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Proceedings of the regional peer review meeting on the assessment of the lobster in Quebec's inshore waters in 2016

February 25 and 26, 2016
Mont-Joli, Quebec

Chairperson: Denis Chabot
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Canada

Foreword

The purpose of these proceedings is to document the key activities and discussions that took place during the meeting. The proceedings may include research recommendations, uncertainties and the rationale for decisions made during the meeting. They may also document any data, analyses or interpretations that were reviewed and rejected on scientific grounds, including the reason(s) for rejection. Therefore, interpretations and opinions presented in this report 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 of the issue may result in a change in conclusions, particularly if additional relevant information not available during the meeting is provided afterward. Finally, in rare cases where dissenting views are officially expressed, they are also documented in the appendices to the proceedings.

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SUMMARY

This document contains the proceeding from the meeting held within the regional assessment of the lobster in Quebec's inshore waters. This review process was held on February 25th-26th, 2016 at the Maurice Lamontagne Institute in Mont-Joli. This meeting gathered about thirty participants from sciences, to management to 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 la réunion tenue dans le cadre du processus régional d'évaluation des stocks de homard des eaux côtières du Québec. Cette revue, qui s'est déroulée les 25 et 26 février 2016 à l'Institut Maurice-Lamontagne à Mont-Joli, a réuni une trentaine 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 25 and 26, 2016 on the assessment of lobster stock in Quebec's coastal waters.

The objective of the review was to determine whether there were any changes in the resource's status and whether management plans needed to be adjusted based on the chosen conservation approach, the ultimate goal being to formulate a Science Advisory Report on the management of lobster stocks in Quebec's coastal waters for the 2016–2018 fishing seasons.

These proceedings report on the main points of the presentations and deliberations that arise from the regional stock assessment committee's activities. 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 framework defined for this review (Appendices 1 and 2). The proceedings also list the recommendations made by meeting participants.

BACKGROUND

Meeting chairperson Denis Chabot summarizes the peer review objectives and process and presents the Terms of Reference. The participants take turns introducing themselves. Bernard Sainte-Marie introduces the new team responsible for lobster stock assessment: Benoît Bruneau and Nathalie Paille. Given their recent appointment, some indicators could not be incorporated due to a lack of time. However, this does not affect the quality of the assessment.

The biologist evaluator, Benoît Bruneau, highlights the collaborators' work and outlines the plan for the meeting. He provides some background information by presenting the conservation framework established for the lobster. Some components of the lobster's biology are also reviewed. The indicators used to assess stock status (abundance, demography, exploitation rate and productivity) are mainly derived from fishery statistics, sea and dockside commercial catch sampling data, logbooks (mandatory and voluntary), trawl and scuba-diving surveys for the Magdalen Islands, and projects involving experimental traps and a post-season survey in the Gaspé Peninsula. A brief reminder is made on how to calculate certain indicators, including CPUE, densities (trawl), size structures and exploitation rate.

Lobster landings in Quebec in 2015 total 5,880 t. The Magdalen Islands (MI) account for 59% of these landings, while the Gaspé Peninsula ranks second with 31%. Anticosti and the North Shore account for 9% and 1% of the total landings, respectively. Significant fishing effort reduction programs were implemented as of 2006 in the Gaspé Peninsula and, to a lesser extent, on the Magdalen Islands.

ASSESSMENT OF THE RESOURCE

For each area (MI, Gaspé Peninsula, Anticosti, North Shore), Mr. Bruneau briefly presents the highlights of the last assessment, the management measures and the data available for estimating indicators. The biologist then reviews the results obtained for each indicator category (abundance, demographics, exploitation rate, productivity). Given that most of the indicators are based on fishing data, he also refers to fishing effort and temperature during the fishing season.

Questions and comments by the participants are documented in the proceedings for each category of indicator. A summary of the current stock status concludes the presentations for each area and advice is formulated.

MAGDALEN ISLANDS (LFA 22)

Abundance indicators

Landings, the main abundance indicator, reached a historic high of 3,486 t in 2015, which is 52% higher than the 25-year average for a similar or lesser fishing effort. The increase in landings between 2011 and 2015 was greater in the north (51%) than in the south (23%).

In 2015, for the Islands as a whole, the catch per unit effort (CPUE) by weight from commercial sampling was slightly higher (2%) than in 2011, and 30% (18% in the south and 55% in the north) higher than the average of the historical series (1985–2014).

