Fisheries and Oceans Canada | Pêches et Océans Canada
Ecosystems and Oceans Science | Sciences des écosystèmes et des océans

Quebec Region

Canadian Science Advisory Secretariat
Science Advisory Report 2026/021

ASSESSMENT OF SOFTSHELL CLAM (*MYA ARENARIA*) STOCKS IN QUEBEC COASTAL WATERS IN 2025 AND PROPOSAL OF REFERENCE POINTS

CONTEXT

Fisheries and Oceans Canada (DFO) Fisheries Management has requested science advice on the status of softshell clam (*Mya arenaria*) stocks in Quebec coastal waters, as well as the determination of limit reference points (LRPs) and proposed upper stock reference (USR) points for the harvested areas of Quebec.

The commercial softshell clam fishery is conducted on the Upper North Shore (sub-areas 1A, 1B and 1C) and in the Magdalen Islands (Area 5). In addition, softshell clams are also harvested through recreational, and food, social and ceremonial (FSC) fisheries in several areas, where the health status of the stocks remains unknown.

This Fisheries Science Advisory Report is from the regional peer review meeting of February 4, 2026, on Quebec's Coastal Waters Softshell Clam (*Mya arenaria*) Stocks Assessment in 2025 and Proposal of Reference Points. 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 spawning potential ratio (SPR) for 2025 in sub-area 1A of the Upper North Shore and Area 5 of the Magdalen Islands is higher than the proposed USR, placing these stocks in the healthy zone of the precautionary approach (PA).
- In the absence of indicators of clam size at landing since 2022 in sub-area 1B, as well as the absence of fishing activity since 2016 in sub-area 1C, the status of these stocks cannot be determined.

Trends

- Landings have been low and stable for at least the past ten years in sub-areas 1A and 1B of the Upper North Shore, as well as in the Magdalen Islands.
- The average size of clams landed between 2023 and 2025 in sub-area 1A is above the historical average, while in the Magdalen Islands it is slightly below the historical average.
- The SPR has been high and stable in sub-area 1A since 2018, whereas it has been high but variable in the Magdalen Islands since the beginning of the time series in 2004.

Ecosystem and Climate Change Considerations

- Overall, surface water temperature has increased over the past five years, while ice cover has decreased in both the Upper North Shore and the Magdalen Islands. Significant

interannual variability in river flow has also been observed on the Upper North Shore. However, these changes in the coastal ecosystem and their effects on the productivity of softshell clam stocks remain unquantified.

Stock Advice

- Over the past ten years, landings and fishing pressure have remained at historically low levels. In most areas of the Upper North Shore, the total allowable catches (TACs) established in 2015 have never been reached. Under these circumstances, current harvesting levels are not expected to pose a risk to stock status.

Other Management Questions

- In the Lower St. Lawrence region, the 2024 survey conducted in the Ha! Ha! Bay area indicates a high abundance of sub-legal size clams (<51 mm) and a low abundance of legal size clams, suggesting a limited capacity to sustain high fishing pressure.
- In the Chaleur Bay area of the Gaspé Peninsula, the lack of suitable sedimentary habitat in the Miguasha and Groseilles Island areas, which are currently open to recreational fishing, does not allow for the development of productive clam beds.

BASIS FOR ASSESSMENT

Assessment Details

Year Assessment Approach was Approved

The assessment approach was adopted in this assessment (Gianasi and Desrosiers, in prep.).

Assessment Type

Full Assessment

Most Recent Assessment Date

1. Last Full Assessment: February 2023 (DFO 2023)
2. Last Interim-Year Update: N/A

Stock Assessment Approach

1. Broad category: Limited data
2. Specific category: Length-based spawning potential ratio (LB-SPR) (Hordyk et al. 2015)

Stock Structure Assumption

The softshell clam populations of the estuary and the northern Gulf of St. Lawrence are genetically distinct from those of the Magdalen Islands and the southern Gulf (St-Onge et al. 2013). However, precise information on the origin of recruitment in each shellfish harvest area is not available. In this case, reference points were calculated by taking into account all shellfish harvest areas in each sub-area of the Upper North Shore (1A, 1B and 1C) and for Area 5 of the Magdalen Islands.

