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**Proceedings of the Regional Peer Review on the Assessment of the Estuary and Northern Gulf of St. Lawrence Snow Crab Stocks (zones 12A, 12C, 13, 14, 15, 16, 16A and 17)**

**February 15-17, 2023  
Mont-Joli, QC**

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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.

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## **SUMMARY**

This document outlines the proceedings of the regional peer review meeting on the assessment of the Estuary and northern Gulf of St. Lawrence Snow crab stocks (Areas 12A, 12C, 13, 14, 15, 16, 16A and 17). This meeting, which was held on February 15-17, 2023 at the Maurice Lamontagne Institute in Mont-Joli, brought together about sixty participants from science, management, industry and aboriginal communities. These proceedings detail the essential parts of the presentations and discussions held during the meeting, as well as the recommendations and conclusions made.

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## 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 peer review process that is conducted at the Maurice Lamontagne Institute in Mont-Joli. This document outlines the proceedings of the meeting on the assessment of the Estuary and northern Gulf of St. Lawrence Snow crab stocks (zones 12A, 12C, 13, 14, 15, 16, 16A and 17) held on February 15-17, 2023.

The objective of the meeting 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, with the ultimate goal being to provide a science advisory report on the management of the Quebec coastal waters scallop stocks for the 2023 fishing season.

These proceedings report on the main points discussed in the presentations and deliberations stemming from the activities of the regional stock assessment committee. The regional peer review meeting 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 meeting (Appendices 1 and 2). The proceedings also list the recommendations made by the meeting participants.

## ASSESSMENT

The meeting was chaired by Charley Cyr and Kim Émond. Following a reminder of the science review process and objectives, and the role of the participants, the terms of reference and agenda were presented. Attendees were then asked to introduce themselves. Stock assessment biologist Sarah Loboda noted the contributions made by his collaborators and presented the agenda of the meeting. She provided a general overview of landings on the Atlantic coast and by fishing area (16, 12C, 16A, 15, 14, 13, 17, 12A). Area 12B is not included this year, as it has been under moratorium since the 2022 fishing season.

The data used in the assessment are mainly from the fishery (ZIFF and logbooks, commercial sampling at sea and dockside) and independent sources (post-season survey, trawl survey). Environmental data complete the information (temperature and thermal habitat).

The life cycle of the snow crab is briefly described. The biologist explained the CPUE standardization method, as well as the approach to determine the combined index based on the average of the two commercial biomass indices (standardized commercial CPUE and NPUE of adults  $\geq 95$  mm in the post-season survey).

Before going into the details of the assessment, certain environmental considerations were introduced by Peter Galbraith, including seafloor temperature conditions in 2022. A warming of the Gulf of St. Lawrence deep waters has been observed since 2012. The area of the seabed covered by water with a temperature above 6°C has increased. On average, deep waters have risen from 5.1°C in 2009 to 6.7°C in 2022. A thermal habitat index, based on the snow crab's thermal preferences (large crabs: -1 to 3 °C; small crabs: 0 to 2° C), was briefly presented. In 2022, an overall trend of erosion of the favourable thermal habitat was observed for large crab in the western and central areas (12A, 12C, 16, 16A and 17), whereas a slight increase in the availability of favourable thermal habitat was observed in areas 13 and 14. For small crabs, a

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downward trend in the area of favourable thermal habitat was seen in areas 16 and 17, but an increasing trend was observed in areas 16A, 14 and 13.

## **RESULTS**

For each fishing area, a review of key indicators is conducted. An overview of the area is then presented, along with an outlook. The outlook includes three possible scenarios (high, intermediate, low) for harvesting for the next fishing season. These scenarios have been developed by taking into account an index combining the catch rate (CPUE) from the previous year's commercial fishery and the post-season survey abundance for adult commercial-size crabs (NPUE), the uncertainty associated with this indicator, and related stock status indicators (crab carapace size and condition, expected recruitment, and levels of spermathecal load of females, if available). The proposed changes are related to the landings of the last fishing year. Participants asked questions and made comments. As part of this meeting, participants have to agree on the scenarios, but the preferred option will be discussed at the Advisory Committee meeting.

