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

**Canadian Science Advisory Secretariat (CSAS)**

**Proceedings Series 2023/038**

**Quebec Region**

# Proceedings of the Regional Peer Review on the Assessment of the Gulf of St. Lawrence (4RST) Atlantic Halibut Stock

**March 6-7, 2023**
**Mont-Joli, QC**

**Chairperson: Stéphane Plourde**
**Editor: Sonia Dubé**

Maurice Lamontagne Institute
Fisheries and Oceans Canada
850 Route de la mer, P.O. Box 1000
Mont-Joli, Quebec G5H 3Z4

September 2023

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
ISBN 978-0-660-67937-2 Cat. No. Fs70-4/2023-038E-PDF

**Correct citation for this publication:**

DFO. 2023. Proceedings of the Regional Peer Review on the Assessment of the Gulf of St. Lawrence (4RST) Atlantic Halibut Stock; March 6-7, 2023. DFO Can. Sci. Advis. Sec. Proceed. Ser. 2023/038.

***Aussi disponible en français :***

*MPO. 2023. Compte rendu de l'examen par les pairs régional sur l'évaluation du stock de flétan atlantique du golfe du Saint-Laurent (4RST); du 6 au 7 mars 2023. Secr. can. des avis sci. du MPO. Compte rendu 2023/038.*

## TABLE OF CONTENTS

SUMMARY ..... iv
INTRODUCTION ..... 1
ASSESSMENT ..... 1
COMMERCIAL FISHERY ..... 2
TRAWL SURVEYS ..... 2
LONGLINE SURVEY AND TAGGING ..... 3
ASSESSMENT MODEL ..... 3
PRECAUTIONARY APPROACH ..... 4
SUMMARY: MODEL AND PRECAUTIONARY APPROACH ..... 5
CONCLUSION ..... 6
INTERIM YEAR ..... 6
RESEARCH ..... 6
HIGHLIGHTS AND ADVICE ..... 6
APPENDIX 1 – TERMS OF REFERENCE ..... 8
APPENDIX 2 – LIST OF PARTICIPANTS ..... 10
APPENDIX 3 – AGENDA ..... 11

## SUMMARY

This document outlines the proceedings of the regional peer review meeting on the assessment of the Gulf of St. Lawrence (4RST) Atlantic halibut stock. This meeting, which was held on March 6-7, 2023 at the Maurice Lamontagne Institute in Mont-Joli, brought together about forty participants from science, management, First Nations and industry. These proceedings detail the essential parts of the presentations and discussions held during the meeting, as well as the recommendations and conclusions made.

## 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 that is conducted at the Maurice Lamontagne Institute in Mont-Joli. This document outlines the proceedings of the meeting on the assessment of the Gulf of St. Lawrence (4RST) Atlantic halibut held on March 6-7, 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 Gulf of St. Lawrence (4RST) Atlantic halibut stock for the 2023-2024 and 2024-2025 fishing seasons.

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

Chair Stéphane Plourde welcomed the participants and went over the objectives and process for the science review, as well as the role of the participants. The terms of reference and agenda (Appendix 3) were presented. The participants were then asked to introduce themselves.

The assessment biologist, Mathieu Desgagnés, presented some information on the biology of the Atlantic halibut, including its distribution in the Gulf of St. Lawrence (GSL). It appears that Atlantic halibut are tolerant of relatively high temperatures (2 ºC to 11 ºC) and avoid the cold intermediate layer (CIL). In summer, they are distributed across the GSL in two depth ranges (20–50 m and 100–300 m) and display a certain degree of summer site fidelity. In winter (December to April), they are generally found in deep channels and their vertical ascents in the water column seem to be associated with spawning behaviour. In terms of diet, Atlantic halibut less than 50 cm long feed mainly on shrimp, fourbeard rockling and hermit crab, while the main prey of individuals over 50 cm is redfish, followed by cod, fourbeard rockling and snow crab.