Reference Points

- Limit Reference Point (LRP): 20% of the spawning potential ratio

- Proposed Upper Stock Reference (USR): 40% of the spawning potential ratio
- Removal Reference (RR): N/A
- Target Reference Point (TRP): N/A

Data

- Commercial landings: 1917–2025 (by region), 2003–2025 (by shellfish harvest area)
- Commercial fishing effort: 2003–2025
- Commercial dockside sampling: 2004–2025
- Bed surveys conducted in 2023 and 2024

ASSESSMENT

Stock status and trend in sub-area 1A of the Upper North Shore

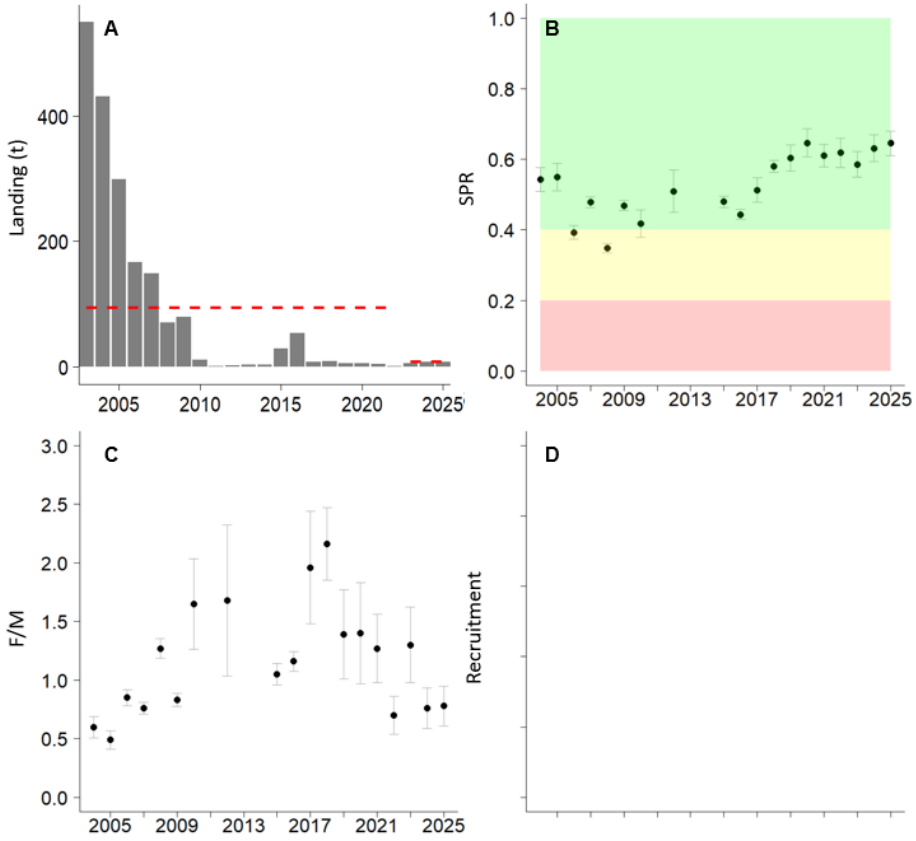

Figure 1. Stock status in sub-area 1A of the Upper North Shore. (A) Annual landings (t). The red dotted lines represent the historical average for 2003–2022 and the average for 2023–2025. (B) Spawning potential ratio (SPR). The healthy, cautious and critical zones are shown in green, yellow and red, respectively. (C) Ratio of fishing mortality to natural mortality (F/M). (D) Recruitment data are not available.