### **AREA 16**

#### **Review of Indicators: Area 16**

The TAC in 2022, which was increased to 2,236.9 t from 2021, was reached. According to the 2022 post-season survey, the abundance indices for both adult and adolescent males increased between 2021 and 2022, with a marked increase in sub-legal size adults. According to the data obtained in the 2022 scientific trawl survey in Sainte-Marguerite Bay, primiparous female recruitment will likely decrease over the next few years, while recruitment to the commercial fishery should increase. However, the average size of adult males is declining and early terminal moulting (i.e. before crabs reach legal size) is increasingly frequent, representing significant losses for the commercial fishery, particularly from 2019 to 2022.

The combined index increased for a second year (+23.1%), suggesting that the biomass available to the fishery in 2023 should be greater than in 2022.

Several comments were made by participants:

- Some participants suggested that recruitment would likely decline sharply after 2026 based on the results of the monitoring in Sainte-Marguerite Bay.
- The participants wondered what affects size-at-terminal moult. Explanations included notably the effects of temperature during the first two years of life (cold: moult at a smaller size; warm: moult at a larger size). The possibility of a density-related effect was also raised. A 2021 scientific publication by DFO's NL snow crab research team highlighted the link between a substantial exploitation rate and a high prevalence of early moult.
- Industry representatives questioned the validity of the data from the at-sea observers; the coverage rate was at issue, in particular.

#### **Summary and Outlook: Area 16**

Participants discussed the summary and the scenarios presented:

- The key point on the survey in Sainte-Marguerite Bay should state that primiparous female recruitment should decline (rather than will decline).
- With regard to the three scenarios, some participants felt that, given the uncertainty, a more cautious lower scenario should be adopted, with a 5% increase rather than the proposed

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15%, while others wished to retain the 15% given the current situation, which they deemed to be of little concern. Some participants considered the intermediate scenario of 15% to be more reasonable than a 23% increase (i.e. the increase observed in the combined index). Other participants suggested a 20% increase under the intermediate scenario and a 25% increase under the higher scenario. Opinions on the intermediate scenario were somewhat divided, with Science proposing a 15% increase and the industry, a 20% increase. In the end, the meeting participants opted for 15%. The industry representatives would be able to express their views at the Advisory Committee meeting.

Finally, after extensive discussion, the assembly agreed on the following scenarios:

The combined index increased between 2021 and 2022 (+23.1%), which suggests that the biomass available to the fishery in 2023 should be greater than in 2022.

Given the expected high abundance of recruits, associated with densities of mature females that are still high, it would be a good idea to limit the increase in removals in 2023 to prevent increased white crab mortality and to avoid obtaining a sex ratio that is overly biased towards females.

- *Higher scenario*: A 25% increase relative to total landings in 2022.
- *Intermediate scenario*: A 15% increase relative to total landings in 2022.
- *Lower scenario*: A 5% increase relative to total landings in 2022.

## **AREA 12C**

### **Review of Indicators: Area 12C**

The TAC in 2022 was reduced to 71.5 t from 2021, and was not reached. The commercial (CPUE increased between 2021 and 2022, but the 2022 value remains among the lowest in the time series. Different spatial coverage in the post-season surveys created some uncertainty in the indicators for 2021 and 2022. The difference in NPUE95 (legal-size adults) between 2021 and 2022 was +42.5% without adjusting for the differences in the protocol, but -23.7% when the transects sampled in the two years were compared. The abundance of commercial-size adults in 2022 remained very low.

The value of the combined index in 2022 was among the lowest observed since the time series began in 2014.

Several comments were made by participants:

- With regard to the spatial distribution of fishing trips, Vessel Monitoring System (VMS) data will be used in the future to improve accuracy.
- Concerning the observer data, specifying the period when the observations were made would be useful.
- Participants wondered about the differences in the results on carapace conditions from at-sea and dockside sampling.
- The industry felt that the post-season survey should be carried out a month later in Area 12C, and at shallower depths. The protocol for the post-season survey can be improved in future years. A comparative study will be required for the standardization of the data so that it can be integrated in the entire time series to allow comparisons within the time series.