- Participants wondered about the differences in the species' diet in the northern GSL (nGSL) and southern GSL (sGSL).
- It was noted that the large numbers of redfish in the nGSL ecosystem did not seem to have affected Atlantic halibut, due to the marked difference in these species' diets.
- The generalized increase in GSL temperatures and decrease in CIL volume does not seem to have created unfavourable conditions for Atlantic halibut.
- The biologist noted that work was underway to obtain a representable growth curve for the GSL population. It was pointed out that males and females cannot be accurately differentiated in the curves presented. In order to correctly identify trends, a greater number of individuals will have to be taken into account. Alternative otolith reading methods would also help in obtaining more complete information and in refining the analyses.

- It was added that the current growth curve results already show significant differences from those obtained for other stocks outside the GSL, notably the Scotian Shelf stock, and provide a good basis for modelling.

## COMMERCIAL FISHERY

The data used for the commercial fishery assessment come from landing statistics, zonal interchange format files (ZIFF) (logbooks, purchase slips, dockside verification program), at-sea observers and dockside sampling. In recent years (since 2015), 95% of halibut landings have come from the longline fishery. Landings of Atlantic Halibut have been increasing since the early 2000s and have reached the highest values since 1960. For the 2021–2022 and 2022–2023 management years, preliminary landings were 1,526 t and 1,407 t, respectively. The catch-per-unit effort (CPUE) for Atlantic halibut in the directed longline fishery increased from the early 2000s to the mid-2010s. Since then, it has remained high and stable to approximately 450 kg/1,000 hooks. The average size and weight of landed Atlantic halibut has been increasing since 2006.

- The fact that the TAC was not reached was mainly attributable to the effects of various management measures.
- A certain amount of consistency was observed in the arrival patterns of the new cohorts as shown in the different data sources (at-sea observer and dockside sampling data), although the at-sea observers detected the new cohorts a little sooner.
- In Division 4R, gaps were found in the information on landings, including catch location and fishing effort. This could be explained by the fact that the captains of small vessels (< 35 ft.) do not complete a logbook. As a result, a portion of the GSL is less well represented in the data.
- It was noted that several factors are responsible for the fact that the CPUE is not necessarily a good indicator of abundance, but rather one of fishery performance. This indicator was not used in fitting the model.

## TRAWL SURVEYS

Other data used for the assessment come from fishery-independent surveys (DFO surveys: northern and southern Gulf; mobile sentinel survey program in the northern Gulf). The biomass indices of commercial-sized Atlantic halibut (greater than 85 cm) from trawl surveys in 2021 and 2022 are among the highest in historical series. Abundance indices of Atlantic halibut pre-recruits (65 to 85 cm) from trawl surveys show high values since the mid-2000s.

- The biologist acknowledged that the sGSL survey was 2.438 times more efficient in capturing halibut than the nGSL survey. An adjustment factor was used to calculate the mean of the minimum trawlable biomass values, which were adjusted for the area of overlap. To obtain the total minimum trawlable biomass, this mean value was added to the values obtained for each survey outside the area of overlap.
- According to participants, the stratified random sampling method used remained valid. The sampling design was not likely to bias the estimation of biomass. Participants were reminded that the index obtained remained an index of relative abundance.
- It was noted that the size frequencies obtained in the surveys corresponded fairly closely to those observed in the fishery.

- It was noted that the sentinel survey program did not capture small fish, which could explain why the most recent cohort was not visible in the size frequencies associated with this indicator.
- In the last 15 years, average relative exploitation rates of 6.7% and 2.7% were obtained in the sGSL and nGSL surveys respectively, reflecting their different selectivity. Participants considered these rates to be low.

## LONGLINE SURVEY AND TAGGING

A combined longline survey and tagging project has been carried out since 2017. Every year, roughly 125 longline fishing stations are sampled and spaghetti tags are applied to about 800 individuals, which are then released back in the water. The model estimated a natural mortality rate of approximately 0.19, but it was decided that the more realistic figure of 0.1 should be used. The preliminary analysis of the capture-mark-recapture data suggests a low exploitation rate.

- It was suggested that a strata map be included in the document.
- Fishers were asked about their perceptions of tag returns, but this appeared to be very difficult to evaluate.
- The participants agreed on the importance of this survey and recognized the efforts expended on it.

## ASSESSMENT MODEL

Delayed-difference models are an intermediary between simple production surplus models and complex age-structured models. Adjustment of a delay-difference type assessment model, integrating DFO monitoring, longline survey and capture-mark-recapture, shows that the biomass of the commercial-sized stock has grown to reach 94,482 t in 2022.

