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International Joint Commission
Lake Memphremagog Study - Science and Policy Workshop
Summary and Outcomes

Final Report

Submitted to:

Pierre-Yves Caux

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International Joint Commission – Canadian Section

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About this report: This report describes the discussions and outcomes of a workshop held in September 2019 to collect comments and advice from stakeholders on a preliminary report entitled "*Study of nutrient loading and impacts in Lake Memphremagog*", prepared by the Memphremagog Study Advisory Group. The planning of the workshop and its delivery were facilitated by René Drolet, an independent consultant retained by the Canadian section of the International Joint Commission (IJC). A workshop planning committee comprised of individuals from various organizations coordinated the planning, organization and delivery of the workshop. However, the content of this report is the sole responsibility of the consultant and does not necessarily represent the views or opinions of the individual members of the workshop planning committee.

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1. Introduction and Context

Lake Memphremagog is a fresh water lake located between Newport City (Vermont) and Magog (Quebec). Most of its watershed is located in Vermont even if the larger part of the lake is located in Quebec. Human activities on the watershed are a source of phosphorus, sediments and other pollutants. Significant resources and efforts have been dedicated to the reduction of nutrient loading to Lake Memphremagog and the prevention of harmful algal blooms (HABs), but ecological conditions have been slow to improve. As a consequence, the public and various stakeholders have high expectations that existing and planned efforts will improve water quality.

Because of its transboundary nature, governance of the lake is complex and of interest to both Canada and the United States, as well as the State of Vermont and the Province of Quebec. The International Joint Commission (IJC), created under the *Boundary Waters Treaty* signed by both countries in 1909, has been asked by the national governments to investigate the nutrients issue in Lake Memphremagog and to recommend solutions.

The IJC has engaged organizations in both countries in the conduct of a study of nutrient loading and impacts in Lake Memphremagog. This initiative aims to synthesize what is known about nutrient loading issues and HABs in the system and to revisit and strengthen current collaborative efforts between federal agencies as well as between Quebec and Vermont.

A Science and Policy workshop was held on September 20, 2019, in order to discuss and evaluate recommendations from a preliminary study report and provide input to strengthen the viability and feasibility of the recommendations. This report provides a summary of what was heard during the workshop, highlighting some suggestions from workshop participants with respect to the recommendations from the preliminary study report.

2. Process and Methodology

As the recipient of a reference from the governments of Canada and the United States to address nutrients issues in Lake Memphremagog, the International Joint Commission (IJC) is working with the State of Vermont and the Province of Quebec, as well as with regional basin organizations on both sides of the border. The Memphremagog Study Advisory Group (MSAG) produced a preliminary report in 2019 and wishes to present the report findings and discuss its recommendations with stakeholders through a science and policy workshop. A decision was made to hire an independent consultant to support the IJC and its partners in this endeavor and to provide a neutral facilitated space for the discussions to take place.

2.1 Workshop Planning Committee

A planning committee was created to plan, design, organize and deliver the science and policy workshop. The committee was comprised of representatives from the IJC (Canadian and US sections), Memphremagog Conservation Inc. (MCI), Memphremagog Watershed Association (MWA), Conseil de gouvernance de l'eau des bassins versants de la rivière Saint-François (COGESAF), Vermont Department of Environmental Conservation, and the independent consultant retained as facilitator for the workshop. The list of workshop participants presented in Appendix I also identifies the members of the planning committee.

The Committee met several times by conference calls between July and September 2019 to design the workshop agenda, develop the facilitation approach and the workshop materials, coordinate invitations to the workshop, manage logistical issues and other related tasks. The broad range of expertise and interest within the Committee has allowed the group to bring forward the issues and perspectives of interested groups in a more comprehensive way than would have been possible should the workshop had been designed and organized solely by the IJC.

2.2 Workshop Objectives and Expected Outcomes

The primary purpose of the workshop was to discuss the preliminary report and receive feedback from participants, with a focus on the report's science and policy recommendations. The workshop was by invitation only and it is important to note that it did not provide opportunity for participation of the general public at this time. Public engagement on a revised version of the report will be conducted at a later date.

The main outcome of the workshop was the reception of comprehensive feedback from participants on the preliminary report's recommendations. The feedback received during the workshop led to the preparation of this workshop summary report, which will be used by the IJC and other organizations involved to prepare a revised and more complete version of the study report.

