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Sciences des écosystèmes
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Canadian Science Advisory Secretariat (CSAS)

Proceedings Series 2017/019

Quebec Region

Proceedings of the regional peer review meeting on the assessment of softshell clam stocks in Quebec coastal waters

February 16, 2017

Maurice Lamontagne Institute

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Foreword

The purpose of these Proceedings is to document the activities and key discussions of the meeting. The Proceedings may include research recommendations, uncertainties, and the rationale for decisions made during the meeting. Proceedings may also document when data, analyses or interpretations were reviewed and rejected on scientific grounds, including the reason(s) for rejection. As such, interpretations and opinions presented in this report individually may be factually incorrect or misleading, but are included to record as faithfully as possible what was considered at the meeting. No statements are to be taken as reflecting the conclusions of the meeting unless they are clearly identified as such. Moreover, further review may result in a change of conclusions where additional information was identified as relevant to the topics being considered, but not available in the timeframe of the meeting. In the rare case when there are formal dissenting views, these are also archived as Annexes to the Proceedings.

Published by:

Fisheries and Oceans Canada
Canadian Science Advisory Secretariat
200 Kent Street
Ottawa ON K1A 0E6

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csas-sccs@dfo-mpo.gc.ca](http://www.dfo-mpo.gc.ca/csas-sccs/csas-sccs@dfo-mpo.gc.ca)



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ISSN 1701-1280

Correct citation for this publication:

DFO. 2017. Proceedings of the regional peer review meeting on the assessment of softshell clam stocks in Quebec coastal waters; February 16, 2017. DFO Can. Sci. Advis. Sec. Proceed. Ser. 2017/019.

Aussi disponible en français :

MPO. 2017. Compte rendu de l'examen régional par des pairs sur l'évaluation de la mye des eaux côtières du Québec ; le 16 février 2017. Secr. can. de consult. sci. du MPO, Compte rendu 2017/019.

SUMMARY

This document contains the proceeding from the meeting held within the regional Assessment of Softshell Clam Stocks in Quebec's Coastal Waters. This review process was held on February 16th, 2017 at the Maurice Lamontagne Institute in Mont-Joli. This meeting gathered about twenty participants from sciences, management and industry. This proceeding contains the essential parts of the presentations and discussions held and relates the recommendations and conclusions that were presented during the review.

SOMMAIRE

Ce document renferme le compte rendu de l'examen régional par des pairs portant sur l'évaluation de la mye des eaux côtières du Québec. Cette revue, qui s'est déroulée le 16 février 2017 à l'Institut Maurice-Lamontagne, à Mont-Joli, a réuni une vingtaine de participants des sciences, de la gestion et de l'industrie. Ce compte rendu contient l'essentiel des présentations et des discussions qui ont eu lieu pendant la réunion et fait état des recommandations et conclusions émises au moment de la revue.

INTRODUCTION

The Quebec Region of Fisheries and Oceans Canada (DFO) is responsible for assessing several stocks of fish and invertebrate species harvested in the Estuary and Gulf of St. Lawrence. Most of these stocks are periodically assessed as part of a regional advisory process conducted at the Maurice Lamontagne Institute in Mont-Joli. This document reports on the proceedings of the meeting held on February 16, 2016, on the assessment of softshell clam stocks in Quebec coastal waters.

The objective of the review is to determine whether there were any changes in the resource's status and whether management plans needed to be adjusted based on the conservation approach used, the ultimate goal being to formulate a Science Advisory Report on the management of softshell clam stocks in Quebec coastal waters for the 2017–2019 fishing seasons.

These proceedings report on the main points discussed in the presentations and deliberations stemming from the activities of the stock assessment regional committee. The regional review is a process open to all participants who are able to provide a critical outlook on the status of the assessed resources. Accordingly, participants from outside DFO are invited to take part in the committee's activities within the defined framework for this review (Appendices 1 and 2). The proceedings also list the recommendations made by meeting participants.

CONTEXT

The meeting Chair, Charley Cyr, summarizes the peer review objectives and process. The participants introduce themselves. The biologist in charge of the review, Sylvie Brulotte, highlights the work of her collaborators and presents the outline of the meeting. Ms. Brulotte provides information on the biology of the species (habitat, distribution, growth, reproduction, burying and dispersion) with reference to various works. Softshell clams, familiar shellfish in the intertidal zone, are present along most of Quebec's shoreline in beds in soft-bottom sediments. Its growth varies according to soak time and the quality of the site. The growth rate is also linked to the original size. Softshell clams take five to seven years to reach the minimum legal size of 51 mm. The sexes are separated and the sex ratio is generally balanced. Gametes are released into the water and fertilization occurs outside the shell. Following a short larval stage (3 to 5 weeks), clams develop into adult form and set on the seabed where they spend the remainder of their life, buried. The time required for a clam to be completely buried is primarily influenced by its size and water temperature.