This approach allows individuals that are vulnerable and invulnerable to the fishery to be separated; however, recruitment (i.e. the new individuals that have become vulnerable) is in fact composed of a number of different ages. According to growth estimates for the 4RST stock, the average age of recruitment at 85 cm is nine years, regardless of sex. Based on the model, individuals are recruited at the age of nine years, which is well past their early years, when natural mortality (*M*) rates are much higher. It is reasonable to think that the value of *M* becomes stabilized and then declines. The value of *M* was assumed to be 0.1 for the purposes of model fitting, and the sensitivity of the model to the chosen value of this parameter was explored. Weight growth in the next two years was assumed to follow the linear relationship described by the Ford-Walford equation, with weight derived from the von Bertalanffy growth parameters. Regardless of the source used to describe this relationship, the growth of halibut seems to meet this criterion. Values corresponding to a return rate of 80% and a survival rate of 99% after tagging were used in fitting the model. A scenario with a 50% return rate and 90% survival rate was used in the sensitivity analyses.

- It was confirmed that the data from the longline survey as well as those from the DFO surveys were used in fitting the model, with the two datasets processed simultaneously. When the DFO survey data were used exclusively, the differences appeared minimal.
- Some participants wondered why modelling was not limited to individuals 85 cm and larger. The biologist explained that, in the past, part of the fishery targeted 81–85 cm individuals. There was therefore a danger of model drift. Although this was not a major correction (only involving the 2010 point), it was nevertheless a valid one.

- It was explained that the survival rate after release into the water was based on previous tagging studies. Work was underway that would allow these data to be refined.
- When a variable value for *M* was used (instead of a fixed value), the fishing mortality increased but only slightly. However, the sum of *M* and *F* (total mortality) showed a greater increase. It would be a good idea to explain this clearly in the document.
- The model results seem to effectively reconcile the very low biomass values obtained in the 1990s and the upward trajectory seen in the survey data in the following years.
- It was explained that average weight provides information on the capacity of fish in the population for longevity and growth. In the absence of constraints on the parameters, the model provided recruitment values corresponding to those observed in the surveys.
- It was noted that variation in recruitment did not influence biomass that much. Increases in biomass were mainly due to the influence of the growth of large individuals.
- Participants questioned the magnitude of the increase in biomass to 94,482 t in 2022.

The model was used to calculate a range of projected removals in the next two years. The parameters estimated by the model were assumed to be valid for the next two years; in addition, recruitment values equivalent to the average of the last 10 estimates were used for each of the two years for which projections were made. Sensitivity analyses were carried out on the projections by modifying certain scenarios (e.g. natural mortality, tag return rate for estimating *F* and *M*, years used, growth rate).

Regardless of the scenario, the model results indicated that exploitation rates are likely low and any increase in these rates would not result in a decline in biomass. The range of absolute biomass values estimated by the model was variable over time, but began to stabilize in 2018, the year when fishing mortality (*F*) input was first used in the model. According to the model, removals as great as 3,584 t in the next two years would not cause a decrease in biomass. These projections are robust to the different values chosen for the main model parameters. The retrospective patterns do not appear to cause any problems in the short-term projections.

- Participants noted significant differences between abundance and biomass in the retrospective patterns.
- The point was raised that the model had problems with scaling when it did not have access to the main parameters. When appropriate values were used for the parameters, the model seemed to provide accurate results.
- It was noted that the *F* value obtained from tag returns appeared to serve as an anchor.
- It was noted that several model inputs would improve with time.

## PRECAUTIONARY APPROACH

The determination of reference points by the model involves ascertaining the maximum sustainable yield (MSY), equilibrium biomass at MSY ($B_{MSY}$) and equilibrium fishing mortality at MSY ($F_{MSY}$). These calculations require that a curve be determined that shows the relationship between spawning stock biomass as an indicator of the stock's potential productivity, and the associated recruitment to the population.

The biomass of individuals 85 cm and larger was used in the model as an indicator of the stock's potential productivity, although most 85-cm-long halibut are still immature. An estimated time interval of nine years was assumed between the arrival of new recruitment and the spawning biomass that produced it, although it is expected that the reproductive effort in a given

year will contribute to recruitment (defined here as new individuals 85 cm and larger) over several years, given the variations in individual growth.