Summary and Outlook: Area 12C

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Participants discussed the summary and outlook:

- In the key point on the post-season survey, it should be noted that the different spatial coverage in the 2021 and 2022 surveys creates uncertainty over the indicators in those years. The difference in the values of NPUE95+ (legal-size adults) in 2021 and 2022 was +42.5% without adjusting for the differences in the protocol and -23.7% when the transects sampled in both years were compared.
- In view of the uncertainty created by the difference in spatial coverage in the 2021 and 2022 post-season surveys, it was decided that the outlook should be worded in a way that de-emphasizes the combined index. In the end, the combined index was not used and the outlook was based on two separate indicators, CPUE (+17.1%) and NPUE (-23.7%), based on the transects covered in both years of the survey. It was added that the biomass available to the fishery in 2023 could remain at a level similar to that of 2022.

The proposed scenarios are accepted without discussion.

The assembly agreed on the following scenarios:

- *Higher scenario*: A 10% increase relative to total landings in 2022.
- *Intermediate scenario*: Status quo relative to total landings in 2022.
- *Lower scenario*: A 10% decrease relative to total landings in 2022.

## **AREA 16A**

### **Review of Indicators: Area 16A**

The TAC remained the same in 2021 and 2022 and was reached in 2022. The commercial CPUE increased between 2021 and 2022, although the 2022 value remained below the historical average. According to the 2022 post-season survey data, the abundance of legal-size crabs, which primarily consist of recruits, is increasing. Although the abundance of crabs left by the fishery increased between 2021 and 2022, it still remains very low.

The combined index increased for the first time since 2014. The large increase between 2021 and 2022 suggests that the biomass available to the fishery in 2023 will be greater than in 2022.

Several comments were made by participants:

- It was noted that only small (Japanese) traps were used in the CPUE calculations. Some participants felt that this did not reflect reality. The standardization method was in the process of being revised to take account of all traps (small and large) and other influencing factors. A discussion with the industry on this subject was planned.
- It was noted that some subjectivity was involved in at-sea observers' interpretation of crab carapace conditions. However, there was a fair amount of confidence in the dockside data, for which the criteria are well defined. Dockside samplers are well trained.
- It was noted that it would be beneficial to carry out dockside sampling on the same day as at-sea sampling.

### **Summary and Outlook: Area 16A**

Comments were raised regarding the key points in the summary and outlook:

- The participants were reminded that, as agreed in the past, recommendations are made in relation to landings and not the TAC.



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- The key point on dockside sampling was revised to be consistent with what was said for Area 16. Information on at-sea sampling was included in the Science Advisory Report.
  - A key point was to be added stating that the experimental traps used in the post-season survey showed a high density of primiparous females in the last four years. All indicators suggest that recruitment to the commercial fishery was increasing and could be expected to be maintained over the short to medium term.
  - The outlook should emphasize the strong increase in the combined index between 2021 and 2022, but without specifying a percentage. The commercial fishery's dependence (rather than heavy dependence) on recruitment should be noted. This suggests that caution should be exercised in increasing removals during the resumption of the recruitment wave, to support the establishment of a male spawning population and prevent increased white crab mortality.
  - A consensus was quickly reached on the proposed scenarios.

The assembly agreed on the 2023 following scenarios:

- *Higher scenario*: A 30% increase relative to total landings in 2022.
- *Intermediate scenario*: A 20% increase relative to total landings in 2022.
- *Lower scenario*: A 10% increase relative to total landings in 2022.

## **AREA 15**

### **Review of Indicators: Area 15**

In 2022, the TAC was reduced by 25.3% relative to 2021, and was fully fished. The commercial CPUE declined between 2021 and 2022 and the values in the last four years are the lowest for the period [2000; 2022]. All abundance indices obtained from the post-season survey showed an upward trend between 2021 and 2022 for both adolescent and adult males, and the 2022 values were above their respective historical averages.

The combined index increased sharply between 2021 and 2022. This suggests that the biomass available to the fishery in 2023 should be greater than that in 2022.

One comment was made:

- Industry representatives pointed out that adhering to the sampling plan for the post-season survey was not possible in recent years because of certain socio-economic factors (e.g. COVID-19, fuel prices), which makes comparison between years difficult. This matter was under consideration.

### **Summary and Outlook: Area 15**

Participants made several comments on the summary and outlook:

- In the key point on dockside sampling data, an increasing proportion since 2019 should be specified.
- The key point on the abundance of primiparous females was removed.
- It was agreed that white crab should not be a problem in this area.
- In the outlook, the participants agreed on the need to recommend caution in increasing removals.