- One growth ring does not necessarily correspond to one year. These rings can therefore not be used for the determination of age.
- It takes closer to seven years to reach the minimum legal size on the North Shore.

Softshell clams are exploited by commercial and recreational harvesters. Various aspects about this fishery are addressed by Ms. Brulotte, namely: the classification of the Canadian Shellfish Sanitation Program (CSSP) for shellfish sectors (approved, conditionally approved, restricted, prohibited); the almost exclusive commercial exploitation on the North Shore since 1972; the intensive exploitation on the Upper North Shore in the early 2000s and the actions of the DFO to monitor this activity; the closure of two clam processing plants on the Upper North Shore in the spring of 2010; the reopening of a plant in 2015; and the implementation of TACs by shellfish sector that same year. The main shellfish sectors of the North Shore are presented as well as the three commercial fishing areas (1A, 1B and 1C), including a brief overview of management measures.

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- At first glance, the status of the softshell clam stocks does not seem very encouraging. Natural beds are vulnerable to depletion and overfishing. In 2016, there were only 3 shellfish sectors that reached their TAC.
 - Shellfish sector commercial landings have been recorded since 2002. However, the quantities that are harvested recreationally, an activity valued by coastal communities, remain unknown.
 - Participants believe that the extent of the recreational harvest should be better assessed in order for it to be taken into account with regard to TACs.
 - The sectors where harvesting is prohibited are the same as those where no sampling was conducted by Environment and Climate Change Canada.

RESOURCE ASSESSMENT

There is no commercial fishery in the Gaspé Peninsula and the Lower St. Lawrence. Landings from the Magdalen Islands are low (< 1.3 t). Since 2010, clam landings have mainly come from 11 shellfish sectors in sub-areas 1A, 1B and 1C of the Upper North Shore. Therefore, the review of indicators is mainly concerned with hand harvesting on the Upper North Shore by zone and by shellfish sector. The indicators used are: landings, fishing effort, catch per unit effort (CPUE), average size, research index, and exploitation index. Effort is represented by the number of vendor-days rather than by the number of harvester-days because the number of harvesters involved in each landing is unknown.

LANDINGS

Landings reached a maximum of 1,173 t in 2000 on the Upper North Shore. They then declined to 190 t in 2009, a year prior to the closure of the processing plants. After a few years of low landings, they rose somewhat in 2015 following the re-opening of a plant. Landings amounted to 72 t in 2015 and 83 t in 2016. Total allowable catches (TACs), introduced in 2015, were not met for the vast majority of areas, despite a good price.

- Despite the increase in effort in 2001 and 2002, landings on the Upper North Shore decreased, which reflects a depletion in the beds.

EFFORT

The measure of fishing effort in vendor-day is somewhat uncertain because there may have been more than one harvester per seller, mainly during the intensive exploitation of the early 2000s. This uncertainty also affects the catch per unit effort (kg/vendor-day). Despite the low commercial fishing effort in recent years, several areas (e.g. Pointe à Boisvert and Pointe de Mille-Vaches) have not shown a significant improvement in the status of their resources.

- According to participants, a minimum of softshell clams should be left on the bed, with no exploitation for 5 to 7 years, in order to expect a recovery.
- However, even without exploitation, other factors (erosion, storm surges, decreased ice cover) will threaten the recolonization.

AVERAGE SIZE

In 2015 and 2016, the average size of clams landed was between 58 and 74 mm in the exploited areas. The proportion of clams of sub-legal size (<51 mm) was generally below 5%.

However, this proportion was about 10% for the Anse du Colombier, Anse Noire and Îlets Jérémie areas in sub-area 1A.

RESEARCH INDEX

The survey conducted in 2014 on the Reserve Pessamit Sud bed suggests a stable density and biomass of legal-size clams compared to the 2010 survey. Surveys were taken in 2016 on the Banc Marie-Marthe and the Baie des Plongeurs. The closure of the Baie des Plongeurs from 2010 to 2015 appears to have favoured the recovery of this bed.

- Participants wonder about the absence of small clams (25-50 mm) in 2016 in the Banc Marie-Marthe area. Participants are concerned about the impact of exploitation on recruitment.

EXPLOITATION INDEX

Ms. Brulotte presents exploitation indices based on effort and biomass. The proposed exploitation index, based on commercial-sized softshell clam biomass, would be around 10% and correspond to a maximum index.

- In calculating effort, the total area of the bed is taken into account if the exploited area is unknown.
- The effort index is considered to be less reliable given the uncertainty around the vendor-day indicator.
- Participants seem comfortable with the proposed maximum value of 10% for the exploitation index based on biomass.

CONCLUSION

ASSESSMENT FREQUENCY AND MONITORING INDICATORS

In terms of the assessment frequency and monitoring indicators, the next scientific review is expected to take place in three years, with no updates to the indicators in the intervening years.