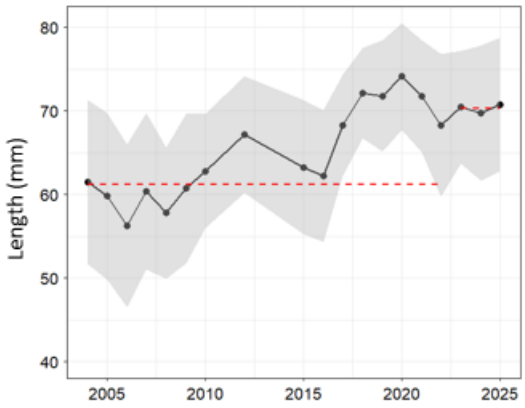

Figure 2. Average size (mm ± SD) of softshell clams landed in sub-area 1A of the Upper North Shore. The dotted lines represent the historical average for 2004–2022 and the average for 2023–2025.

Landings

Landings have declined sharply since the early 2000s (Figure 1A). A slight increase was observed in 2015 and 2016, but they subsequently declined again and remained at low levels. The average annual landing across all shellfish harvest areas for 2023–2025 was 7.2 t, well below the historical average of 94.1 t for 2003–2022.

Spawning Potential Ratio (SPR)

Between 2016 and 2020, the SPR increased and then stabilized at high values. The stock has remained in the healthy zone since 2009 (Figure 1B).

F/M

After peaking in 2018, the ratio of fishing mortality to natural mortality has been declining ever since (Figure 1C).

Average Size

The average size of landed clams increased from 56 mm in 2006 to 74 mm in 2020 (Figure 2). It declined to 68 mm in 2022 and has remained stable since. The average size for 2023–2025 was 70 mm, well above the historical average of 61 mm for 2004–2022.

Current Status

The stock in sub-area 1A has remained in the healthy zone since 2009. Total landings are well below the historical average, and TACs in recently exploited shellfish harvest areas have never been reached. In addition, the average size of landed clams exceeds both the legal size and the historical average. Current harvest levels are, therefore, not expected to pose a risk to stock status.

Stock status and trend in sub-area 1B of the Upper North Shore

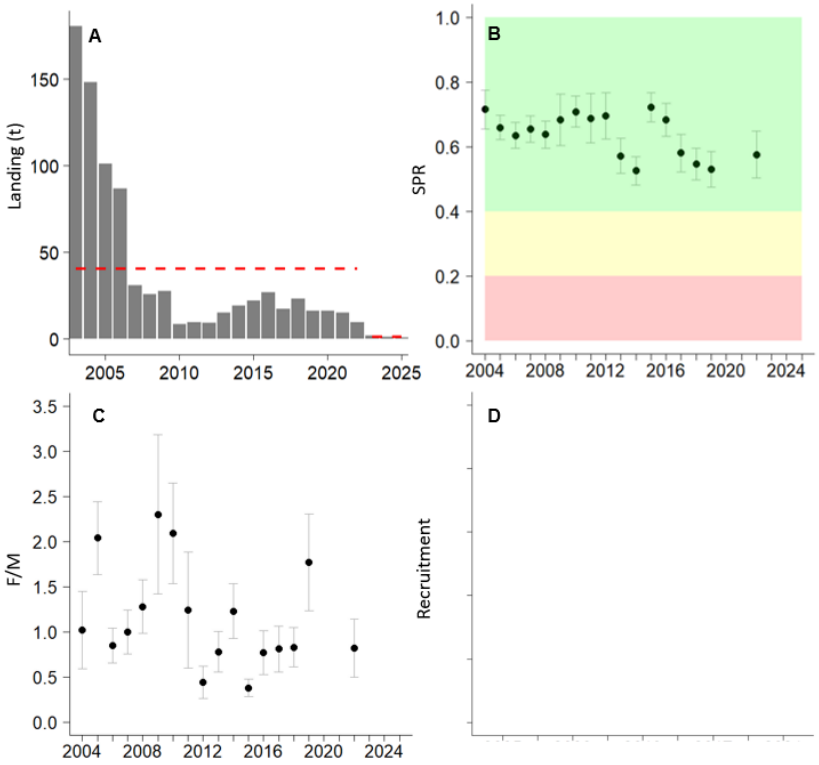

Figure 3. Stock status in sub-area 1B of the Upper North Shore. (A) Annual landings (t). The red dotted lines represent the historical average for 2003–2022 and the average for 2023–2025. (B) Spawning potential ratio (SPR). Healthy, cautious and critical zones are shown in green, yellow and red, respectively. (C) Ratio of fishing mortality to natural mortality (F/M). (D) Recruitment data are not available.