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- After some discussion, particularly in view of the sharp rise in the value of the combined index (+75.3%), the participants agreed on scenarios with greater increases than those initially proposed.

The assembly agreed on the following scenarios:

- *Higher scenario*: A 45% increase relative to total landings in 2022.
- *Intermediate scenario*: A 35% increase relative to total landings in 2022.
- *Lower scenario*: A 25% increase relative to total landings in 2022.

## **AREA 14**

### **Review of Indicators: Area 14**

In 2022, the TAC was reduced by 15.1% in relation to 2021, and was reached. Between 2021 and 2022, the commercial CPUE increased, but remain slightly below the historical average. According to the post-season survey, the abundance of adult legal-size male crabs increased between 2021 and 2022, due to an increase in the number of commercial crabs left by the fishery. Recruit abundance declined during the same period.

The 2022 scientific trawl survey conducted in the eastern part of Areas 13 and 14, in the Lower North Shore area, points to a high density of primiparous and multiparous females and sublegal-size males.

The combined index rose sharply between 2021 and 2022, indicating that the biomass available to the fishery will likely be greater in 2023 than in 2022.

Several comments were made by participants:

- Participants wondered about the crab carapace conditions reported at sea, and the very different picture that they presented in 2022.
- A lack of consistency was noted in the data from dockside and at-sea sampling. This inconsistency was to be highlighted in the Science Advisory Report.
- It would be interesting to look at the data from the post-season survey to further investigate the relationship between temperature and catches at different trap depths.

### **Summary and Outlook: Area 14**

The assembly discussed the summary and possible scenarios.

- It was agreed that the key point on dockside data should state that landings were mainly composed of intermediate-shell crabs, followed closely by recruits, without specifying any percentages.
- The key point on the post-season survey was reviewed to clarify the message. Participants wondered about the lack of consistency between the post-season survey and the scientific trawl survey regarding the abundance of primiparous and multiparous females.
- In the outlook, the sharp rise in the combined index between 2021 and 2022 was to be highlighted, but the percentage was not to be specified (as was done for the other areas). This was noted to be the first increase since 2014. It should be added in the outlook that the biomass available to the fishery in 2023 should be higher than in 2022 and consists mainly of crabs left by the fishery.

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- Some participants found the outlook to be worded somewhat harshly. The fact that there were still three good cohorts that should be recruited to the fishery in the next three years should be taken into account. However, given the decline in the abundance of legal-size recruits and adolescents observed in the post-season survey in 2022, it was recommended that caution be exercised when increasing removals.
  - Participants suggested and accepted a 5% increase in the percentages for the proposed scenarios.

Thus, the assembly agreed on the following scenarios:

- *Higher scenario*: A 35% increase relative to total landings in 2022.
- *Intermediate scenario*: A 25% increase relative to total landings in 2022.
- *Lower scenario*: A 15% increase relative to total landings in 2022.

## **AREA 13**

### **Review of Indicators: Area 13**

Between 2021 and 2022, the TAC decreased by 18.7% and was reached. Between 2021 and 2022, the commercial CPUE increased and is currently below the historical average. The commercial abundance index derived from the post-season survey rose between 2021 and 2022 and is now above the average for the last three years. This upward trend reflects the increasing abundance of recruits in the northern part of the fishing area. The abundance of sublegal-size adult males rose significantly in the northern part of the area between 2021 and 2022.

The 2022 scientific trawl survey conducted in the eastern part of Areas 13 and 14, in the Lower North Shore area, points to a high density of primiparous and multiparous females and sublegal-size males.

Between 2021 and 2022, the combined index increased sharply. The biomass available to the fishery in 2023 is expected to be greater than that in 2022.

Several comments were made by participants:

- Some participants said that the carapace widths obtained from at-sea sampling did not represent reality.
- Participants were reminded that, in this area, there were only four years of data for the combined index, which was also the case in Area 14.
- Considering the high proportion of sublegal-size crabs in this area, it was suggested that this stock was protected from fishing effects to some extent. The presence of small individuals, possibly linked to the cold temperatures in the Mecatina Trough, could be a useful subject for study. For the moment, this was a source of uncertainty.

