCK ASSESSMENT IN 2025

CONTEXT

The Fisheries Management Branch requested that northern contingent Atlantic mackerel (IFMP, rebuilding plan) be assessed relative to established reference points that are consistent with the DFO precautionary Approach (DFO 2009). Advice is provided on ecosystem and climate change considerations relevant to stock status, and the impacts of harvest rules for the 2026 and 2027 fishing seasons are evaluated.

This Fisheries Science Advisory Report is from the regional peer review of May 27, 2026, on the Northern Contingent Atlantic Mackerel (*Scomber scombrus)* 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 2025 SSB was estimated at 52% of the LRP, placing the stock in the Critical Zone of the PA with a high probability (92%).
- The 2025 fishing mortality was below the RR with a very high probability (>95%).

Trends

- The stock has been near or below the LRP since 2011.
- No notable recruitment event has been observed since 2015. Recruitment in 2024 and 2025 remained near all-time low values.
- Fish older than 6 years have been uncommon in the stock since the early 2010s.

Ecosystem and Climate Change Considerations

- Ecosystem effects on recruitment, growth, maturation, and natural mortality have not been recently evaluated.

Stock Advice

- The probability of the SSB growing out of the Critical Zone by 2028 ranges from 41.5% under a TAC of 0 t to 24% under a TAC of 8,000 t. Both scenarios assume continued Canadian recreational and U.S. removals from the northern contingent.
- Under the same scenarios, the probability that the SSB in 2028 will be greater than in 2026 ranges from 57.5% under a TAC of 0 t to 29% under a TAC of 8,000 t. There is a greater than 50% probability that the SSB in 2028 would be greater than in 2026 with a TAC not exceeding 1,000 t.

Other Management Questions

- The L50 of all cohorts from 2014 onwards (average = 258 mm) has been below the current minimum legal size of 268 mm. The L50 is decreasing and recent values are amongst the lowest observed.

BASIS FOR ASSESSMENT

Assessment Details

Year Assessment Approach was Approved

2019 (DFO 2019)

Assessment Type

Full Assessment

Most Recent Assessment Date

1. Last Full Assessment: 2025 (DFO 2025)
2. Last Interim-Year Update: N/A

Stock Assessment Approach

1. Broad category: single stock assessment model
2. Specific category: State-Space model (Van Beveren et al. 2020)

The stock is assessed with a custom statistical catch-at-age model. It features a censored catch approach to account for recreational fisheries (not monitored) and other unaccounted-for landings for Canada, and all U.S. catches.

Ecosystem and Climate Change Assessment Approach

Uncertainty associated with environmental effects on mackerel recruitment, growth and maturation, is at least partially accounted for in the assessment model using time varying processes. Uncertainty in future recruitment was acknowledged using different statistical assumptions in short term projections.

Stock Structure Assumption

The stock in the Northwest Atlantic (NWA) is genetically distinct from the one in the Northeast Atlantic. Within the NWA there are two spawning contingents; a northern contingent that spawns predominantly in the southern Gulf of St. Lawrence (sGSL) in June-July and a southern contingent that spawns in the Western Gulf of Maine and offshore southern New England from mid-April to June. The northern contingent mixes with the southern contingent in U.S. waters during winter, where it is subject to fishing. The proportion of the northern contingent fish in U.S. catches is assumed to be between 20 and 80%.The available evidence indicates there are no significant, temporally stable spawning areas for the northern contingent outside of the sGSL.

Reference Points

- Limit Reference Point (LRP): $40\%SSB_{F40\%}$ = 40,348 t
- Upper Stock Reference (USR): $80\%SSB_{F40\%}$ = 80,696 t
- Removal Reference (RR): $F_{40\%}$ = 0.59

- Target Reference Point (TRP): N/A

There is no accepted harvest control rule for this stock (no F reference in the critical and cautious zones).

Management Objectives

A management strategy evaluation was conducted by Van Beveren et al. (2020). The rebuilding plan (DFO 2024) indicates that the overarching goal is for the stock to grow out of the Critical Zone with a high likelihood (greater than 75% probability). Secondary objectives aim to promote stock growth while providing opportunities for fishing.