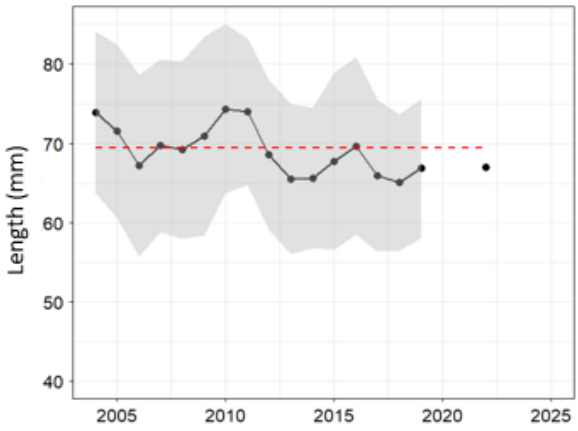

Figure 4. Average size (mm ± SD) of softshell clams landed in sub-area 1B of the Upper North Shore. The dotted line represents the historical average for 2004–2022.

Landings

Landings have declined sharply since the early 2000s (Figure 3A). A period of slight increase followed by stabilization occurred between 2013 and 2021. More recently, landings have reached the lowest levels observed in the time series. The average annual landing across all shellfish harvest areas for 2023–2025 in sub-area 1B was 1.2 t, well below the historical average of 40.5 t for 2003–2022.

Spawning Potential Ratio (SPR)

The SPR remained high and relatively stable until 2012, after which it became more variable. Despite these fluctuations, it has remained within the healthy zone since the beginning of the time series in 2004 (Figure 3B).

F/M

The ratio of fishing mortality to natural mortality peaked in 2009 and subsequently declined until 2016. From 2016 to 2022, it remained generally stable, with the exception of a higher value observed in 2019 (Figure 3C).

Average Size

The average size of landed clams peaked at approximately 74 mm in 2010 (Figure 4), then declined to 65 mm in 2018. In 2022, the average size was 67 mm. No length measurements have been collected since 2023.

Current Status

From 2004 to 2022, the stock in sub-area 1B remained in the healthy zone. Since 2023, the absence of size-at-landing indicators has prevented the determination of current stock status. Nevertheless, very low landings in recent years do not suggest a change in the stock’s status. TACs have not been reached in any shellfish harvest area since 2015.