### **Summary and Outlook: Area 13**

Participants discussed the summary and proposed scenarios:

- The participants decided that the key point on carapace width should refer solely to dockside sampling data.
- For the post-season survey, it should be noted that the increase between 2021 and 2022 was attributable to the increased abundance of recruits in the northern part of the fishing

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area. Information on primiparous and multiparous females and spermathecal load is to be included in this key point.

- The outlook should refer to the reliance (rather than heavy reliance) of the commercial fishery on recruits. At the end of this key point, the participants added “to prevent increased white crab mortality.”
- A majority of participants were in favour of slightly more optimistic scenarios than those suggested.
- It was noted that the total landings to be considered corresponded to the value presented in the science peer review.

The assembly agreed on the following scenarios:

- *Higher scenario*: A 20% increase relative to total landings in 2022.
- *Intermediate scenario*: A 10% increase relative to total landings in 2022.
- *Lower scenario*: Status quo relative to total landings in 2022.

## **AREA 17**

### **Review of Indicators: Area 17**

In 2022, the TAC was similar to that in 2021 and was reached. Between 2021 and 2022, the commercial CPUE declined slightly and is currently below the historical average. The commercial abundance index derived from the post-season survey rose significantly between 2021 and 2022 and is slightly below the historical average. This increase is observed throughout the fishing area, with recruit abundance above the historical average.

The combined index rose by 26.6% in 2022, suggesting that the biomass available to the fishery in 2023 will be greater than in 2022.

Several comments were made by participants:

- The calculation of the CPUE was described, including the data retained (or removed) and the factors taken into account (soak time, month, fishing quadrant, vessel number). According to the industry, the month of March should be included, as the yields are significant. Results including the month of March were then presented. It should be noted that the trend remains unchanged, even though the average was slightly higher. For the purposes of this assessment, the standardization criteria established in 2006 were still being used, i.e. without the month of March; however, this detail will be analyzed during the review of the standardization procedure.
- A number of inconsistencies were noted regarding CPUE values in recent years. It was mentioned that presenting both standardized and raw data might be useful.
- It is to be emphasized that the industry will be consulted during the development of the new standardization method, in order to set out the important factors to be considered.
- A significant change in the sampling plan for the 2022 post-season survey was noted, mainly related to safety issues. The three westernmost transects in the northern part would no longer be sampled, and three transects were to be added in the southern part of the area.
- The wave of primiparous females seemed to be occurring a year or two later in this area compared with other areas further east, particularly Area 16.

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- The decline in spermathecal load in recent years was noted and participants wondered about the possible threshold at which a low value would be considered “too” low.
  - Given that Area 17 showed the strongest temporal trend in the decline in favourable thermal habitat for crabs during the summer, participants wondered about the possibility of a density dependent effect following this decline.
  - The NPUE values derived from the post-season survey may have reflected the greater reduction in habitat compared to during the fishing season. Recruits were also more prevalent in the post-season survey.
  - Participants also mentioned the impact of the shrimp fishery (trawling), which could explain some of the differences between the northern and southern parts. Corrections seemed to have been made in 2022 to avoid crabbing areas.
  - The industry hoped that the trawl survey, which did not take place in 2021, would return to the Estuary in 2023 to improve our understanding of the point currently occurring in the snow crab cycle. The biologists reported that the survey had been added to the CCG vessel’s schedule.

### **Summary and Outlook: Area 17**

Participants discussed the summary and proposed scenarios:

- Regarding the abundance of primiparous females in the post-season survey, the participants agreed that it should be stated that it had been increasing since 2020. The fact that the spermathecal load had been decreasing since 2019 should also be mentioned.
- The percentage increase should be retained in the key point on the combined index.
- The participants quickly agreed on the scenarios.

The assembly agreed on the following scenarios:

- *Higher scenario*: A 25% increase relative to total landings in 2022.
- *Intermediate scenario*: A 15% increase relative to total landings in 2022.
- *Lower scenario*: A 5% increase relative to total landings in 2022.