It was also expected that the workshop would allow participants from the national governments and from various organizations located in Vermont and in Quebec to exchange information and identify common interests, therefore strengthening the foundation for future collaboration.

2.3 Participants

A total of 52 people attended the workshop, including 23 from Canada and 29 from the United States. A complete list of participants is shown in Appendix I of this report.

2.4 Workshop Design and Agenda

The workshop was designed with the intent of hearing a broad range of perspectives and get participants to work together towards the shaping of recommendations that would address the issues at stake in Lake Memphremagog, while being as practical and feasible as possible.

The Workshop Planning Committee determined that a minimum level of basic information about the science and policy issues regarding nutrient loading and impacts in Lake Memphremagog should be shared with all participants ahead of time. To that end, summaries of the key chapters of the draft report were sent to participants before the workshop.

The workshop was held on Friday September 20, 2019, in Newport, Vermont. After welcoming remarks from the IJC, the Memphremagog Study Advisory Group and the co-chairs of the Quebec/Vermont Steering Committee, most of the morning session was dedicated to providing additional information to participants. This included a detailed presentation of the preliminary report, both from a science and a policy perspective. This presentation was intended to bring all participants up to speed with respect to the report findings and recommendations. It was followed by a science presentation from Dr. Alain Rousseau highlighting similar nutrients issues around the world and actions taken to address these issues.

The rest of the day was focused on getting participants' input on the draft report and its recommendations. To do so, participants were divided into breakout groups and worked together to assess the recommendations, identify challenges with their implementation, suggest priority actions and identify potential gaps. Each group worked on a different issue, in an attempt to cover all of the report's recommendations. More information on the breakout sessions is presented in the next chapter.

The workshop agenda is presented in Appendix II and the key outcomes of the workshop discussions are presented in the next chapter.

3. Summary of Workshop Discussions

This section summarizes the presentations and key perspectives expressed at the workshop.

3.1 Summary of the presentations

The workshop started with welcoming remarks from the IJC, the MSAG and the co-chairs of the Quebec/Vermont Steering Committee. It was followed by a presentation of the preliminary study report, and finally, a broader perspective on similar nutrients issues and responses in other geographical areas. A short summary of these presentations is provided below[1].

Michael Laitta, IJC – US Section

Mr. Laitta welcomed all participants and provided contextual information for the workshop. He summarized the IJC mandate and explained that as part of its mandate, the IJC sometimes gets references from the two national governments. A reference requires the IJC to investigate and make recommendations on issues referred by governments. The 2017 Reference on nutrients reads as follows:

> *In collaboration with relevant government agencies, academic institutions and other entities in the region, identify the range of nutrient loading issues that are of concern in the Lake Memphremagog basin and make recommendations on how current efforts can be strengthened, including consideration of management approaches being taken for Lake Champlain and Missisquoi Bay that may be applicable*.

In response to this Reference, the IJC chose to hire basin organizations on both sides of the border to write the report and conduct networking. It also established the Memphremagog Study Advisory Group (MSAG) to review and direct the work. Mr. Laitta also reminded the audience that the Boundary Waters Treaty of 1909 requires that all parties interested therein shall be given a convenient opportunity to be heard. In that spirit, he mentioned that public outreach and communications activities will be planned later in this process to inform and engage the general public and interested parties.

Ben Copans & Julie Grenier, co-chairs of Memphremagog Study Advisory Group (MSAG)
Pete LaFlamme & Nathalie Provost, co-chairs of Quebec/Vermont Steering Committee

All four speakers welcomed workshop participants and emphasized the importance of their input to this study. Ms. Provost mentioned that Quebec and Vermont have been working together for 30 years to improve water quality in Lake Memphremagog. Mr. LaFlamme reiterated that the

[1] The full presentations are publicly available and can be obtained through the International Joint Commission.

lake is a unique natural feature that needs protection and that the Quebec/Vermont Steering Committee is moving that way.

