Fisheries and Oceans Canada | Pêches et Océans Canada
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Canadian Science Advisory Secretariat (CSAS)

Proceedings Series 2017/035

Quebec Region

Proceedings of the regional peer review of the Assessment of the sea cucumber fishery in Quebec's Inshore Waters

June 6, 2017
Mont-Joli, Quebec

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November 2017

Canada

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

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

ISSN 1701-1280

Correct citation for this publication:

DFO. 2017. Proceedings of the regional peer review of the Assessment of the sea cucumber fishery in Quebec's Inshore Waters; June 6, 2017. DFO Can. Sci. Advis. Sec. Proceed. Ser. 2017/035.

Aussi disponible en français :

MPO. 2017. Compte rendu de l'examen régional par des pairs sur l'évaluation de la pêche au concombre de mer des eaux côtières du Québec ; le 6 juin 2017. Secr. can. de consult. sci. du MPO, Compte rendu 2017/035.

SUMMARY

This document contains the proceedings from the the regional Assessment meeting of the sea cucumber fishery in Quebec's inshore waters. This review process was held on June 6, 2017 at the Maurice Lamontagne Institute in Mont-Joli. This meeting gathered more than thirty-five participants from science, 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.

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 consists of the proceedings of the meeting held on June 6, 2017, on the assessment of sea cucumber stocks in Quebec's inshore waters.

The objective of the review was to determine whether there were any changes in the resource's status and whether adjustments were required to the management plans based on the chosen conservation approach, the ultimate goal being to provide scientific advice on these stocks 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 terms of reference for this review (appendices 1 and 2). The proceedings also list the recommendations made by meeting participants.

CONTEXT

Meeting chairperson Charley Cyr welcomed the participants. He went over the peer review's objectives and agenda. After the participants introduced themselves, the assessment biologist, Jean-Paul Dallaire, began his presentation by highlighting the contribution of his collaborators. He went over the recommendations in the last Science Advisory Report published in 2014 and presented the Terms of Reference for this meeting. Mr. Dallaire presented a few components of the species' biology (distribution, size at maturity, clutch, habitat). He then discussed the sea cucumber processing market; this discussion elicited the first comments from the participants.

- The market is controlled by the Chinese, who put significant pressure on stocks harvested worldwide. It was stated that the sea cucumber is prepared whole to meet the demand of this market.
- Some participants said that growth is probably longer than what was estimated in the past. In Newfoundland and Labrador, it now takes at least 25 years to reach a size of 150 mm. The participants insisted that determining age is a research priority.
- They concluded that care must be taken given echinoderms' slow growth rate. The resource can be quickly overharvested.

The biologist presented the Canadian and American landings, as well as the context of the fishery in Quebec. The sea cucumber fishery began in Quebec in 2008 and is still in the exploratory stage. Total landings were 1037 t in 2016, with 49% originating from the Gaspé Peninsula's north shore (units B and C) and 51% from the North Shore (Unit 3).

ASSESSMENT OF THE RESOURCE

Fishery indicators: Unit 3

The biologist presented the results of the exploratory fishery in Unit 3. Authorized effort increased from 70 to 100 fishing days in 2014. Landings were between 192 and 335 t during the

2011–2013 period; they then increased to a maximum of 526 t in 2016. The CPUE increased from an average of 226 kg/hm from 2011 to 2013 to an average of 254 kg/hm for the 2014–2016 period. The increase is related to harvesting in the western part of the area in 2016.

- The participants wondered how the spatial aspect should be considered in the assessment of the resource. It would be appropriate to assess the sea cucumber according to their natural beds without considering management units. This idea also applied to units B and C.
- A management representative said that management measures must also be rethought. The polygons and the exclusion zones must be reviewed. Reference was also made to "other measures" that cover the protection of other species.
- It was mentioned that, ideally, this resource should be harvested like a "garden," with a bit of effort here and there while protecting the nurseries.

The biologist also presented sea sampling results and bycatch species, as well as a comparison of the sizes measured at sea and dockside. He suggested considering only the sea sampling results. The average commercial size of the individuals measured at sea decreased in 2016 and is now at its lowest level since 2009.

- According to the participants, measurements taken at sea are more reliable than those taken dockside due to water loss, which can occur quickly. They are therefore given more importance. The participants wondered what the best way is to measure cucumbers. Improving and standardizing measurement techniques would be worthwhile.
- Industry representatives said that small individuals would still get through the net.
- As for bycatches, it was mentioned that this fishery is rather selective and would have an apparently minimal impact on other species.

Fishery indicators: units B and C

In 2015, sub-areas were implemented in units B and C to foster better distribution of the fishing effort. Similarly, the authorized depths increased from 22–40 m to 32–42 m. Consequently, the harvestable area decreased and the TACs were adjusted downward.

The biologist presented the exploratory fishery results for units B and C. In Unit B, landings were up from 2009 to 2014, peaking at 608 t. The TAC of 600 t fell to 350 t in 2015. There was no fishery in 2015, and landings subsequently fell to 160 t in 2016, partly in response to the reduction of the harvestable area. Effort fell from an average of 38 days from 2011 to 2013, to 23 days in 2016. CPUEs also increased from 2009 to 2014, reaching 787 kg/hm in 2014. A significant decline in the CPUE in 2016 was partly explained by the change in management measures.