### **AREA 12A**

#### **Review of Indicators: Area 12A**

In 2022, the TAC was reduced to 43.1 t, representing a 37.5% decrease relative to 2021, and was fully fished. The commercial CPUE, which reached its lowest value in the time series in 2021, increased in 2022 and is below the historical average. According to the post-season survey, the commercial abundance index increased between 2021 and 2022, after a steady decline since 2011, but remains among the lowest in the time series. The abundance of primiparous females remains high in 2022.

The combined index reached its lowest value in 2021 and is increasing between 2021 and 2022, indicating that the biomass available to the fishery will likely be greater in 2023 than in 2022.

Several comments were made by participants:

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- Participants were reminded that Area 12A is small and has fewer fishers, and therefore changes in the fleet (many new fishers in 2022) may have a greater impact there. However, the standardized CPUE did not appear significantly different from that derived from the raw data. Presenting both trends was still useful in order to better assess discrepancies and uncertainty.
  - The work begun on the standardization approach will make it possible to review all the factors to be considered.
  - Participants wondered about the decline in carapace width in recent years. This could be explained by the fact that the stock is in a recruitment trough.

### **Summary and Outlook: Area 12A**

Participants discussed the summary and proposed scenarios:

- In the key point on the CPUE, the percentage increase should be removed.
- For carapace width (from at-sea and dockside observer data), the point should simply say that it was declining and is below the historical average.
- For the NPUE derived from the post-season survey data, participants agreed that the key point should state that it was still among the lowest values of the time series.
- For primiparous females, the point should simply state that abundance remained high in 2022.
- For the combined index, the percentage value related to the increase was to be removed.
- Participants expressed an interest in including Area 12A in the tagging project and carrying out tagging along the boundary between Areas 17 and 12A to collect data on the hypothesis of a spill-over effect from Area 17.
- With regard to the scenarios, some participants proposed a 20% increase under the intermediate scenario rather than the status quo in order to offset the loss in 2020. Several participants maintained that the exploitation rate had been too high in recent years and this should be corrected. In the end, participants opted for a cautious approach.

The assembly agreed on the following scenarios:

- *Higher scenario*: A 10% increase relative to total landings in 2022.
- *Intermediate scenario*: Status quo relative to total landings in 2022.
- *Lower scenario*: A 10% decrease relative to total landings in 2022.

### **RESEARCH PRIORITIZATION**

With respect to research priorities, brief reference was made to the following issues:

- Review of the assessment approach and development of a precautionary approach and the ecosystem approach;
- Collection and analysis of demographic (e.g., crab size, tagging and telemetry) and environmental (biodiversity, oceanography) data to inform these approaches.

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## APPENDIX 1 – TERMS OF REFERENCE

### Assessment of the Estuary and northern Gulf of St. Lawrence Snow Crab stocks Regional Peer Review - Quebec Region

February 15-17, 2023

Mont-Joli, Qc

Chairpersons : Charley Cyr and Kim Émond

#### Context

The snow crab fishery in the Estuary and the northern Gulf of St. Lawrence began in the late 1960s. Landings have varied depending on the adjusted Total Allowable Catches (TACs) based on the recruitment waves and troughs. In 2021, landings have totaled 4,456 t, down by 8% from 2020.

The Estuary and northern Gulf of St. Lawrence are divided into nine management areas (13 to 17, 16A, 12A, 12B and 12C). The effort is controlled by a fishing season as well as a limited number of licences and traps and catches are limited by quotas. A limitation of fishing for male crabs with a legal size of 95 mm is also in place.

The resource is assessed each year to determine whether changes that have occurred in the stock status necessitate adjustments to the conservation approach and management plan.

#### Objectives

Provide scientific advice to determine TACs for the snow crab stocks in the Estuary and northern Gulf of St. Lawrence: management units 13 to 17, 16A, 12A and 12C for the 2023 fishing season. The advice shall include:

- Description of the biology of the snow crab in the Estuary and northern Gulf of St. Lawrence;
- Description of the fishery including landings, fishing effort, carapace condition and changes in size structure over time;
- Analysis of catches per unit effort from the fishery;
- Analysis of data from post-season trap surveys conducted annually in collaboration with fishers. Indicators: number per unit of effort (NPUE) of legal-size and sub-legal-size crabs, changes in size structure over time and spermatheca load when available;
- Analysis of data from trawl survey(s) conducted annually in certain sectors or areas, when available. Indicators: changes over time in the annual densities of males and females according to the size observed;
- Identification and prioritization of research projects to be considered for the future;
- Perspectives and/or recommendations on management measures in effect for the 2023 fishing season for each of the management units, among others, harvest levels and their possible effects on the abundance and maintenance of the reproductive potential, based on a combined indicator (CPUE and NPUE) and related indicators for short- and medium-term predictions in compliance with the precautionary approach.