Ben Copans, Vermont Department of Environmental Conservation
Alexandra Roy, Orford County (Quebec)

Mr. Copans and Ms. Roy presented a summary of the science from chapters 2 & 3 of the report. The presentation provided an overview of the lake and its watershed. It also covered water quality through results of monitoring in the lake and tributaries. There was a discussion of nutrient loading sources and cyanobacteria blooms. It was pointed out that Lake Memphremagog is the source of drinking water for 175 000 Canadians and that even if 75% of the lake is located in Quebec, almost 75% of its watershed is in Vermont. Nutrient loading sources in Quebec and in Vermont were presented, as estimated by current models. Watershed phosphorus load modeling was originally developed through the Quebec/Vermont Steering Committee, using estimated loading from each land use based on literature values. The modeling was modified to support the creation of a Vermont Total Maximum Daily Load (TMDL) and calibrated based on load estimates from Vermont tributaries. The speakers pointed out that updates are needed to estimate loads in Quebec more accurately. The study also used a BMP scenario tool and tracking in Vermont, combined with a lake model to show that a 29% reduction in Vermont watershed loading is required to meet the water quality standard. The presenters discussed a number of potential effects of nutrient loading and they identified opportunities for increased monitoring efforts, including the update of the binational mass balance model, ensuring that water quality monitoring approaches and laboratory analysis are better harmonized and more comparable, as well as the development of a better understanding of potential climate change impacts.

Pete LaFlamme, Vermont Department of Environmental Conservation
Nathalie Provost, Quebec Ministry of Environment and the Fight against Climate Change

Both speakers summarized the policy, regulatory and legislative framework in place in their respective jurisdiction that are relevant to water quality. Ms. Provost emphasized the importance of Quebec's *Environment Quality Act* and its recently modernized environmental authorization processes. She mentioned the existence of regulations specifically addressing agricultural operations, as well as Quebec's No Net Loss policy for wetlands. Quebec also released in 2018 a new *National Water Strategy*. She concluded by saying that development will continue to happen and all jurisdictions must work together to protect Lake Memphremagog.

Mr. LaFlamme pointed out that the situation in Vermont is very similar. Major pollution sources are non-point sources such as agricultural and municipal runoffs. State regulations address

agricultural processes and runoffs. Certain regulations also apply to private lands of three acres or more. The State of Vermont uses models to set limits and achieve targets for nutrient loadings.

Dr. Alain Rousseau, National Institute for Scientific Research (Quebec)

Dr. Rousseau presented a global scan of how the issue of nutrient loading and harmful algal blooms (HABs) is being addressed. As part of his study[2], hundreds of situations were considered around the world and twelve case studies were retained for the conduct of a detailed analysis. The issues faced across these case studies were harmful blooms, limited recreation, phosphorus loading, massive fish kills and drinking water shutdowns. The responses from government agencies fall within four categories: a) regulatory approaches; b) incentive-based approaches; c) risk management and mitigation; d) outreach, engagement and educational activities. The main conclusions of the study were the following:

- National water quality standards are not stringent enough to prevent HABs.
- Frameworks are all based on integrated watershed management planning.
- Effectiveness of non-point source (NPS) best management practices are questioned throughout the world.
- Market-based strategies to offset pollution or promote targeted BMP adoption are becoming popular and resulting in cost-effective and efficient approaches.
- Cost-benefit analyses are increasing the use technical solutions (such as algaecide, PhoslockTM, etc.), which are only effective in relatively small waterbodies.
- Climate change synergy in all likelihood is increasing HABs frequencies and the size of affected areas.

Dr. Rousseau concluded his remarks by saying that there are no actual success stories related to remediation of HABs; there are only management stories.

He also presented some analysis of climate change and water quality, based on information from Quebec's Hydroclimatic Atlas. The results indicate an overall increase in water quality variations and adaptation issues.

[2] Foulon, É., A.N. Rousseau, G. Benoy, R.L. North. 2019. *A Global Scan of How the Issue of Nutrient Loading and Harmful Algal Blooms is Being Addressed by Governments, Non-Governmental Organizations and Volunteers.* https://iwaponline.com/wqrj/article/doi/10.2166/wqrj.2019.013/69781/A-global-scan-of-how-the-issue-of-nutrient-loading

3.2 Breakout group sessions

In order to achieve the main workshop objective which was to obtain input from participants on the preliminary report, a number of breakout sessions were conducted where participants were asked to work in groups ranging from 6 to 10 people. Five groups were created based on participants' expertise and interest. Each group focused on one of the five themes covered by the recommendations in the report:

- Breakout Group 1: Binational Mass Balance Model
- Breakout Group 2: Agriculture
- Breakout Group 3: Developed Lands
- Breakout Group 4: Natural Lands
- Breakout Group 5: Quebec/Vermont Steering Committee

The groups were asked to review the relevant recommendations in the report and provide comments and suggestions regarding any gaps or missing recommendations for their theme. They were also asked to identify any issues or challenges related to the implementation of the recommendations and to offer additional comments or suggestions as they see fit. A reporting sheet was provided to each group to guide their discussion and capture their input. A copy of the reporting sheet can be found in Appendix III.