Data

Landings (1969–2025) : Canada and U.S. landing statistics. U.S. landings were adjusted to account for the recreational fishery that may contain the northern contingent (November to April).

June sGSL egg survey (1979, 1983–2025, with no survey in 1995,1997 and 2020). 1991 and 1999 were removed as in previous assessments.

Canadian catch-at-age (1969–2025)

Biological data (1969–2025): Maturity-, fecundity- and weight-at-age.

ASSESSMENT

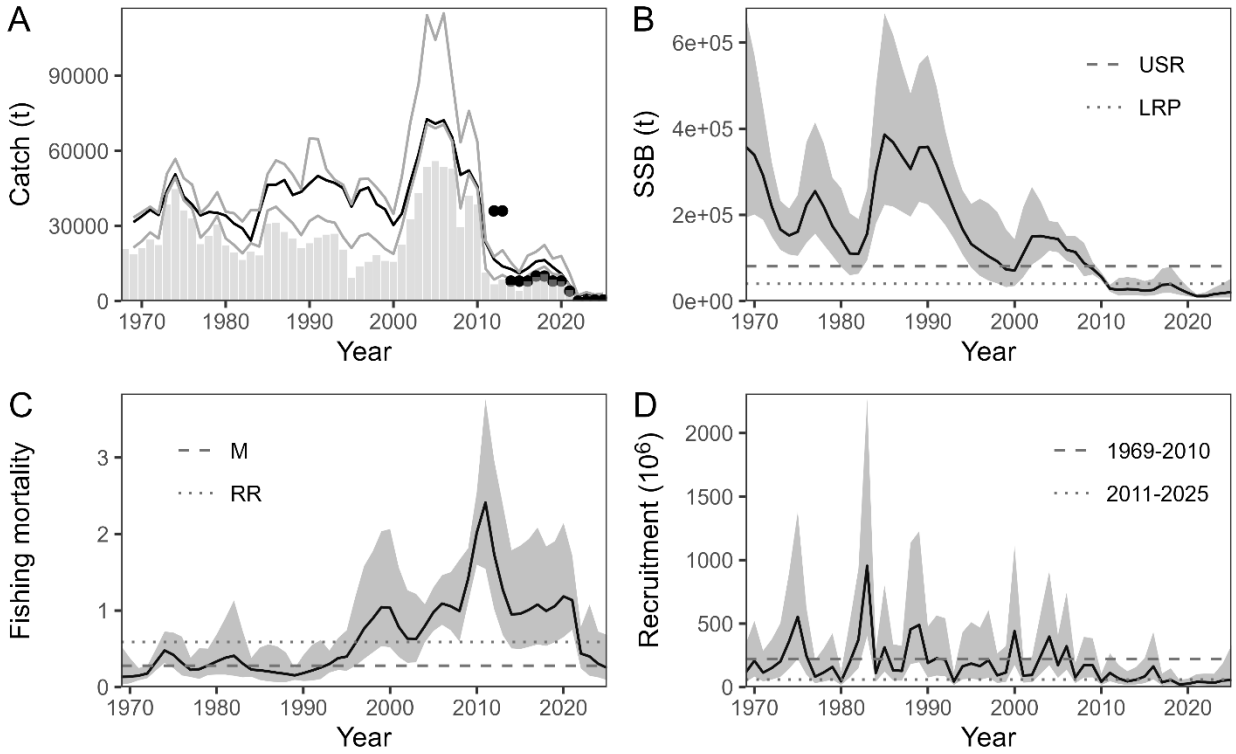

Figure 1: (A) Estimated catch (t, black line) between the predetermined bounds (grey solid lines) and Canadian landings (grey bars) and TAC (black dots), (B) SSB (t) estimated by the model (black line) with 95% confidence intervals (grey) in relation to the LRP (dotted horizontal line), the USR(dashed horizontal line). (C) Fishing mortality (F averaged over the fully selected age classes 5–10) with removal reference (RR=0.59, horizontal dotted line), and natural mortality (M=0.28, horizontal dashed line), (D) Recruitment (millions of age 1 fish) with averages for the 1969–2010 period (horizontal dashed line) and the 2011–2025 period (dotted horizontal line).

