



SFA 27A (GEORGES BANK 'A') SEA SCALLOP (*PLACOPECTEN MAGELLANICUS*) UPDATE IN 2025

CONTEXT

The Fisheries Management Branch of Fisheries and Oceans Canada (DFO) has requested that the scallop fishing area (SFA) 27A (Georges Bank 'a') [Sea Scallop \(*Placopecten magellanicus*\)](#) stock be assessed relative to reference points that are consistent with the DFO Precautionary Approach, and provide harvest advice based on various potential catch levels for the 2026 fishery.

This Science Response is from the regional peer review meeting of February 12, 2026 on Stock Status Update of Offshore Scallop (*Placopecten magellanicus*): SFAs 26A (Browns Bank North) and 27A (Georges Bank 'a').

SCIENCE ADVICE

Status

- The median fully-recruited biomass estimate in 2025 was 7,956 t (meats), with greater than 0.99 probability of being in the cautious zone (below the upper stock reference (USR) but above the limit reference point (LRP)).

Trends

- Fully-recruited biomass was in the healthy zone from 2000 to 2024, but decreased by 41% from 13,459 t in 2024 to 7,956 t in 2025, placing it in the cautious zone.
- The median recruit biomass estimate in 2025 was 732 t, which is below the long-term median (1986–2024) of 3,334 t and a decrease of 47% from 2024. Recruit biomass fluctuated above the long-term median from 2008 to 2018, and has decreased since the historically high recruitment event in 2009.
- The estimated proportional exploitation rate has fluctuated below the removal reference (RR) since 1999 and is estimated at 0.2 in 2025. Exploitation increased in 2025, but was comparable to the past 20 years.
- The estimated natural mortality rates for both recruit and fully-recruited scallop have increased since 2019 to 0.5 and 0.45, respectively, in 2025. For recruit scallop, this is the highest value in the time series; for fully-recruited scallops, it is the second highest value.
- In 2025, scallop condition increased by 20% compared to 2024, was above the long-term median, and was within the range of values observed from 1986 to 2022.

Ecosystem and Climate Change Considerations

- Rising bottom temperatures, ocean acidification, and aggregations of predators in areas of high scallop density affect scallop physiology, growth and natural mortality.

Stock Advice

- Based upon preliminary analysis of the 2025 fishery and DFO Maritimes Offshore Scallop Survey data, an interim total allowable catch (TAC) of 500 t (meats) was set for the 2026 SFA 27A fishery.
- A catch of 500 t is estimated to result in an exploitation rate of 0.17 and a 38% decrease in fully-recruited biomass. The probability that a catch of 500 t will result in the fully-recruited biomass being above the LRP is 0.56, and the probability that it will be above the USR is 0.02.
- Catch scenarios ranging from 0–1,000 t for 2026 are expected to result in a decrease in fully-recruited biomass for the stock, and probabilities of dropping below the LRP ranging from 0.37 to 0.50.

BASIS FOR ASSESSMENT

Assessment Details

Year Assessment Approach was Approved

2013 (Hubley et al. 2014)

Assessment Type

Interim Year Update

Most Recent Assessment Date

1. Last Full Assessment: 2025 (DFO 2025b)
2. Last Interim Year Update: 2024 (DFO 2024)

Assessment Approach

1. Broad category: Single stock assessment model
2. Specific category: Delay difference, Biomass dynamics, State-Space

Science advice is provided for this stock using a Bayesian state-space modified delay difference model that integrates both fishery and DFO Maritimes Offshore Scallop Survey (hereafter referred to as the 'survey') data. Additional details on the assessment model can be found in Hubley et al. (2014).

Stock Structure Assumption

The Offshore Sea Scallop fisheries conducted on Georges Bank SFA 27 were split into SFA 27A (Georges Bank 'a') and SFA 27B (Georges Bank 'b') in 1998 based on productivity and historical fishing patterns (Figure A1). SFA 27A was identified as being more productive and has historically represented greater than 70% of the SFA 27 fishery. Stock reference points (USR, LRP, RR) have been adopted for SFA 27A, while SFA 27B has separate management measures.