Stock status and trend in sub-area 1C of the Upper North Shore

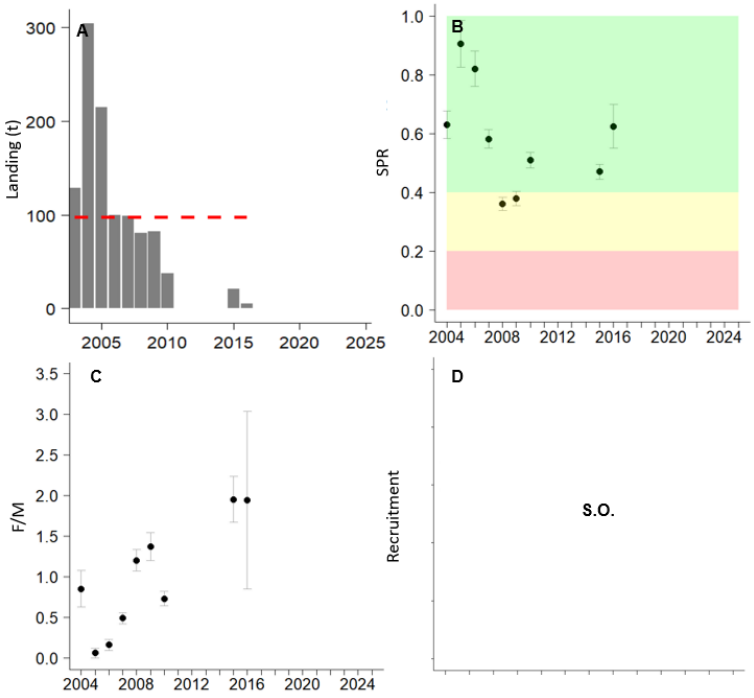

Figure 5. Stock status in sub-area 1C of the Upper North Shore. (A) Annual landings (t). The red dotted line represents the historical average for 2003–2016. (B) Spawning potential ratio (SPR). Healthy, cautious and critical zones are shown in green, yellow and red, respectively. (C) Ratio of fishing mortality to natural mortality (F/M). (D) Recruitment data are not available.

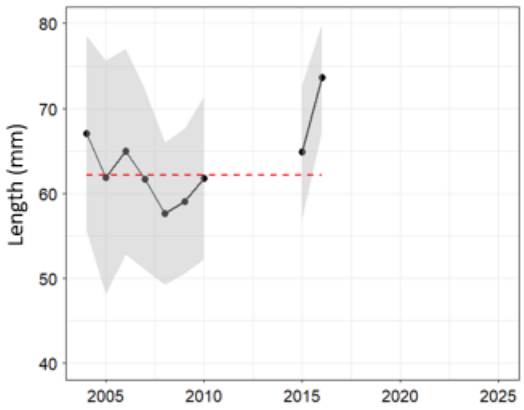

Figure 6. Average size (mm ± SD) of softshell clams landed in sub-area 1C of the Upper North Shore. The dotted line represents the historical average for 2004–2016.

Landings

Landings peaked at 304 t in 2004, then declined sharply to 5 t by 2016. No commercial fishing has occurred since that time (Figure 5A).

Spawning Potential Ratio (SPR)

During the last years of harvesting (2015 and 2016), the SPR indicated that the stock was in the healthy zone (Figure 5B).

F/M

During the same period, the ratio of fishing mortality to natural mortality remained stable (Figure 5C).

Average Size

The average size of landed clams reached a low point in 2008, at around 57 mm, before subsequently increasing (Figure 6). In 2016, the average size was 73 mm. No clams have been measured since 2016.

Current Status

During the last years of harvesting, in 2015 and 2016, the stock in sub-area 1C was in the healthy zone. However, the current stock status cannot be determined.