- Some participants mentioned that temperatures at the beginning of the 2014 and 2015 fishing seasons were particularly cold.
- It is specified that in the landings graph, "north" and "south" refer to the landing port.
- Meeting participants are informed that a research project is underway to examine the relationship between temperature and lobster abundance. There seems to be a link between current warming and increased abundance in some regions that are historically too cold, but declines are also observed in waters where conditions were once favourable.
- With respect to the trawl survey, it is noted that the data (density, biomass) have not been adjusted to account for the vessel change. This correction will eventually be made. There may be an underestimation for high densities. The 2013–2015 data should therefore be carefully used. It is suggested that the year that corresponds to the vessel change in the graph be indicated.
- It is added that a very cold summer in 2012 may have reduced lobster catchability in the trawl survey.

Demographic indicators

The demographic indicators show that the average size of commercial lobsters sampled during the fishery has increased slightly, but steadily since the end of the legal size increase in 2003. In the trawl survey, the average size of commercial lobster was also found to have increased slightly for females since 2003, but to have decreased for males since 2013.

- Meeting participants find that the management measures had a positive impact on the average size of the lobsters.
- It is suggested that jumbo lobsters be examined in absolute value, rather than as a percentage, for a more accurate picture (to eliminate the effect of recruits).
- It is pointed out that berried females are not included in the sex ratio because they are not available for breeding.

Exploitation rate

Fishing pressure indicators show a slight decrease in exploitation rates since 2011.

- It is noted that the 2012 value can be explained by a reduced catchability associated with colder conditions.

- It is mentioned that the approach for calculating the exploitation rate has already been validated by peers.

Productivity indicators

Productivity indicators have remained high. For the Islands as a whole, the egg production increase factor for the 1994–1996 period that preceded the increase in legal size was 2.9x in 2012–2015, compared to 3.3x in 2009–2011. For these same periods, there was an increase in the contribution of multiparous females to egg production, thereby fostering stock productivity. Indicators of fishery recruitment and pre-recruitment suggest that landings will remain high in the coming years.

- It is noted that the same uncertainty regarding the CPUE in recent years on the South Coast (sea sampling), as raised earlier, also applies to berried females.
- Commercial and pre-recruit (-1) density data from the trawl survey, for which no correction factor was applied following the change of research vessel, should also be carefully considered.
- It is specified that the difference in lobster size between the north and the south is related to a different size at sexual maturity.
- Regarding mating success, some participants associate the low of 2013–2014 with a late moult. It could be interesting to have mutually-exclusive moult classes.

Precautionary approach

High abundance, productivity and landings indicate that the Magdalen Islands lobster stock is in good condition and located in the healthy zone according to the precautionary approach. In the current environmental conditions, recent exploitation levels have allowed these indicators to remain stable or to improve.

- Meeting participants agree that this is an optimal situation, particularly as it relates to recruitment. We are witnessing a healthy rebuilding of the stock.

Summary and opinion – Magdalen Islands

The key points of the assessment are presented and the participants suggest some changes. Only comments on substance (and not form) are reported.

- The first discussion relates to the method of presenting trends. It is suggested that the comparison with the historical series be kept and that the comparison of 2015 vs. 2011 be replaced with a comparison of the current period (2012–2015) vs. the previous period (2009–2011). This approach allows for a comparison with the last assessment and with the historical series.
- Participants also wonder about the reference period: should it be fixed or adjusted over the years (including last year)? It is important to use the same reference period in the various highlights to ensure consistency.
- In the key point on demographic indicators, it is recommended that the information on jumbo lobsters be removed because the participants are not comfortable with the proportions presented.

- As for the key point on productivity indicators, it should be pointed out that the situation is positive. Above all, consideration must be given to the increase in egg production and the increased contribution of multiparous females.

Finally, the participants' recommendation is as follows:

High abundance, productivity and landings indicate that the Magdalen Islands lobster stock is in good condition and located in the healthy zone according to the precautionary approach. In the current environmental conditions, recent exploitation levels have allowed these indicators to remain stable or to improve.