In Unit C, the TAC of 800 t fell to 382 t in 2015. Landings fell in 2015 and 2016 to 271 t and 351 t, respectively, after the reduction in the harvestable area. Effort was relatively stable since 2011, ranging from 37 to 52 days, except in 2014 when it reached 84 fishing days. The average CPUE was 432 kg/hm from 2011 to 2013, but it dropped sharply in 2014, then stabilized at a historical minimum of about 200 kg/hm in 2015 and 2016.

- It seemed difficult to interpret the data for Unit B given all the changes that occurred between 2014 and 2016.
- For the industry representatives, it was nevertheless obvious that the decline in CPUE in 2016 (Unit B) is related to changes in the management measures.

- Note that with an exploratory fishery, the precautionary approach applies as long as it remains unknown whether this fishery can harm the other fisheries. A post-season survey has also been in place for four years to study the impact of dredging. The results should eventually make it possible to report on the situation.
- Several participants said that it would be quite appropriate to implement an independent sea cucumber survey. The industry showed great interest in collaborating on this.

The presentation continued with data from the commercial catch sampling program and the at-sea observer program: at-sea and dockside sizes, bycatch species. In Unit B, the size of cucumbers caught at sea was greater in 2014 and 2016 than it was in the 2011–2013 period. In Unit C, the average commercial size of cucumbers caught at sea was relatively stable from 2011 to 2014, and it increased in 2015 before falling again—to its lowest level—in 2016.

- The participants wondered about the scope of the resource's movements, which could be greater according to some observations. There are still many unanswered questions.
- The participants said that the increase in bycatches may be related to the exploration of other fishing areas, including seabeds unfavourable to the sea cucumber and more favourable to other species.

Work on sea cucumber spawning

Marie-Hélène Rondeau of the MMAFMA presented the results of a sea cucumber spawning study. Its main purpose was to determine the spawning date. Following an adjustment to the protocol after the first year, there was an agreement after two years on the need to obtain a full-year profile to better understand the breeding cycle. In one individual, tubes were observed at various maturation stages.

- It was mentioned that this is a lecithotrophic species where the relationship with an algal bloom is debatable. This is probably why there are no clear signs of clutch.
- Larval sampling to better monitor clutch was suggested.
- Ms. Rondeau mentioned the MMAFMA's interest in teaming up with DFO for basin work.
- The exact spawning period is still unknown.

Post-season inventory

Ms. Rondeau also presented a study conducted from a post-season survey in units B and C. The study's main purpose was to assess the impact of the drag fishery on sea cucumbers and benthic communities by comparing harvested and unharvested sites. One of the key results of the study stated that there would be no significant differences between harvested and unharvested sites. However, cucumber size was still greater on unharvested sites.

- It was mentioned that it would be advisable for this monitoring to become an actual post-season survey to monitor the status of the population after the fishery, and for this information to be included in the stock assessment.
- It was mentioned that it would be very interesting to have an idea of how long it would take natural beds to regenerate.

CONCLUSION

Summary and recommendations

The assessment biologist presented the highlights of the assessment, and the participants suggest some changes. Only comments about the content (not the form) were mentioned.

- In the first highlight, it should be noted that the change in depth, not the implementation of sub-areas, caused a reduction in the harvestable surface.
- It was decided to remove the Unit 4 highlight, not discussed in this assessment.
- It was suggested to compare the average for this assessment period (2014–2016) to that of the last assessment period (2011–2013), to the extent possible. This item also applies to units B and C.
- It was suggested to add a preamble about implementing sub-areas and adjusting the TAC to the highlights for units B and C..
- For Unit B, adding a brief highlight on the effort to better interpret the decline in CPUE was also suggested. It can also be simply said that the decline in CPUE in 2016 is related to changes in management measures.
- For Unit C, it should be said that landings declined in 2015 and 2016, rather than they have been falling since 2015, because there is no clear trend. Effort appeared relatively stable if the increase in 2014 is excluded.
- With regard to the recommendation for Unit 3, the participants agreed to keep the effort near the current level.
- For the recommendation in Unit B, a decrease in TAC was proposed (350 t to 299 t). However, in the fishers' opinion, current data do not warrant this decrease. The harvesting rate probably declined given the changes in the management measures. For this unit, there does not seem to be a conservation issue, but an economic sustainability issue. The *status quo* was therefore agreed to, with an adjustment of the TAC, as needed, if a decline in the CPUE (interim years) is observed. It was stated that only a downward adjustment will be made.
- With regard to the recommendation for Unit C, a decrease in TAC was proposed (800 t to 352 t). The Science representatives seemed more concerned about this area. However, concerns may have been more about economic sustainability than conservation of the stock. The participants agreed to decrease the TAC to 352 t and to a downward adjustment in case the CPUE declines during the interim years.