Stock status and trend in Area 5 of the Magdalen Islands

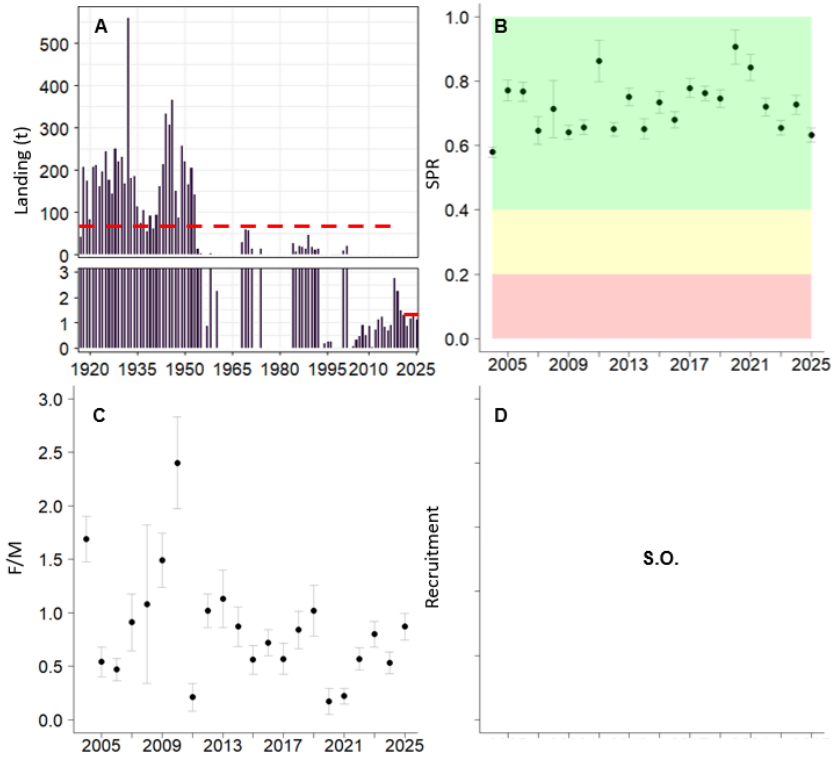

Figure 7. Stock status in Area 5 of the Magdalen Islands. (A) Annual landings (t). The lower part of the graph shows a close-up of landings below 3 t. The red dotted lines represent the historical average for 1917–2022 and the average for 2023–2025. (B) Spawning potential ratio (SPR). Healthy, cautious and critical zones are shown in green, yellow and red, respectively. (C) Ratio of fish mortality to natural mortality (F/M). (D) Recruitment data are not available.

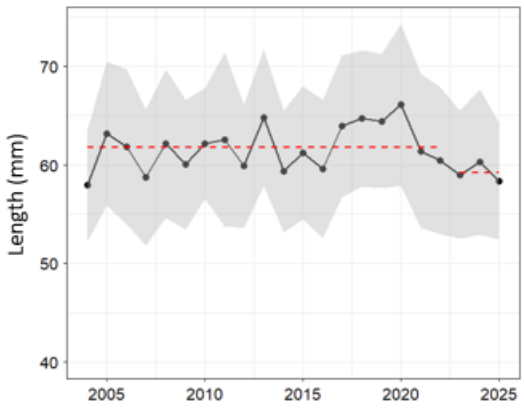

Figure 8. Average size (mm ± SD) of softshell clams landed in Area 5 of the Magdalen Islands. The red dotted lines represent the historical average for 2004–2022 and the average for 2023–2025.

Landings

Between 1917 and 1955, annual landings exceeded 200 t before declining sharply. Since 2003, landings have remained at approximately 1 t per year. The average annual landing for 1917–2022 was 74 t, compared with 1.2 t for 2023–2025 (Figure 7A).

Spawning Potential Ratio (SPR)

The SPR has been variable but consistently high, placing the stock in the healthy zone since the beginning of the time series in 2004 (Figure 7B).

F/M

Since 2013, the ratio of fishing mortality to natural mortality has remained relatively stable (Figure 7C).

Average Size

The average size of landed clams has remained relatively stable since 2004, ranging from 58 to 66 mm (Figure 8). The average size for 2023–2025 was 59 mm, slightly below the historical average of 61 mm for 2004–2022.

Current Status

The stock in Area 5 of the Magdalen Islands has remained in the healthy zone since 2004. Landings in recent years have remained low. The average size of landed clams is above the legal size limit, despite a slight decrease compared to the historical average. Current harvest levels are not expected to pose a risk to stock status.

History of Landings

From 1917 to the mid 1950s, commercial landings of softshell clam originated almost exclusively from the Magdalen Islands (Figure 9). Subsequently, landings from the Islands declined, while those from Gaspé–Lower St. Lawrence and the North Shore increased. Since the late 1960s, the commercial fishery has been concentrated primarily on the North Shore, particularly on the Upper North Shore since 1993.

Total landings in Quebec increased markedly in the mid 1990s, peaking in 2000 at 1,173 t, before declining sharply. In 2025, landings totalled 8.2 t on the Upper North Shore and 1.1 t in the Magdalen Islands, for a total of 9.3 t for all of Quebec, one of the lowest values observed in

the time series (Figure 9). No commercial landings have been reported on the Middle North Shore or Gaspé–Lower St. Lawrence since 2008, nor on the Lower North Shore since 1985.