Reference Points

- Limit reference point (LRP): 30% of B_{MSY} proxy
- Upper stock reference (USR): 80% of B_{MSY} proxy
- Removal reference (RR): 0.25 (when the stock is in the healthy zone)

Maritimes Region

- Target reference point (TRP): Not applied.

SFA 27A LRP and USR reference points are based on 30% and 80% of the long-term mean modelled biomass from 1986 to 2009 (a proxy for B_{MSY} , biomass at maximum sustainable yield), which changes annually as new data are included in the model (Smith and Hubley 2012, Hubley et al. 2014). More details can be found in the Integrated Fisheries Management Plan (DFO 2025a).

Data

- DFO Maritimes Offshore Scallop Survey data (1986–2025)
- Commercial data (1986–2025)

Proportional exploitation rates represent the exploitation over a survey year (September–August) and are reported under the following calendar year (e.g., the 2025 value reflects exploitation from September 2024–August 2025).

In 2020, the DFO Maritimes Offshore Scallop Survey was cancelled due to challenges associated with the COVID-19 pandemic. The 2020 model inputs were imputed using the average of the 2019 and 2021 survey indices, except for growth, which used the long-term median from 1986–2019.

ASSESSMENT

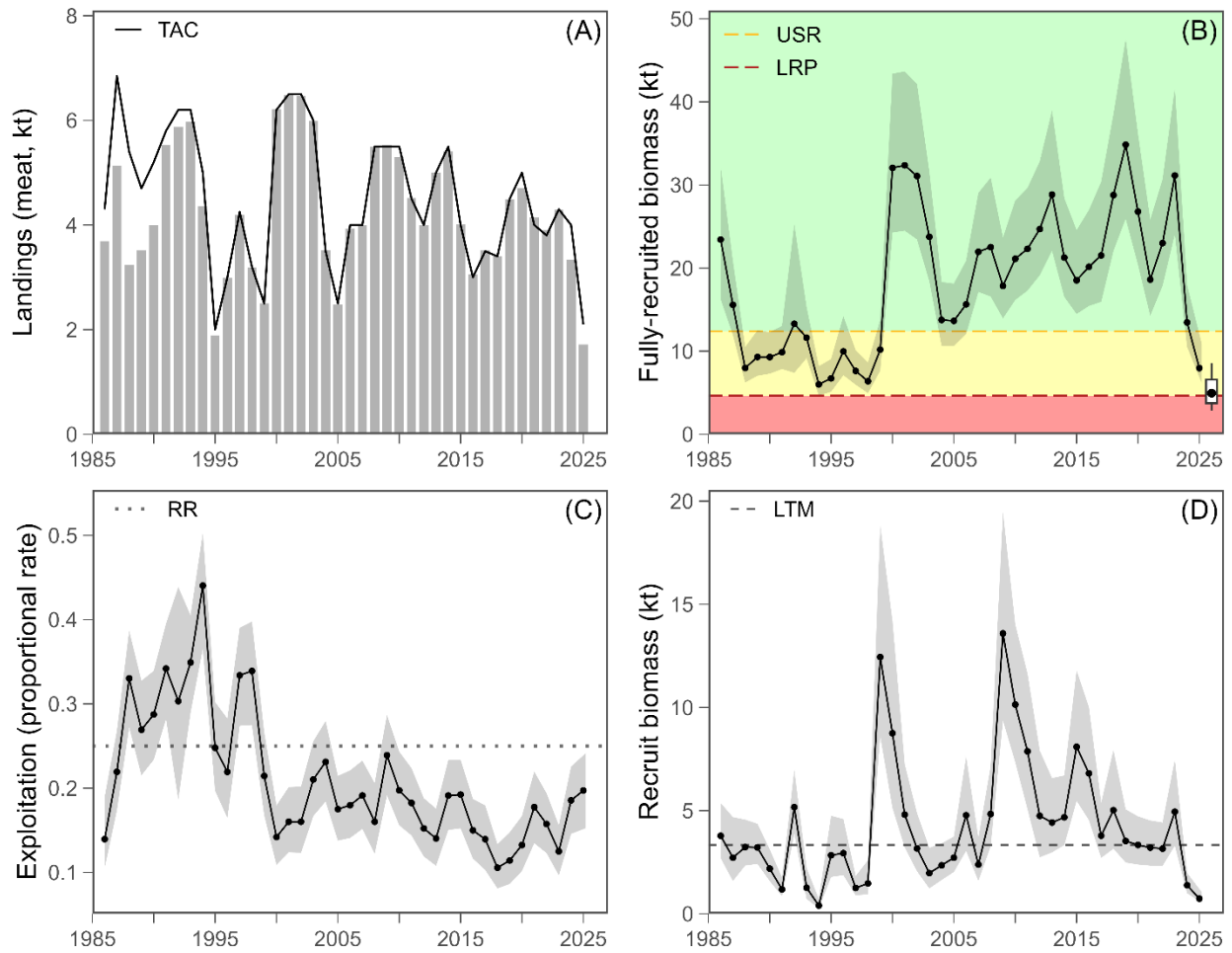