Stock Status and Trends

Spawning stock biomass

The spawning stock biomass (SSB) dropped below the LRP in 2011 (Figure 1B). SSB approached the LRP in 2017 and 2018 with the arrival of the 2015 cohort but decreased and reached a time series low in 2021–2022 (28% and 29% of the LRP). The stock has remained in the Critical Zone with a high probability (greater than 90%) since 2020.

Fishing mortality

The fishing mortality rate (F) of fully exploited mackerel (ages 5 to 10) decreased sharply after 2021, reaching a historically low level of 0.25 in 2025 (Figure 1C). Since 2022, F was below the RR due to the commercial fishery closure in Canada and a decrease in U.S. catches (Figure 1A).

Recruitment

Recruitment has on average been lower from 2011 onwards (Figure 1D). The last notable recruitment event occurred in 2015 (age 1 in 2016). Recruitment in 2024 and 2025 remained near all-time low values.

Age structure

Since the 2000s, the age structure of the population has become truncated, and fish 8 years and older became rare. By the early 2010s, fish older than 6 were uncommon. The stock has been dominated by ages 1–3 (~70-80%) since 2022 with no dominant cohort.

Current Status

In 2025, the SSB was at 52% (21-131%) of the LRP, placing the stock in the critical zone of the precautionary approach, with a high (92%) probability.

History of Landings and TAC

Up to 2020, Canadian TACs were equal to or above 8,000 t (Figure 1A). In 2021, the TAC was reduced to 4,000 t. The commercial and bait fisheries were closed in 2022–2023 with landings limited to by-catch, sampling programs, recreational fishing and U.S. catches. A small bait fishery was opened in 2024 and 2025 with a TAC of 470 t and 440 t respectively. The landings in Canada were 76 t, 65 t, 549 t and 414 t in 2022–2025, respectively. Data for the last two years are preliminary.

Ecosystem and Climate Change Considerations

Mackerel recruitment is influenced by stock state (including SSB and maternal body condition) and the temporal and spatial match between mackerel larvae and their prey. Uncertainty in future recruitment was acknowledged using different statistical assumptions.

A likely increase in overall mackerel consumption by a variety of predators combined with low mackerel SSB might have increased the natural mortality rate. However, uncertainty in both trends and scales of natural mortality, compounded with technical challenges, currently prevent the explicit incorporation of time-varying mortality into the assessment model.

The ecosystem factors affecting northern contingent mackerel body growth have not yet been specifically investigated. However, no directional trends in weight-at-age have been observed.

Stock Advice

Short term projections

Projections were made over a three-year period to estimate the impact of different TACs (0–8,000 t) and recruitment scenarios (stock-recruitment relationship or average recruitment since 2011) on the projected SSB. Most projections included recreational catches for Canada and the US catches on the northern contingent (Table 1; grey columns). A scenario assuming zero catch from all sources (F=0, first row in Table 1) is included as a baseline stock trajectory under current biological productivity conditions, allowing comparisons with projected trajectories across various levels of TAC and other removals.

The probability that the SSB will increase by 2028 was consistently greater than 50% with a TAC of 1,000 t or less (Table 1). This TAC includes all landings considered to be under Fisheries Management control, including from the commercial and bait fisheries, Section 52 Licenses for scientific sampling, and mackerel caught for bait in the Bluefin Tuna fishery. In the

absence of all fishing, the average probability of stock growth by 2027 and 2028 is greater than 85%, and the stock would likely reach the LRP in 2028 with a 59% probability.