The participants' **recommendations** were therefore as follows:

Unit 3: Keep the fishing effort near the current level for the next three years.

Unit B: Keep the TAC near the current level for the next three years.

Unit C: The TAC, which has been in effect since 2015, has resulted in fishing pressure that does not seem to allow the biomass available to the fishery to be maintained. Decrease the TAC by a percentage equivalent to that of the CPUE and the decrease in the harvestable area. The new TAC should be in the range of 352 t.

During the interim years, adjust the fishing effort (Unit 3) or the TAC (units B and C) only when there is a significant decline in CPUE. At least a 20% decrease in CPUE compared to the unit average or reference value (Unit 3: 2009–2015; Unit B: 2016; and Unit C: 2015–2016) should

result in an equivalent decrease in the TAC. In case of a CPUE increase, no adjustment to the fishing effort or to the TAC is made before the next assessment.

Implement one or more refuge areas in Unit 3 and continue to monitor bycatches in each of the three areas.

Research identification and prioritization

Work deemed to be a research priority by the participants, and brought up during the meeting concerned the following:

- Clutches (date laid, sex identification of young whelk, size at maturity, parasites);
- Collecting fishery-independent data (e.g., post-season);
- Impact of fishery on habitat;
- Sea cucumber movements;
- Improvement and standardization of measurement techniques;
- Development of a growth curve;
- Integration of vessel monitoring system (VMS) data: natural bed mapping, harvesting rate estimates.

ANNEXE 1 – LIST OF PARTICIPANTS

Name	Affiliation
Arseneault, Line	North Shore Fisherman
Arsenault, Lionel	North Shore Fisherman
Basque, Johanne	Micmac GESPEG
Belley, Rénald	DFO – Science
Bourdages, Hugo	DFO – Science
Brulotte, Sylvie	DFO – Science
Chabot, Denis	DFO – Science
Chouinard, Pierre-Marc	DFO – Science
Couillard, Catherine	DFO – Science
Coulombe, Francis	MERINOV, Gaspé
Croussette, Yolaine	DFO – Management
Cyr, Charley	DFO – Science
Dallaire, Jean-Paul	DFO – Science
Denis, Jean-René	Poissonnerie Cloridorme
Denis, Patrick	Poissonnerie Cloridorme
Denis, Marcel	ACPG
Dubé, Sonia	DFO – Science
Gallant, Annie	AMIK
Gaudel, Éric	New-Brunswick Fisherman
Girard, Mathieu	Zone C Fisherman
Hardy, Magalie	DFO – Fisheries Management
Huard, Georges	ACPG
Hurtubise, Sylvain	DFO – Science
Jenniss, Pierre	PNMV
Juillet, Cédric	DFO – Science
Lambert, Yvan	DFO – Science
Lambert, Jean	DFO – Science
Lambert Kazumi, Catherine	AGHAMM
Larochelle, Mia	DFO – Management
Morneau, Renée	DFO – Science
Rondeau, Marie-Hélène	AGHAMM
Sainte-Marie, Bernard	DFO – Science
Sandt-Duguay, Emmanuel	AGHAMM
Synnott, Herman	GESGAPEGIAG
Vigneault, Guy	SHIPEK Fisheries
Weimer, Guy Pascal	Maliseet Fisheries

ANNEXE 2 – TERMS OF REFERENCE

Assessment of the sea cucumber fishery in Quebec's Inshore Waters

Regional Peer Review - Quebec Region

June 6, 2017
Mont-Joli, Quebec

Chairperson: Charley Cyr

Context

The sea cucumber (*Cucumaria frondosa*) fishery is a recent activity in Quebec's inshore waters. It began in 2008 on the Gaspé Peninsula's north shore and in 2009 it extended to the Middle North Shore near Havre-Saint-Pierre. This fishery, still exploratory, is carried out either by diving, using an LGS-type dredge or by a dredge specifically designed for sea cucumbers.

The last assessment of this fishery goes back to 2014. DFO Fisheries and Aquaculture management has requested an assessment of the sea cucumber fishery for 2017 to 2019 fishing seasons. The objective of the review is to determine whether changes that have occurred in the stock status require adjustments to management plans based on the conservation approach used.

Objectives

Provide science advice on management measures for the sea cucumber fishery in the Estuary and northern Gulf of St. Lawrence, management units A, B, C, 3 and 4. This advice shall include:

- Description of the biology of the sea cucumber and its distribution in Quebec's coastal waters.
- Description of the fishery including landings, fishing effort and management measures specific to the fishing areas.
- Analysis of catches per unit effort from the fishery.
- Analysis of data from the commercial sampling program and the at-sea observer program.
- Identification and prioritization of research projects to be considered for the future.
- The determination of the process to provide advice during the interim years, including a description of conditions that may warrant a full stock assessment earlier than originally planned;
- Perspectives and/or recommendations on management measures in effect for the 2014-2016 fishing seasons.
- Perspectives for the 2017-2019 fishing seasons based on indicators derived from fishing and research activities.

Expected Publications

- Science Advisory Report
- Proceedings

Participation

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