#### Expected Publications

- Science Advisory Report

- 
- Proceedings

**Expected Participation**

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



## APPENDIX 2 – LIST OF PARTICIPANTS

Name	Affiliation	Feb. 15	Feb. 16	Feb. 17
Beaudin-Gauthier, Jérôme	Fisher area 16	X	-	-
Beaudry-Sylvestre, Manuelle	DFO – Science	X	-	-
Belley, Rénaud	DFO – Science	X	X	X
Bennett, Lottie	DFO – Science	X	X	X
Bernier, Denis	DFO – Science	X	-	-
Bois, Samantha	ACGP	X	-	X
Boudreau, Sophie	DFO – Science	X	X	X
Bouchard, Donald	Essipit First Nation	-	-	X
Boucher, Jean-René	Area 16	X	X	X
Boucher, Larry	Fisher area 16	X	-	-
Boula, Dominique	DFO – Fisheries management	X	X	X
Bourassa, Luc	Consultant	X	X	X
Bourdages, Hugo	DFO – Science	X	-	-
Brûlé, Caroline	DFO – Science	-	X	-
Buffitt, Shawn	APBCN	X	X	-
Chabot, Denis	DFO – Science	X	X	X
Couillard, Catherine	DFO – Science	-	X	X
Cyr, Charley	DFO – Science	X	X	X
Dennis, Olivia	Province of Newfoundland	X	X	X
Desjardins, Christine	DFO – Science	-	-	X
Doucet, Marc	Fisher area 16	X	X	X
Dubé, Sonia	DFO – Science	X	X	X
Duplisea, Daniel	DFO – Science	X	X	-
Émond, Kim	DFO – Science	X	X	X
Galbraith, Peter	DFO – Science	X	X	-
Gianasi, Bruno	DFO – Science	X	-	X
Gosselin, Claude	Fisher area 17	X	-	X
Guénard, Guillaume	DFO – Science	X	X	X
Joncas, Jean-Richard	Fisher Lower North Shore	-	X	-
Juillet, Cédric	DFO – Science	X	X	X
Lacasse, Olivia	DFO – Science	X	X	X
Langelier, Serge	AMIK	X	X	X
Lavallée, Dean	Fisher Lower North Shore	X	-	-
Leclerc, Caroline	DFO – Fisheries management	-	X	X
Lees, Kirsty	DFO – Science	X	X	X
Léonard, Pierre	Essipit First Nation	X	-	X
Lévesque, Isabelle	DFO – Science	X	X	X
Loboda, Sarah	DFO – Science	X	X	X
Marcoux, Guylaine	DFO – Fisheries management	X	X	X
Martin, Henri	DFO – Fisheries management	-	X	-
Monger, Julie	LNSFA	X	X	-
Monger, Marc	Fisher Lower North Shore	X	X	-
Munro, Daniel	DFO – Science	X	-	-
Nadeau, Paul	LNSFA	X	X	-
Pinette, Majoric	Pessamit First Nation	X	X	X
Poirier, Serge	Fisher area 16	X	-	-
Ransom, Glen	Fisher Lower North Shore	X	X	-
Roy, Marie-Josée	DFO – Fisheries management	X	X	X
Sainte-Marie, Bernard	DFO – Science	X	X	X
Sandt-Duguay, Emmanuel	AGHAMW	-	-	X
Sigouin, Evelyne	AGHAMW	X	X	X

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<b>Name</b>	<b>Affiliation</b>	<b>Feb. 15</b>	<b>Feb. 16</b>	<b>Feb. 17</b>
Senay, Caroline	DFO – Science	x	-	-
Stubbert, Curtis	Fisher Lower North Shore	x	x	-
Tamdrari, Hacène	DFO – Science	x	x	x
Vallée, Simon	Fisher area 17	-	-	x
Vigneault, Guy	Shipek	x	x	-