Figure 1. (A) Annual landings of scallop meats (kilotonnes, kt) from scallop fishing area (SFA) 27A between 1986 and 2025. The black solid line represents total allowable catch (TAC). (B) Mean model predicted biomass estimates (kt) for fully-recruited scallops (black solid line) from the stock assessment model fit to the SFA 27A survey and commercial data. The grey shaded region represents the upper and lower 95% credible intervals. Coloured zones (from top to bottom) represent the healthy (green), cautious (yellow) and critical (red) zones in relation to the limit reference point (LRP, red dashed line) and upper stock reference (USR, yellow dashed line). The forecasted fully-recruited biomass for 2026, assuming a catch of 500 t, is displayed as a box plot with median (black dot, •), 50% credible intervals (white box) and 80% credible intervals (black whiskers). (C) Estimated proportional exploitation rate (black solid line) in relation to the target removal reference (RR) in the healthy zone of 0.25 (grey dotted line). The grey shaded region represents the upper and lower 95% credible intervals. Proportional exploitation rates represent the exploitation over a survey year (September–August) and are reported under the following calendar year (e.g., the 2025 value reflects exploitation from September 2024–August 2025). (D) Mean model-predicted biomass estimates (kt) for recruit scallops (black solid line) in relation to the long-term median (1986–2024, LTM) recruit biomass (grey dashed line). The shaded region represents the upper and lower 95% credible intervals.

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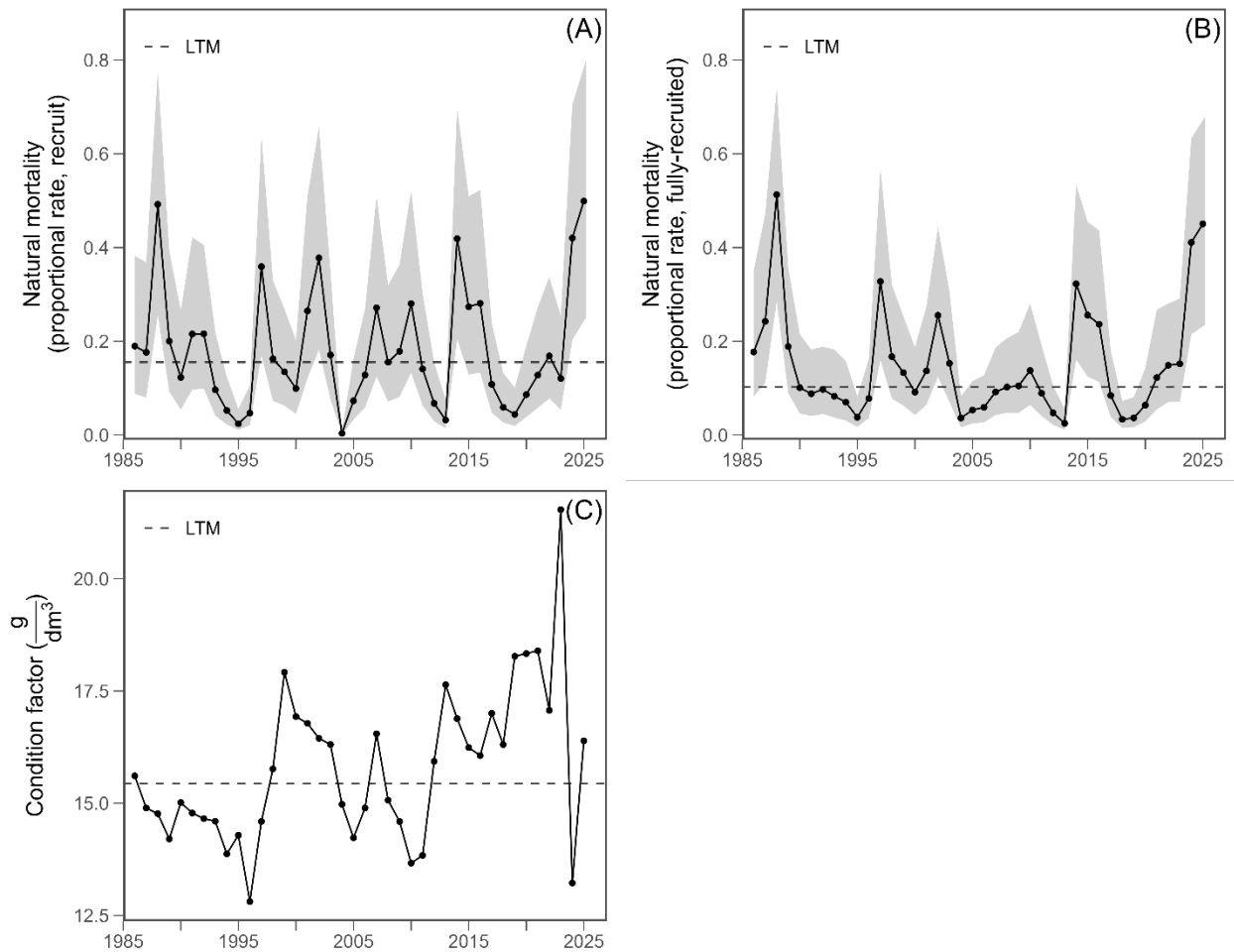