A limit reference point is set at 40% of the theoretical biomass at the maximum sustainable yield ($B_{MSY}$), i.e. 25,291 t. A upper stock reference point (USR) is proposed at 80% of the $B_{MSY}$, i.e., 50,582 t, and would place the stock in the healthy zone of the precautionary approach. However, the results of the model are sensitive to the adjustment parameters chosen.

Other options for determining the reference points include using the biomass corresponding to the biomass per recruit at F0.1 multiplied by the average number of recruits; using the average biomass (or index of biomass) over a productive period; and using the biomass corresponding to 50% of the maximum historical biomass.

- The participants agreed with the biologist that the determination of reference points is strongly influenced by the parameters chosen to fit the model. This is the major disadvantage of using the model to determine reference points.

## SUMMARY: MODEL AND PRECAUTIONARY APPROACH

The second day of the peer review began with an overview. During the previous assessment, it had been agreed that a robust index of abundance was not available. However, the survey data produced similar signals. The DFO survey seemed to track biomass well, even though its catchability (q) was not ideal. It was also agreed that the exploitation rate remained low. The model presented in this peer review attempts to combine the various indicators (DFO monitoring data, longline survey data and capture-mark-recapture data) to provide greater consistency. The question was whether participants were comfortable with this model, despite some imperfect data, and whether the model provides us with more information. Participants were reminded that the first objective of the peer review was to provide a somewhat clearer framework for Management, while the second objective was to determine reference points.

- Some participants seemed to be uncomfortable with the value for biomass provided by the model (94,482 t). It seemed obvious that, for large halibut (85 cm and over), the value for q had to be lower than 1, since, the larger the fish, the less catchable they are. However, an even greater number of large fish were observed. Therefore, we were left with very high biomass values, regardless of whether the survey is effective in capturing large fish. Either we accept that exploitation rates are low or realize that the survey is a good indicator of large halibut. According to the biologist, the survey is possibly a good indicator of halibut 85 cm and larger, which is fairly consistent with the low exploitation rates.
- Having more information on the trawl's selectivity curve could be useful.
- Fairly strong sensitivity to the model parameters was observed but, once the parameters were chosen, the retrospective patterns showed a convergence, which is quite positive.
- The model appears to be robust enough to allow changes in removals, which is promising. The projections remained consistent.
- The unease expressed about the model did not appear to be great enough to prevent its use in making short-term projections. However, emphasizing the uncertainty will be important.

The other proposed approaches for determining reference points were reviewed, including the option of using a biomass value corresponding to 50% of the maximum historical biomass and the option of using the average biomass during a productive period.

- It was noted that both these approaches situated the stock in the healthy zone, which is very reassuring.
- Some participants saw the benefits of using the smoothed data provided by the current model.
- It was noted that $B_{rec}$ is not relevant to this stock.
- Some participants would opt for either the model or an empirical approach but not a combination of both.
- Some participants found the empirical approach (average during a productive period) to be a more prudent one since it is based on the minimum trawlable biomass.
- Several participants considered data smoothing by the model to be a real benefit. In addition, the model takes account of more parameters than the empirical approach and it was clear that it would improve over time.
- In addition, the participants' unease over the model did not seem strong enough to preclude using it to determine reference points.
- Finally, a consensus was reached on using the model presented to determine the reference points.

## CONCLUSION

### INTERIM YEAR

Given the stock's dynamics, in which changes are generally slow and gradual, and the two-year assessment cycle, it was suggested that the science advice be considered valid in the interim year and that no updates be provided. However, if the frequency of science advice and advisory reports must change, the process to be completed in interim years should also be modified.

- Management was comfortable with the proposed approach. The assessment cycle could perhaps be revisited.

### RESEARCH

Various research issues were raised:

- Determining the age of halibut (growth curve, catch-at-age data):
- Validating maturity at age;
- Continuing the longline survey, given its importance, and maximizing the information obtained (tag returns and electronic logbooks). This would help reduce uncertainty;
- Evaluating alternative assessment approaches (e.g. age determination, which would allow a new age-structured model to be used);
- Improve the precautionary approach;
- Continue the work on otolith chemistry.