The section below presents a summary of discussion for each of the breakout sessions.

3.2.1. Binational Mass Balance Model

Input from breakout group session

- A research partnership should be developed with local universities to address complex and emerging issues related to Lake Memphremagog such as climate change or more complex models or studies to address lake mixing. This needs to be a long-term partnership to effectively maintain and develop knowledge over an extended timeframe.
- Use satellite data to evaluate cyanobacteria blooms on the lake and as a way to better compare Cyanobacteria data obtained through traditional monitoring and voluntary mechanisms in Vermont and Quebec, and to help address differences in sampling frequency and protocols and track progress towards nutrient reduction goals.
- Create a formal structure to share technical information between the Lake Champlain basin program technical advisory committee and the technical committee of the Quebec-Vermont steering committee.

- Develop estimates for BMP costs, and phosphorus reduction benefits for both Quebec and Vermont so that a cost/benefit analysis can be completed to guide implementation and help communicate such benefits and success stories to landowners and producers on lands where projects with high benefit/cost ratios are located.
- There are concerns with the ability of local technical partners to maintain complex models over time. In addition, the utility of the model(s) must be considered when selecting a model.
- Since the discussion is about a binational model, the group pointed out that clarification and agreement will be needed with respect to whom will be responsible for that model over time.

Report Recommendation #1: Establish watershed nutrient loading reduction goals through a binational mass balance model.

One binational mass balance model for a holistic view of the watershed will be developed. Currently, Vermont has the TMDL modeling tools which can be used as a starting point for the watershed model.

The goal of the model is to establish agreed upon binational nutrient reduction goals by land use type and to evaluate the effectiveness of BMPs, limits to land use conversion, and land management decisions to aid in binational decision making.

The watershed model must include climate change impacts and, if possible, the long-term effectiveness of BMP and management decisions should be evaluated following climate change scenarios.

The Quebec Vermont Steering Committee provides leadership to coordinate the development of this model and acts as a platform for discussion and collaboration.

Through the modeling process, Quebec and Vermont will analyze the existing water quality and HABs dataset and propose a sampling strategy to ensure consistent water quality sampling and monitoring methods.

Quebec and Vermont will develop a binational public message for the watershed and to structure a common data set.

Once the model is developed and BMPs are installed, water quality monitoring will be used to track progress towards nutrient reduction goals.

Quebec and Vermont will stay current with emerging technologies, methods, and best management practices to reduce nutrient loading.

Technical support and potential funding will be needed for the development of the model.

The group also offered a few additional points to complement the information from the report and generate further discussion:

- There was a concern raised concerning the evaluation of internal loading, the phosphorus retention in the lake, and how it was modeled previously.
- There is limited data on lake stratification and how this might be impacted by climate change that may lengthen the duration of stratification, and whether this may increase the amount of internal loading with increasing temperatures.
- Less costly probes are now available, which could support continuous or near-Real Time monitoring of some parameters in the lake or tributaries and these should be considered.
- There is historical data on the south end of the lake that showed concentrations in the 30ug/l range and so conditions seemed to have improved substantially with levels now less than 20 ug/l.

Finally, the group provided some suggested edits to the text of the recommendations in the report. The new text would read as follows, with suggested changes in red[3].

The following are recommendations for the development of a binational set of tools to support efforts to reduce phosphorus loading in the Lake Memphremagog watershed.

- One of these tools is a binational mass balance model for a holistic view of the watershed will be developed. Currently, Vermont has the TMDL modeling tools (section 3.2.1.2) which can be used as a starting point for the watershed model.
- The goal of the model is to establish agreed-upon binational watershed nutrient reduction goals by land use type and to evaluate the effectiveness of BMPs, limits to land use conversion, and land management decisions to aid in binational decision making.
- Another tool is a set of estimates for BMP instillation costs, and phosphorus reduction benefits for both Quebec and Vermont so that a cost/benefit analysis can be completed to guide implementation efforts and help communicate benefits to landowners on lands where projects with high benefit to cost ratios are located.
- Develop a long-term research and development partnership for the lake Memphremagog watershed in coordination with local universities to address complex issues such as understanding the impacts of climate change on nutrient loading in the watershed, improving in lake modeling, evaluating the effectiveness of BMP projects and other emerging topics. This partnership could support the development of more dynamic models to answer many of these questions.
- The Quebec Vermont Steering Committee or its technical subcommittee provide leadership to coordinate the development of the mass balance model and acts as a platform for discussion and collaboration to maintain and improve the mass balance