Figure 2. Estimated proportional natural mortality (black solid line) of recruit (A) and fully-recruited (B) scallop, in relation to respective long-term median (1986–2024, LTM) natural mortality rates (grey dashed line). The grey shaded regions represent corresponding upper and lower 95% credible intervals. (C) Survey index of scallop condition factor (grams per cubed decimetre, g/dm^3), in relation to the long-term median (1986–2024) proportional value (grey dashed line).

Stock Status and Trends

Fully-recruited Biomass

Model estimated fully-recruited biomass has been variable and above the USR from 2000 to 2024. Biomass increased from 2021 to 2023 before declining by 74% to 7,956 t in 2025 (Figure 1B). In 2025, the probability that biomass is below the USR and in the cautious zone is greater than 0.99.

Recruit Biomass

Following a period of relative stability near the long-term median of 3,334 t between 2019 and 2022, recruit biomass increased by 57% in 2023, before declining to 732 t in 2025, the lowest level observed since the 1990s (Figure 1D).

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Natural Mortality

The estimated proportional natural mortality of recruit and fully-recruited scallop have fluctuated within consistent ranges (between 0.01–0.5 and 0.02–0.5 for recruit and fully-recruited scallops, respectively) throughout their respective time series. Elevated values occur approximately every 5–8 years for recruit and every 7–10 years for fully-recruited scallop (Figures 2A and 2B). The proportional natural mortality rates for both recruit and fully-recruited scallop have tended to increase since 2018–2019, with an abrupt jump observed in 2024. In 2025, the estimated natural mortality of recruit scallop was the highest in the time series, while the value for fully-recruited scallop was the highest value since 1988.

Fishing Mortality

Over the past decade (2015–2025) proportional exploitation rates have varied within a relatively consistent range (between 0.1–0.2, Figure 1C). Between 2024 and 2025, the estimated proportional exploitation rate was 0.2.

Condition

Scallop condition factor (meat weight given shell height) in 2023, as measured by the DFO Maritimes Offshore Scallop Surveys of Georges Bank and Scotian Shelf, increased by 26% to the highest observed value in the time series. In 2024, condition factor decreased by 39% to the second lowest value in the time series. In 2025, condition factor increased by 20% to 16.4 g/dm³, which is above the long-term median and within the range of estimates from 1986 to 2022 (Figure 2C).