### HIGHLIGHTS AND ADVICE

The key points were presented, and commented on by participants. Comments concerning stylistic rewording were not reported.

- In the key point on landings, the fact that the TAC was not reached was superfluous and should be removed.
- In the key point on the abundance index derived from DFO trawl survey data, the last sentence on the minimum trawlable biomass should be removed. The reference to the abundance index should be replaced by biomass indices. The fact that they were DFO surveys should be omitted, as it should in the key point on pre-recruit abundance indices. The participants decided that this key point should refer to a period (since the mid-2000s) rather than a specific year (2017).
- The key point on the size of landed halibut should be reworded to refer to average size and weight. The second sentence on the proportion of fish larger than 100 cm was to be removed.
- For the assessment model, participants agreed on the use of the term “delayed-difference population dynamics model.” It should be specified that this model integrates DFO monitoring data, longline survey data and capture-mark-recapture data.
- In the key point on reference points, participants finally agreed to include the LRP and USR. It should be clearly stated that the model results are sensitive to the model fits chosen.
- The key point on the two-year model projections was revised. Finally, the participants agreed that it should refer to a significant increase in removals, which should not reduce the stock biomass. It was preferable not to mention specific values or orders of magnitude. It was also agreed that the point should state that biomass should remain in the healthy zone based on the proposed USR. It should also be added that these projections are robust to different modelling scenarios.
- Regarding the exploitation rates estimated by the model, the wording should say that they are consistent with the values observed from the capture-mark-recapture work and the relative exploitation rates derived from the minimum trawlable biomass values obtained in the DFO surveys. It should be specified in the beginning that exploitation rates have been low in the last 15 years.
- In the science advisory report, the importance of the longlining survey, which has been conducted since 2017, must be emphasized. Going forward, Science supports the need for these data.

The participants agreed on the following wording for the **conclusion**:

The exploitation rates estimated by the model have been low for 15 years and are consistent with the values observed from capture-mark-recapture work and the relative exploitation rates obtained from the minimum trawlable biomass of DFO surveys.

The model's 2-year projections show that a significant increase in removals is not expected to cause a decrease of the stock biomass, which would remain within the healthy zone under the proposed USR. These projections are robust to different modelling scenarios.

## APPENDIX 1 – TERMS OF REFERENCE

### Assessment of the Gulf of St. Lawrence (4RST) Atlantic halibut

**Regional Peer Review - Quebec Region**

**March 6-7, 2023**
**Mont-Joli, Québec**

Chairperson: Stéphane Plourde

### Context

The directed Atlantic halibut fishery is mainly carried out by fixed-gear vessels using longline. Atlantic halibut is also caught as by-catch in other fisheries, in particular the Greenland halibut fishery. To protect the population's reproductive potential, this fishery is subject to several management measures including a total allowable catches (TAC).

At the request of the Fisheries Management Branch, a full stock assessment is conducted every two years. The purpose of the assessment is to provide the Minister with detailed advice on the status of the stock in order to inform management decisions for the 2023-24 and 2024-25 fishing seasons.

### Objectives

Provide scientific advice on the status of the Atlantic halibut stock in NAFO Divisions 4RST. This advice shall include:

- A description of the biology of Atlantic halibut and its distribution;
- An oceanographic and environmental overview for the stock area. If possible, this information should be integrated into the advice;
- An assessment of the resource status of Atlantic halibut in 4RST, including abundance, recruitment, exploitation rate, and biological characteristics based on:
- Analysis of the commercial fishing data including landing statistics, logbooks and commercial at-sea and dockside sampling program;
- Analysis of data from the DFO annual research trawl survey and sentinel fisheries;
- Analysis of data from the longline survey and tagging project carried out in collaboration with industry;
- Fitting a stock assessment model to these data.
- Identification of a Limit Reference Point for this stock, and a report on stock status relative to the LRP.
- Determination of a process to provide advice in the form of an update during the interim years between full assessments, and the identification of indicators that may trigger a full stock assessment in place of an update;
- Evaluation of the impact of maintaining and changing current harvest levels;
- Identification of major sources of uncertainty in the assessment
- Identification of research priorities based on the assessment needs.