NORTH COAST (LFA 15, 16 AND 18) AND ANTICOSTI (LFA 17)

Abundance indicators

Abundance and biomass indicators on the North Shore and at Anticosti have increased significantly since 2011. Lobster landings in Area 15 were 32 t in 2015, which represents an increase of 113% compared to 2011 (15 t) and of 33% compared to the average for the last 30 years (25 t). In Area 16, landings have increased by 266% (22 t) compared to 2011 (6 t) and by 200% compared to the average for the past 30 years (11 t). At Anticosti Island, in Area 17B, landings have been increasing since 2005, reaching a historical maximum of 504 t in 2015, which is a 189% increase from 2011 (174 t) and a 259% increase of the average for the last 30 years (140 t). Finally, in Area 18, landings increased from 2 t in 2011 to 17 t in 2015.

In areas 15 and 16, the CPUE in weight from commercial sampling increased by 151% from 2011 to 2015, while fishing effort has remained low and stable since 2011. In Area 17, the 2015 CPUE from the logbooks was 131% more than that in 2011 (1.1 kg/trap), while fishing effort has been relatively stable since 2009–2011.

- It is suggested that the 2012 point be removed from the fishing effort graph (LFA 15-16).
- In areas 15 and 16, the increase in CPUE in 2010 corresponds to the peak in fishing effort that year.
- Among the management measures for Area 17B, it is suggested to mention the fact that black boxes have been in place since 2015.
- For Area 17B, it is specified that the temperature data is taken from a thermograph attached to a fisherman’s trap. It is suggested that arrows be added to indicate the fishing period.
- With respect to the fishing effort at Anticosti, participants mention that several factors could explain the variations: weather, soak time, fisherman’s behaviour, fishing gear, etc. However, the overall effort is stable.
- For areas 15, 16 and 17, participants agree that there has been a real increase in recent years. The resource appears abundant.
- It is suggested that consideration be given to methods used to standardize the CPUE.

Demographic indicators

Commercial sampling for demographic indicators is very limited in this region, especially in areas 15 and 16, where the number of lobster measured from commercial sampling is not sufficient to draw conclusions on trends in legal lobster size or egg production. In Area 17, size structures are broad and the average size is stable. For females in this area, the average size is

stable and the growing number of jumbo-sized females (>127 mm) suggests sustained or increased egg production.

- In addition to the limited size of the sample in areas 15 and 16, it is added that there could be a geographical effect, as coverage is very broad.
- For the next assessment, it would be relevant to indicate the number of fishermen involved.
- It is suggested that Area 18 be further explored to learn more information about this area.
- For Area 17B, some participants felt that there could be intimidation by large lobsters. It should therefore not be concluded that there was a decline in recruitment. In addition, the number of female jumbo lobsters actually increased.
- With respect to the graphs on average lobster size in 17B and for jumbo-sized lobsters, it is suggested that the scale be adjusted to better distinguish between males and females.
- It is suggested that the presentation of sex ratio data be standardized using a bar graph.

Summary and opinion – North Coast and Anticosti

The key points of the assessment are presented and the participants suggest some changes. Only comments on substance (and not form) are reported.

- With respect to the key point on demographic indicators, it is suggested that it be specified that commercial sampling remains very limited. There is a clear need to increase the commercial dockside sampling effort to allow for better monitoring.
- As for the average size of the females in Area 17, it is agreed that stability is noted. We are no longer witnessing a reduction.
- Participants agree that the stock appears to be in very good condition and that it is more productive, although growth remains slow and sexual maturity is late.

The participants' **recommendation** is as follows:

Landings in areas 15–18 and significantly greater CPUE in areas 15–17 suggest that lobster stocks on the North Shore and at Anticosti Island are in excellent condition and that these indicators could continue to increase.

Due to the significant increase in landings in areas 15–18, it is recommended that dockside commercial sampling be increased in these areas. It is also recommended that Area 17 catches landed in the Magdalen Islands be sampled.

GASPÉ PENINSULA (LFA 19, 20 AND 21)

Abundance indicators

Landings—the main abundance indicator—reached a historic level of 1,802 t in 2015, which is 106% greater than in 2011, and 98% greater than the average over the last 25 years for similar fishing effort since 2008, and less than the 1994–2004 level. In 2015, 87% of Gaspé landings came from Area 20, 7% from Area 21, and 6% from Area 19.

For the entire Gaspé Peninsula, the CPUE in weight from commercial sampling rose sharply, reaching a historic high in 2014–2015. In Area 19, the CPUE increased by 238% from 2011 (0.48 kg/trap) to 2015 (1.61 kg/trap). In Area 20, the CPUE increased by 41.3% from 2011 (0.34 kg/trap) to 2015 (0.48 kg/trap). In Area 21, the CPUE increased by 213% from 2011 to 2015.