Current Status

The 2025 median fully-recruited biomass estimate of 7,956 t (meats) is below the USR, with a greater than 0.99 probability of being in the cautious zone (below the USR but above the LRP).

History of Landings & Total Allowable Catch (TAC)

Scallop landings have been monitored for Georges Bank (SFA 27) since 1984 (Figure 1A). The current monitoring structure began in 1998, when Georges Bank was divided into SFA 27A (Georges Bank 'a') and SFA 27B (Georges Bank 'b') for quota allocation purposes (DFO 2025a). Table 1 shows the total annual landings, and associated TACs (pre-quota reconciliation), for SFA 27A since the separation of Georges Bank.

**SFA 27A Sea Scallop Stock
Assessment in 2025**

Maritimes Region

Table 1. Annual total allowable catch (TAC), scallop landings (meats, weight in tonnes) and effort (in hour-metres) by calendar year for scallop fishing area (SFA) 27A from 1986 to 2025. TAC values are pre-quota reconciliation. The landings values shown are those used in the model and are based on logbook data available to DFO Science.

Year	TAC	Landings	Effort
1986	4,300	3,693	369,650
1987	6,850	5,129	558,578
1988	5,400	3,230	620,501
1989	4,700	3,513	560,623
1990	5,200	3,990	533,819
1991	5,800	5,525	539,011
1992	6,200	5,877	597,364
1993	6,200	5,967	510,713
1994	5,000	4,356	514,137
1995	2,000	1,894	334,724
1996	3,000	2,990	288,747
1997	4,250	4,198	323,617
1998	3,200	3,191	399,456
1999	2,500	2,503	219,217
2000	6,200	6,212	150,704
2001	6,500	6,480	266,216
2002	6,500	6,469	155,789
2003	6,000	5,985	381,438
2004	3,500	3,518	327,489
2005	2,500	2,484	257,083
2006	4,000	3,931	312,210
2007	4,000	4,000	137,101
2008	5,500	5,498	307,876
2009	5,500	5,524	316,862
2010	5,500	5,300	349,298
2011	4,500	4,517	260,938
2012	4,000	4,001	193,870
2013	5,000	5,001	183,759
2014	5,500	5,407	218,678
2015	4,000	4,016	191,880
2016	3,000	3,054	141,830
2017	3,500	3,514	133,584
2018	3,400	3,397	125,351
2019	4,500	4,493	126,861
2020	5,000	4,706	182,777
2021	4,000	4,140	114,413
2022	3,800	3,906	124,506
2023	4,300	4,289	111,518
2024	4,000	3,335	172,152
2025	2,100	1,713	161,532

Ecosystem and Climate Change Considerations

Sea scallops are largely sedentary molluscs and are susceptible to climate change stressors, such as, rising bottom temperatures and ocean acidification which affect scallop physiology and growth (Rheuban et al. 2018). Annual growth rates are calculated using a combination of scallop condition (meat weight given shell height) and expected shell growth (Keith et al. 2025). Large interannual shifts in condition have been shown to cause substantial increases in biomass estimates without corresponding increases in abundance (DFO 2024). Observations of significant interannual changes in scallop condition are likely driven by variability in environmental conditions (Laing 2000, Liu et al. 2021). However, direct environmental monitoring and climate research are limited for SFA 27A and other Scotian Shelf stocks. As a result, potential effects are inferred from findings in other regions.

Shifts in predator distributions and increasing predator abundance in northern waters may also present emerging risks. Research survey data suggests that predator abundance, including sea stars (*Asterias spp.*) and crabs (*Cancer spp.*), has increased within areas of known scallop distribution, although the reasons for this are unclear. Aggregations of predators in areas of high scallop density may contribute to increases in natural mortality, particularly for pre-recruit (less than 85 mm shell height) sized scallops (Elner and Jamieson 1979, Barbeau and Scheibling 1994, Wong and Barbeau 2005). High densities of predators and dead scallops (clappers) observed in other regions reinforce the need for continued monitoring of the distribution and abundance of predators.