RESEARCH PRIORITIES

Several issues are identified in terms of research priority:

- Gather more information on recreational fishing.
- Continue the surveys: National Rotational Monitoring Fund for two years.
- Study the effect of storm surges, ice cover, shoreline erosion, bed remodelling versus recovery, etc.
- Examine water (and sediment) acidification and the salinity of surface waters in relation to the survival of larva and juveniles.
- Deepen the recruitment process (origin, stock-recruitment relationship, etc.).
- Study the effects of spatial-temporal variations on the growth and recruitment rates between various beds.
- Examine the impact of the closure of beds (e.g. 10% of the area) on rotation over a 5-year period and/or the implementation of protected areas for each sector.

SUMMARY AND RECOMMENDATION

Ms. Brulotte says that for now, there are no decision rules that will permit changes to the TACs implemented in 2015. These rules should be developed before the next review. A few years ago, rules were proposed for other shellfish that allowed for an increase in the TAC under certain conditions, including reaching the TAC over three consecutive years and maintenance of the CPUE. However, participants wonder about a rule for a reduction in fishing effort (or the TAC).

- Requiring the TAC to be achieved, as a condition, does not have unanimous support.
- It is noted that the CPUE is not necessarily a good index.

The key points of the assessment are presented and the participants suggest some changes. Only the comments about content are reported.

- First, it is important to emphasize the lack of information about the recreational harvest, which seems to be a very popular activity among coastal communities.
- In terms of the highlight about the landings, it should be noted that it is very unlikely that the situation will improve despite economic incentives.
- Participants agree to remove the highlight about the CPUE.

Participants formulate the following recommendation:

To protect the reproductive potential of each shellfish sector, it is recommended to collect less than 10% of the commercial biomass annually. To mitigate the incidental mortality caused by the fishery, it is recommended to continue prohibiting harvesting when the air temperature is $\leq 0^{\circ}\text{C}$.

APPENDIX 1 – LIST OF PARTICIPANTS

Name	Affiliation
Bourdages, Hugo	DFO Science
Brassard, Claude	DFO Science
Brulotte, Sylvie	DFO Science
Couillard, Catherine	DFO Science
Cyr, Charley	DFO Science
Dallaire, Jean-Paul	DFO Science
Desrosiers, Brigitte	DFO Science
Dubé, Sonia	DFO Science
Émond, Kim	DFO Science
Gauthier, Johanne	DFO Science
Hurtubise, Sylvain	DFO Science
Langelier, Serge	Industry
Lambert, Yvan	DFO Science
Mongrain, Samuel	DFO Science
Morin, Mathieu	DFO Fisheries Management
Morneau, Renée	DFO Science
Pinette, Majoric	Industry
Roy, Virginia	DFO Science
Sandt-Duguay, Emmanuel	Industry
Sainte-Marie, Bernard	DFO Science

APPENDIX 2 – TERMS OF REFERENCE

Assessment of Quebec inshore waters Softshell clam

Regional Peer Review – Quebec Region

February 16, 2017

Mont-Joli, QC

Chairperson: Charley Cyr

Context

The softshell clam (*Mya arenaria*) is present along most of Quebec's shoreline. Recreational harvesting of softshell clams has been practised for a long time in Quebec without being well documented. Commercial harvesting expanded on the North Shore during the 1970s and peaked in 2000. Commercial activities on the Upper North Shore are regulated by the number of licenses issued, a minimum legal harvest size, a season and a quota for landings by shellfish area. The management measures that are used for recreational harvesting are the season, minimum legal size and the daily number of clams harvested. Hand tools are the only permitted tools.

At the request of the Fisheries Management Branch, resource assessment is done every three years. Due to the small number of fishery activity, the last stock assessment review planned for 2014 did not take place. The last assessment of Quebec inshore waters Softshell clam was done in 2011. The reopening of a processing plant in 2015 rapidly increased the level of activity in the fishery. The objective of the review is to determine whether changes that have occurred in the stock status necessitate adjustments to management plans based on the conservation approach used.

Objectives

Provide scientific advice on the stock status of softshell clam in Quebec's inshore waters for the 2017-2019 fishing seasons. This advice shall include

- Description of the species biology and its distribution in Quebec's coastal waters;
- Description of the fishery including management measures specific to the shellfish areas, landings and fishing effort;
- Analysis of catch per unit effort from the commercial fishery;
- Analysis of data from the commercial dockside sampling program;
- Analysis of the research survey data realized in the Southern Pessamit Reserve shellfish area (N-05.1.3.1) in 2014 and in the Banc Marie-Marthe (N-04.1.2.1) and Baie des Plongeurs (N-04.1.3, Preliminary data) in 2016.
- Determination of the monitoring process of these populations for the interim years
- Identification and prioritization of research projects to be considered for the future;
- Perspectives for the 2017-2019 fishing seasons based on indicators derived from fishing and research activities.

Expected publications

- Science Advisory Report
- Research document
- Proceedings

Participants

- Fisheries and Oceans Canada (DFO) (Science and Fisheries Management sectors)
- Fishing industry
- Provincial representatives
- Aboriginal communities/organizations