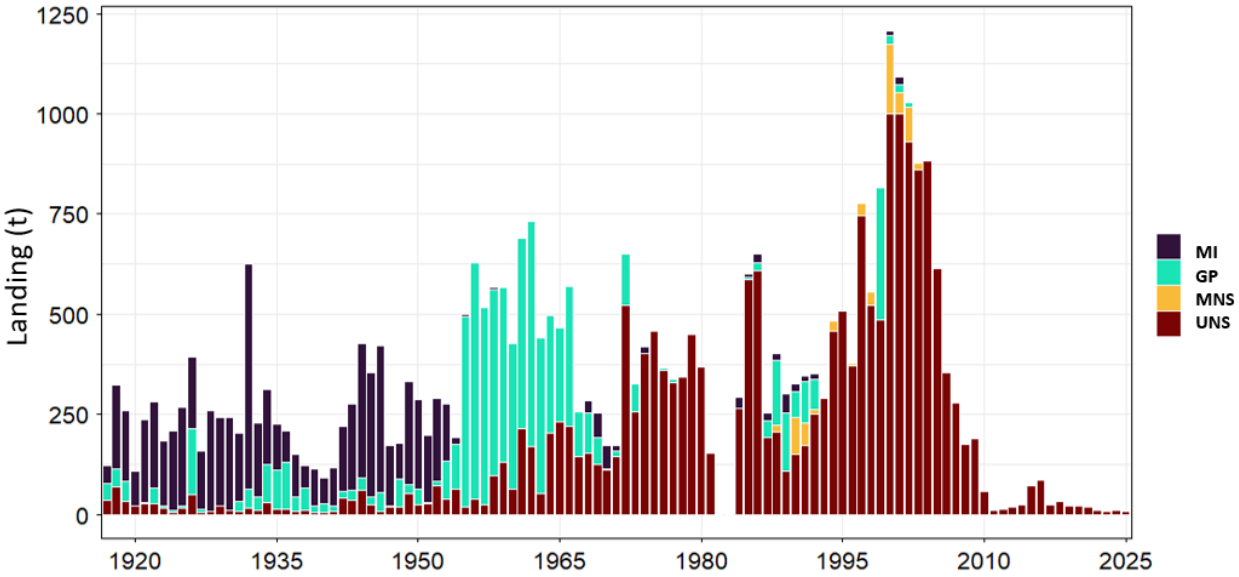

Figure 9. Total annual commercial landings (t) of softshell clams on the Upper North Shore (UNS), Middle North Shore (MNS), Gaspé Peninsula (GP) and Magdalen Islands (MI).

Ecosystem and Climate Change Considerations

The dynamics of the softshell clam stock are closely linked to environmental conditions and coastal ecosystem characteristics. They depend heavily on the type of sediment substrate, habitat stability, and physicochemical conditions that influence growth, reproduction and survival.

Recent years have seen an upward trend in surface water temperature and a long-term decrease in sea ice thickness (Dumas et al., in preparation). On the Upper North Shore, surface temperatures are higher in the fall, and sea ice thickness has decreased by approximately 4 cm per decade. In the Magdalen Islands, changes are more pronounced, with higher surface temperatures in all seasons, particularly in the fall, and a reduction in ice thickness of approximately 7 cm per decade. River flow on the Upper North Shore exhibits strong interannual variability, with no clear trend in recent years (Dumas et al., in preparation).

These environmental changes may affect biological processes of softshell clams, particularly metabolism, reproduction and larval survival. Coastal acidification and salinity variability associated with freshwater inputs may limit local distribution and negatively affect shell formation and strength, particularly in juveniles. In addition, storms and shoreline erosion can disrupt softshell clam beds and cause localized biomass losses. However, the combined effects of these factors on stock productivity remain poorly quantified.

OTHER MANAGEMENT QUESTIONS

As part of the monitoring of recreational softshell clam harvesting, surveys were conducted in 2023 and 2024 in selected areas of the Lower St. Lawrence and Gaspé Peninsula / Chaleur Bay. These included areas open to recreational harvesting (Miguasha, Groseilles Island and

Northeast Saint-Jean River), temporarily closed areas (Ha! Ha! Bay and Mercier Cove), and permanently closed areas (Nouvelle River Basin and Orignal Cove).