Projections

The projected fully-recruited biomass for 2026 is 4,945 t. This projection accounts for fisheries removals (486 t) occurring after the survey in 2025 and assumes:

- a catch of 500 t (the interim TAC set in December 2025),
- the condition of scallop in 2026 will be unchanged from 2025 (16.4 g/dm³), and
- that proportional natural mortality of recruit and fully-recruited scallops in 2026 will be unchanged from 2025 (0.5 and 0.45, respectively).

Catch scenarios ranging from 0 t to 1,000 t are presented in Table 2. All catch scenarios evaluated are projected to result in decreases in fully-recruited biomass, with a probability of biomass decline ranging from 0.86 with no catch to 0.92 for a catch of 1,000 t. The expected change in biomass varies from -34% to -42% for the catch scenarios examined.

In a no-catch scenario, the probability that the stock biomass will be in the healthy zone (above the USR) is 0.02, the probability that the stock biomass will be in the cautious zone (between the USR and LRP) is 0.61, and the probability that the stock biomass will be in the critical zone (below the LRP) is 0.37. The probability that the stock biomass will be in the cautious zone is 0.54 for a catch of 500 t (the 2026 interim TAC), and 0.49 for a catch of 1,000 t. The 2026 interim TAC is projected to result in a proportional exploitation rate of 0.17 and an expected 38% decrease in fully-recruited biomass from 2025 to 2026.

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Table 2. Decision table for the limit reference point (LRP) and upper stock reference (USR) for 1-year projections using catch scenarios ranging from 0 t to 1,000 t for scallop fishing area (SFA) 27A. Potential catches in 2026 are evaluated in terms of the expected exploitation rate (proportional) and change in fully-recruited biomass, and the probability of a decline in biomass. These probabilities account for uncertainty in the biomass forecasts.

Catch (t)	Exploitation Rate	Probability of Biomass Decline	Expected Change in Biomass (%)	Probability biomass will be below LRP	Probability biomass will be below USR
0	0.08	0.86	-34	0.37	0.98
100	0.10	0.86	-35	0.39	0.98
200	0.12	0.87	-36	0.40	0.98
300	0.13	0.88	-36	0.41	0.98
400	0.15	0.88	-37	0.43	0.98
500*	0.17	0.89	-38	0.44	0.98
600	0.18	0.90	-39	0.44	0.99
700	0.20	0.90	-39	0.46	0.98
800	0.21	0.90	-40	0.47	0.99
900	0.23	0.91	-41	0.49	0.99
1000	0.24	0.92	-42	0.50	0.99

SOURCES OF UNCERTAINTY

Delay-difference models, and the predictions from these models, are known to respond more slowly than the actual changes in productivity when rapid changes occur (National Research Council et al. 1998, Jonsen et al. 2009), such as the observed changes in natural mortality and condition since 2023.

The modelled natural mortality terms are informed by survey clapper indices, however there are additional sources of mortality that may not be captured with a clapper-informed index. These sources of mortality include predation that does not result in clappers along with incidental and discard mortality from the fishery (Hubley et al. 2014).

The basis for the science advice to management for 2026 assumes the 2025 proportional natural mortality estimates for recruit and fully-recruited scallops, and assumes no change in condition from 2025 to 2026. If natural mortality and/or condition change in 2026, the biomass projections (and consequent decision table probabilities) would be affected.

LIST OF MEETING PARTICIPANTS

Name	Affiliation
Freya Keyser (Lead)	DFO Science, Maritimes Region
David Keith	DFO Science, Maritimes Region
Tricia Pearo Drew	DFO Science, Maritimes Region
Sophia Harder	DFO Science, Maritimes Region
Nathan Hebert	DFO Science, Maritimes Region
Andrew Harbicht	DFO Science, Gulf Region
Alan Reeves	DFO Resource Management, Maritimes Region
Tara McIntyre	DFO Science, Maritimes Region