- It is mentioned that a size measurement (increase in MCS) has been gradually introduced to protect the reproductive potential.
- It is noted that the number of traps per license began to decrease in 2006 following the consolidation of licenses. Some participants feel it would be interesting to present the effort per fishing area.
- The question is raised as to whether the fall fishery could help to predict the spring fishery.
- For CPUE graphs in Area 20, it is suggested that the reference period for the CPUE in number vs. the CPUE in weight be standardized.
- For Area 19, an inconsistency is noted between the CPUE in weight vs. the CPUE in number from 2013. The CPUE in weight would be too large with respect to potential growth. Questions are raised on the validity of the data between 2012 and 2015 (dockside sampling).
- For 21A and 21B, we are refer instead to "mini-areas." If possible, it would be interesting to obtain more information from the fish harvesters involved. However, given the current scarcity of available data, it is suggested that these two areas be grouped together.

Demographic indicators

In areas 19 and 21, demographic indicators show that the average size of commercial lobsters in 2015 was large (96.8 mm and 96.3 mm, respectively) and has either decreased slightly or been variable since 2011, but has generally increased. In Area 20, the average size of commercial lobsters has changed little since 2008 (≈ 88 mm), apart from a slight 0.8 mm decrease in the size of males between 2014 and 2015. The size structures of commercial lobsters are much wider in areas 19 and 21 than in Area 20.

- In Area 20, participants observe that the average commercial lobster size is closer to the minimum legal size, compared to other areas.
- According to the participants, a 1:1 sex ratio (Area 20) would not arouse concern as long as the size balance is maintained.
- In Area 19, fish harvesters seem to observe a few more individuals close to the minimum legal size.
- With respect to size structures, it is suggested that the data be presented as a percentage (relative value).

Exploitation rate

Fishing pressure indicators could not be estimated for areas 19 and 21. In Area 20, exploitation rates were lower between 2011 and 2014 (71.6%) than between 2008 and 2010 (78.8%) but remain very high, at around 74% in 2014.

- According to some participants, these high exploitation rates leave little room for growth and survival. Thus, a decrease in recruitment would have a significant impact. However, the population has supported this high rate for many years.

Productivity indicators

Productivity indicators are high in Area 20. The abundance of berried females has continued to increase since 2011, and the egg production increase factor compared to the 1994–1996 period was about 3.0x in 2015, as it was in 2011. However, the contribution of multiparous females to

egg production has been on a downward trend since 2005. The abundance of pre-recruits in Area 20 in 2015 remains high, suggesting that landing levels will remain high in the short term. This information is not available for the other areas.

- It is noted that the increase in the minimum legal size was aimed at increasing egg production.

Post-season survey

A post-season survey in Area 20 was implemented in 2011. The data for 2015 indicate a high pre-recruit abundance index.

- This survey will eventually be an important source of information for the assessment.

Precautionary approach

The Gaspé Peninsula lobster stock is in good condition and in the healthy zone according to the precautionary approach.

Summary and opinion – Gaspé Peninsula

The key points of the assessment are presented and the participants suggest some changes. Only comments on substance (and not form) are reported.

- With respect to the key point on the CPUE, it is suggested that information be grouped for the entire Gaspé Peninsula (and not by area). It is also important to mention that the CPUE in weight reached a historic high in 2014-15.
- In the key point on the demographic indicators, it is suggested to remove information on jumbo sized-lobsters and on the sex ratio. It is also recommended that the deficit of large individuals in Area 20 be mentioned. We are talking about a recruitment fishery.
- On the subject, some participants wonder about the exploitation rates, which remain high despite a reduction in effort confirmed by the fish harvesters. However, the small size of commercial lobsters is a strong incentive to continue the work already undertaken to reduce fishing effort.
- In the key point on productivity indices, it is suggested that post-season survey information in Area 20 be added on high pre-recruit abundance, which suggests that landing levels will remain high in the short term.

As such, the participants' **recommendation** is as follows:

High abundance, productivity and landings indicate that the Gaspé Peninsula lobster stock is in good condition and in the healthy zone according to the precautionary approach. In recent years, indicators have remained the same or improved based on prevailing environmental conditions and exploitation levels. However, in Area 20, the small average size of commercial lobsters and the high exploitation rate suggest that the work already undertaken to reduce fishing effort must be continued.