Results indicate that the type of sediment substrate is the primary factor influencing clam distribution. Fine sediments (mud, sand, muddy sand) provide optimal habitat, supporting dense and extensive populations. The most productive areas occur in sheltered environments, such as Nouvelle River Basin and the Northeast Saint-Jean River estuary. In contrast, Ha! Ha! Bay, Mercier Cove, Miguasha and Groseilles Island are characterized by coarse substrates (gravel, coarse sand, rock) that limit the development of productive beds. In these areas, clams are confined in small pockets of soft sediment or crevices, which limit the harvestable area of the bed.

The closure of Ha! Ha! Bay and Mercier Cove since 2019 appears to have promoted recruitment, as evidenced by the high proportion of sub-legal size softshell clams (<51 mm) observed in 2024. However, the density of legal size clams remains low and the harvestable area limited, indicating that this area cannot sustain high fishing pressure (Figure 10).

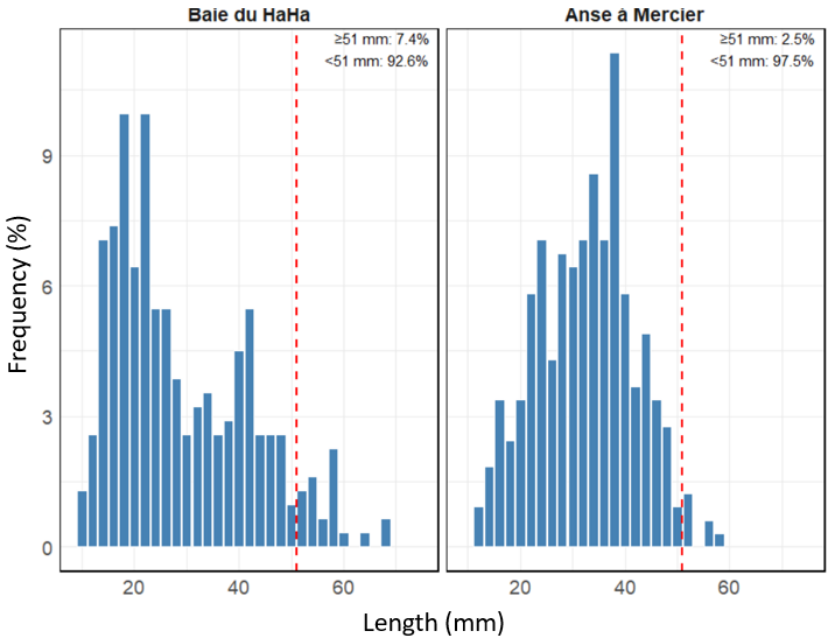

Figure 10. Frequency distribution (%) of softshell clam size classes measured during the 2024 survey in Ha! Ha! Bay and Mercier Cove. The red dotted line represents the minimum legal size (51 mm).

SOURCES OF UNCERTAINTY

Recreational harvesting is permitted along much of Quebec's coastline; however, limited information from the recreational sector makes it difficult to accurately estimate total landings and fishing effort across regions. In addition, the absence of independent fishery indicators, such as research surveys, means that science advice on softshell clam relies heavily on the quality of data from logbooks, purchase receipts, and commercial catch sampling.

The LB-SPR model is an assessment tool used to estimate stock status when data are limited. It relies primarily on length-frequency distributions from commercial fisheries, as well as several assumptions regarding biological parameters, such as growth and natural mortality. Model outputs are therefore highly sensitive to the biological parameters applied. Accurate and representative estimates of these parameters are essential to ensure robust conclusions.

Because size-at-landing data constitute the primary input to the model, it is critical that measured lengths accurately reflect the size structure of softshell clams landed in each fishing area.

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SOURCES OF INFORMATION

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