Table 1: Three-year projections under different constant Total Allowable Catch (TAC). Projections were performed under the assumption that mackerel will also be caught outside of the TAC, by both the Canadian (recreational fishing) and U.S. fleets (with 20–80% assumed to be northern contingent fish) (shaded columns; 95%CI). Recruitment was projected using two different methods (individual values reported in parentheses), and the single value represents the average from both methods. For each TAC scenario, the estimated probabilities of June spawning stock biomass (SSB) being greater than the Limit Reference Point (SSB > LRP) in 2027 and 2028 are provided. The probabilities of SSB growth from 2026 to 2027 and 2028 are also provided (SSBy > SSB_{2026}). The ratio of SSB to LRP (SSB/LRP) is likewise given for each scenario for 2027 and 2028.

TAC (t)	Prob(SSB > LRP) %		Prob(SSB_y > SSB_{2026}) %		SSB/LRP		Unaccounted-for landings			
							Canada		U.S.	
	2027	2028	2027	2028	2027	2028	2.5%	97.5%	2.5%	97.5%
0	48 (47-49)	59 (58-60)	85.5 (83-88)	90 (88-92)	0.96 (0.96-0.97)	1.17 (1.14-1.19)	0	0	0	0
0	38 (38-38)	41.5 (40-43)	58.5 (55-62)	57.5 (53-62)	0.78 (0.77-0.79)	0.83 (0.8-0.86)	192	674	1,387	11,719
250	37.5 (37-38)	41 (40-42)	57.5 (54-61)	56 (51-61)	0.77 (0.76-0.78)	0.81 (0.79-0.84)	192	674	1,387	11,719
500	37 (37-37)	40.5 (39-42)	56.5 (53-60)	55.5 (51-60)	0.76 (0.75-0.77)	0.79 (0.77-0.82)	192	674	1,387	11,719
750	37 (37-37)	40 (38-42)	55.5 (52-59)	54.5 (50-59)	0.75 (0.74-0.76)	0.78 (0.76-0.81)	192	674	1,387	11,719
1,000	36.5 (36-37)	39.5 (38-41)	54 (50-58)	53.5 (49-58)	0.74 (0.73-0.75)	0.76 (0.74-0.79)	192	674	1,387	11,719
2,000	34.5 (34-35)	36.5 (35-38)	49.5 (46-53)	49 (45-53)	0.70 (0.68-0.71)	0.71 (0.68-0.73)	192	674	1,387	11,719
3,000	32.5 (32-33)	33.5 (32-35)	45.5 (42-49)	44.5 (41-48)	0.66 (0.64-0.67)	0.64 (0.61-0.67)	192	674	1,387	11,719
4,000	31 (30-32)	31.5 (30-33)	41.5 (38-45)	41 (37-45)	0.62 (0.61-0.63)	0.58 (0.55-0.61)	192	674	1,387	11,719
6,000	27.5 (26-29)	27.5 (26-29)	35 (32-38)	34 (30-38)	0.54 (0.52-0.55)	0.46 (0.43-0.5)	192	674	1,387	11,719
8,000	25 (24-26)	24.5 (23-26)	29 (27-31)	29 (25-33)	0.46 (0.45-0.48)	0.37 (0.34-0.4)	192	674	1,387	11,719

OTHER MANAGEMENT QUESTIONS

The L50 of all cohorts from 2014 onwards (average = 258 mm) has been below the current minimum legal size of 268 mm. The L50 is decreasing and recent values are amongst the lowest observed.

SOURCES OF UNCERTAINTY

Various key uncertainties (unaccounted for fisheries removals, spawning grounds, catch-at-age, egg index, selectivity, recruitment) have been addressed during this and previous stock assessments. Stock status and trends and derived conclusions were consistent across a wide range of sensitivity analyses. Additionally, there is uncertainty in the level and timing of mixing between the northern and southern contingents.

The two main uncertainties are considered to be (not in order of importance)

1. potential temporal variations in the natural mortality rate and
2. the proportion and catches of northern contingent mackerel in the U.S. mackerel fishery.

An increased understanding of these factors is not expected to alter overall conclusions about current stock status, but will affect the estimated impact of fishing on stock status and growth in short term projections.

In recent years, there have been consistent observations from harvesters of abundant mackerel of various sizes throughout parts of Atlantic Canada.

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