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APPENDIX

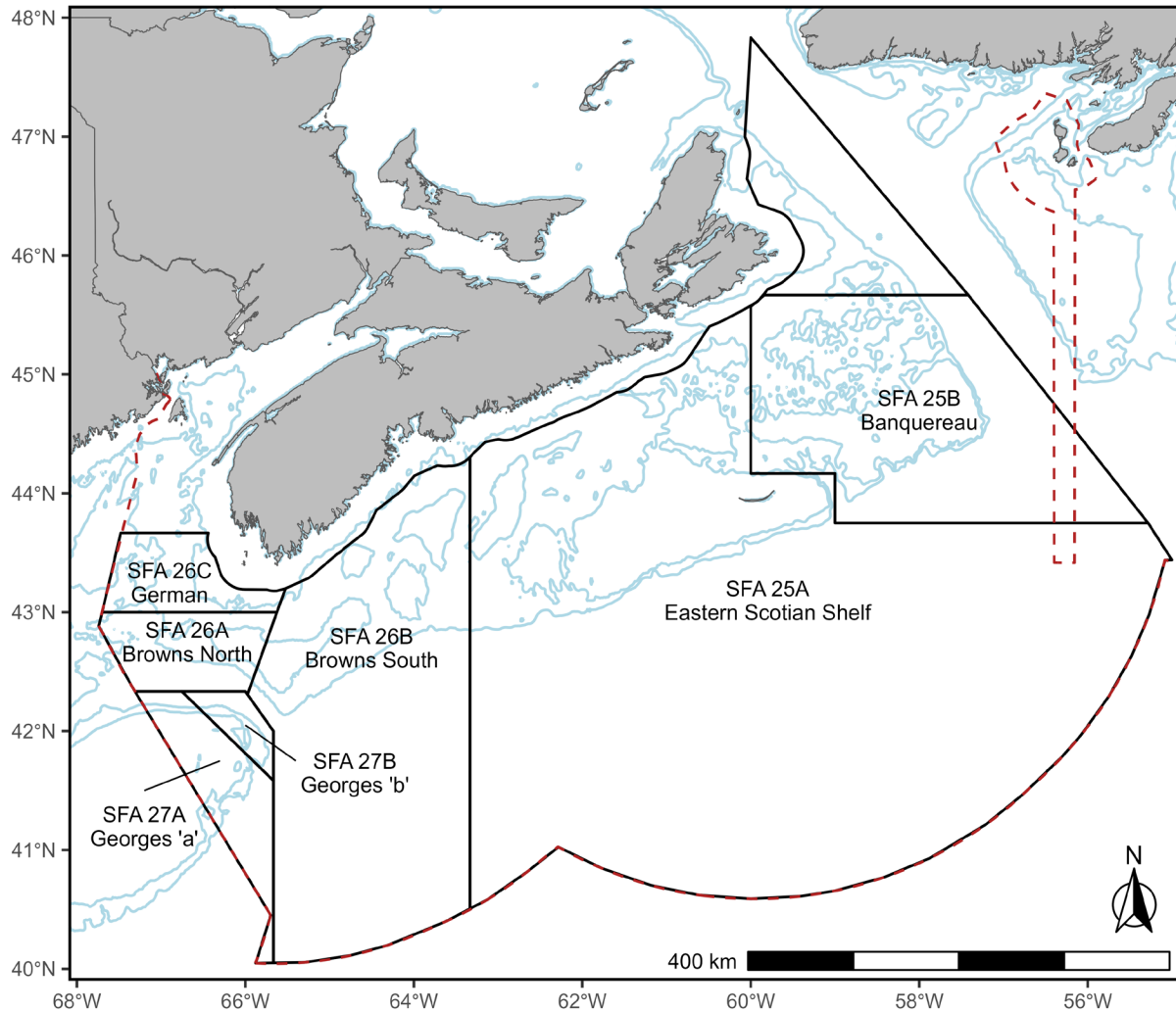


Figure A1. Offshore scallop fishing areas (SFAs) 25–27 used for management purposes in the DFO Maritimes Region. Bathymetry is shown as 50 m contours (blue lines), SFAs are outlined in black, and the Exclusive Economic Zone (EEZ) boundary is indicated by a red dashed line.

THIS REPORT IS AVAILABLE FROM THE:

Centre for Science Advice (CSA)
Maritimes Region
Fisheries and Oceans Canada
1 Challenger Drive, PO Box 1006
Dartmouth, Nova Scotia B2Y 4A2
Canada

E-Mail: MaritimesRAP.XMAR@dfo-mpo.gc.ca
Internet address: www.dfo-mpo.gc.ca/csas-sccs/

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