## Expected Publications

- Science Advisory Report
- Proceedings
- Research Documents (2)

## Expected Participation

- Fisheries and Oceans Canada (DFO) (Science and Fisheries Management sectors)
- Fishing industry
- Provincial Government representatives
- Indigenous Organizations
- External experts

## APPENDIX 2 – LIST OF PARTICIPANTS

| Name | Affiliation | March 6 | March 7 |
|---|---|---|---|
| Beaudry-Sylvestre, Manuelle | DFO – Science | x | x |
| Bois, Samantha | ACPG | x | x |
| Bouchard, Donald | Essipit First Nation | x | x |
| Boudreau, Sophie | DFO – Science | x | x |
| Boulanger, Marie-Pier | DFO – Science | x | x |
| Bourbonnière, Jean-Patrick | Fisher | x | x |
| Bourdages, Hugo | DFO – Science | x | x |
| Bourgeois, Andrew | Gulf Nova Scotia Fishermen's Coalition | x | x |
| Brûlé, Caroline | DFO – Science | x | x |
| Chamberland, Jean-Martin | DFO – Science | x | x |
| Chlebak, Ryan | DFO – Science Ottawa | x | x |
| Couture, John | Oceans North | x | x |
| Cormier, Julien | DFO – Fisheries management – Gulf region | x | x |
| Cyr, Charley | DFO – Science | x | x |
| Dennis, Olivia | Prov. NL | x | x |
| Desgagnés, Mathieu | DFO – Science | x | x |
| Dubé, Sonia | DFO – Science | x | x |
| Duplisea, Daniel | DFO – Science | x | x |
| Émond, Kim | DFO – Science | x | x |
| Ferguson, Louis | MFU-UPM | x | x |
| Gauthier, Charlotte | UQAC | x | x |
| Giffin, Melanie | Prince Edward Island Fishermen's Assoc. | x | x |
| Hardy, Keven | Fisher | | x |
| MacMillan, Robert | Prov. PEI | x | x |
| Martin, Lucas | UQAR-ISMER | x | x |
| Monger, Julie | LNSFA | x | - |
| Nadeau, Paul | LNSFA | - | x |
| Ouellette-Plante, Jordan | DFO – Science | x | x |
| Pelletier, Claude | Prov. NB | x | x |
| Plourde, Stéphane | DFO – Science | x | x |
| Pond, Nancy | DFO – Fisheries management – NL region | x | x |
| Rigg Power, Jodi | DFO – Fisheries management – NL region | x | x |
| Sandt-Duguay, Emmanuel | AGHAMW | x | x |
| Senay, Caroline | DFO – Science | x | x |
| Simard, Émilie | DFO – Science | x | x |
| Smith, Andrew | DFO – Science | x | x |
| Solberg, Abe | FFAW | x | x |
| Tamdrari, Hacène | DFO – Science | x | x |
| Trottier, Steeve | DFO – Fisheries management – Quebec region | x | x |
| Vascotto, Kris | Atlantic Groundfish Council | x | x |
| Way, Loomis | FFAW | - | x |

## APPENDIX 3 – AGENDA

# Assessment of the Gulf of St. Lawrence (4RST) Atlantic halibut stock

***Regional peer review – Quebec Region***

**March 6-7, 2023**

**March 6, 2023**

| Time (EST) | Subject |
|---|---|
| 9:00 | Introduction and round table |
| 9:30 | Biology and ecosystem |
| 10:00 | Fishery and bycatch |
| 10:30 | *Health break* |
| 10:45 | Scientific surveys |
| 12:00 | *Lunch break* |
| 13:00 | Model |
| 14:30 | *Health break* |
| 14:45 | Model / Projections / Sensibility |
| 15:45 | Day wrapup |
| 16:00 | Meeting adjourned |

**March 7, 2023**

| Time (EST) | Subject |
|---|---|
| 9:00 | Summary of the previous day |
| 9:10 | Limit reference points |
| 10:30 | *Health break* |
| 10:45 | Interim year process |
| 11:00 | Future works |
| 11:15 | Révision du sommaire de l'avis scientifique |
| 12:00 | *Lunch break* |
| 13:00 | Review of the science advice summary |
| 14:30 | Word of the chairperson |
| 14:45 | End of meeting |