CONCLUSION

RESEARCH IDENTIFICATION AND PRIORITIZATION

Some issues are identified and aim to:

- Update certain variables used: growth rate, sexual maturity ogive, length-weight relationship, egg production curve.
- Conduct research on recruitment in the Gaspé Peninsula.
- Factor in information from the black boxes in Anticosti.

MONITORING INDICATORS FOR INTERIM YEARS

The Science Advisory Report is issued for three years (2016–2018). No monitoring indicator is required.

APPENDIX 1 – LIST OF PARTICIPANTS

Name	Affiliation
Bénard, Ghislain	Industry
Boudreau, Sophie*	DFO – Science
Brulotte, Sylvie	DFO – Science
Bruneau, Benoît	DFO – Science
Calderon, Isabel	DFO – Fisheries Management
Chabot, Denis	DFO – Science
Côté, Jean	Industry
Côté-Laurin, Marie-Claude	Merinov
Couillard, Catherine	DFO – Science
Dallaire, Jean-Paul	DFO – Science
Deveau, Fernand	Industry
Desgagnés, Mathieu	DFO – Science
Dubé, Sonia	DFO – Science
Duplisea, Daniel*	DFO – Science
Goudreau, Patrice*	DFO – Science
Hardy, Magalie	DFO – Fisheries Management
Hurtubise, Sylvain	DFO – Science
Lambert, Jean*	DFO – Science
Larochelle, Mia	DFO – Fisheries Management
Leblanc, Sylvette*	DFO – Fisheries Management
Légaré, Benoît*	DFO – Science
Lemire, Maryse*	DFO – Fisheries Management
Maltais, Domynick*	DFO – Science
Marquis, Marie-Claude	DFO – Science
M. Arsenault, Lisa	MMAFMA
Michaud, Marie-Claire	DFO – Fisheries Management
Morneau, Renée	DFO – Science
Paille, Nathalie	DFO – Science
Sainte-Marie, Bernard	DFO – Science
Simard, Nathalie*	DFO – Science
Trottier, Steve*	DFO – Science
Vacher, Jean-Sébastien	Industry

*Participated Day 1 Only

APPENDIX 2 – TERMS OF REFERENCE

Assessment of lobster stock in Quebec's coastal waters

Regional Peer Review: Quebec Region

February 25 and 26, 2016
Mont-Joli, Quebec

Chairperson: Denis Chabot

Background

Lobster fishing is practised by over 550 fish harvesters in Quebec scattered along the coast of the Magdalen Islands, the Gaspé Peninsula, the North Shore and Anticosti Island. The exploitation is practiced using traps in shallow water.

Quebec's waters are divided into eight fishing areas. The lobster fishery is managed by controlling the fishing effort and by escapement measures. The management strategies introduced over the last decade were developed based on the recommendations from the Fisheries Resource Conservation Council (FRCC).

At the request of the Fisheries and Aquaculture Management Branch, resource assessment is carried out every three years. The last lobster stock review was done in 2012. The objective of the review is to determine whether changes that have occurred in the stock status justify adjustments to management plans.

Objectives

Provide scientific advice on the management of lobster stocks on the North Shore and Anticosti Island (areas 15, 16, 17 and 18), the Gaspé Peninsula (areas 19, 20 and 21) and Magdalen Islands (Area 22) for the 2016–2018 fishing seasons. The advice will include:

- A description of the biology and distribution of lobsters in Quebec's coastal waters;
- A description of the fishery, including fishing effort and management measures specific to the fishing areas;
- An analysis of abundance indicators (CPUE, density), and exploitation rate from fishery and survey data;
- An analysis of data from the commercial at-sea and dockside sampling program;
- Identification and prioritization of research projects to be considered for the future;
- Identification of stock status monitoring indicators for interim years and criteria for re-opening the Advisory Report;
- The prospects for the 2016–2018 seasons for each of the management units.

Expected publications

- Three CSAS Science Advisory Reports on lobsters in the Magdalen Islands (1), the Gaspé Peninsula (2) and North Shore and Anticosti Island (3);
- A CSAS research document;
- CSAS proceedings summarizing the discussions.

Participation

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

- Provincial representatives