[3] This is the only breakout group that provided this level of detail for the text of the recommendations, so there is no equivalent "text-editing section" for the other groups.

model over time, to support the research and development partnerships, and share information with the Lake Champlain Basin Program technical advisory committee

- Through the modeling process, Quebec and Vermont will analyze the existing water quality and HABs dataset and propose a sampling strategy to ensure consistent water quality sampling and monitoring methods and consider new satellite technology that may support more consistent Cyanobacteria monitoring in both countries.
- Quebec and Vermont will develop a binational public message for the watershed and to structure a common data set and share this on the website and through other platforms.
- Once the model is developed and BMPs are installed, water quality monitoring will be used to track progress towards nutrient reduction goals.
- Quebec and Vermont will stay current with emerging technologies, methods, and best management practices to reduce nutrient loading.
- Technical support and potential funding will be needed for the development of the model.

3.2.2. Agriculture

Input from breakout group session

The breakout group provided the following comments:

- Long-term monitoring needs to be supported in order to show improvement in water quality. It will be important to meet with farmers to show progress and also to communicate that it may take some time until we can see the results of actions on water quality.
- Producers-led initiatives are important but there are major challenges to making that happen. Viable incentives need to be developed.
- Need to continue and expand existing outreach initiatives. Should use scientific information to convey a sense of urgency.
- There is a lack of capacity at the farm level. Targeted one-on-one support and consulting services are necessary to effectively carry out existing initiatives.
- Lake Memphremagog is overshadowed by other lakes such as Lake Champlain and does not receive enough attention, leading to a lack of awareness and motivation for action by farmers.

Report Recommendation #2: Adopt practical solutions to reduce nutrient loading by land use type through the installation of BMPs and investment in clean water projects.

Agriculture

Adopt widespread on-farm BMPs supported by resources for implementation and direct service providers.

Use the Watershed Model to determine loading reduction goals for the agriculture in the watershed and to evaluate the efficiency and effectiveness of BMPs over time and under climate change scenarios in both Quebec and Vermont.

Develop binational approach and goals for BMP implementation for the agricultural sector under the leadership of the Quebec Vermont Steering Committee.

Develop a long-term framework for providing direct assistance to agricultural producers for installation, operations and maintenance, and follow-up for BMP installation.

Develop incentives to avoid the conversion of perennial crops in annual crops and to protect or restore natural lands, as shorelines, to provide ecological services.

Provide adequate support for technical service providers to provide direct assistance to agricultural producers.

Provide training for agricultural equipment and fertilizer dealers on regulations and nutrient management planning.

Assess long-term effectiveness of BMPs after installation assist in the understanding of the lifetime, operations, and improvement of existing practices.

In addition, some specific edits to the report recommendations were suggested:

- Main recommendation for agriculture should read "Adopt and expand widespread on-farm BMPs…..".
- The following statement should be removed as it is repetitive and already implied by the other statements: *Provide training for agricultural equipment and fertilizer dealers on regulations and nutrient management planning*.

3.2.3. Developed Lands

Input from breakout group session

- There is a need to include climate change in the equation. Stream erosion is one of the most important sources of phosphorus and climate change will most likely change peak flows and increase erosion.

- Funding is needed to monitor other nutrients, not only phosphorus.
- Incentives are required to encourage people to continue implementing BMPs in the longer term.
- It is important to put in place rules and regulations and also to support compliance efforts with adequate enforcement resources. Municipalities are often lacking resources to assure implementation of BMPs.
- Private roads and lawn fertilizers are two significant issues requiring attention.
- Leachates from landfills are also a longer-term threat.
- The use of fertilizers could be reduced through a fee or tax (economic disincentive).
- Pervious surfaces (parking lot, road pavement) are part of the solution and should be promoted.
- Erosion control during road construction should be regulated.
- Stormwater management should be approached with a more holistic vision (not just fitting a bigger pipe to flush the problem downstream!).
- Outreach efforts can generate a sense of pride in communities and incent more action. Examples of successful implementation of BMPs need to be communicated and shared so as to become an inspiration for others.

Report Recommendation #2: Adopt practical solutions to reduce nutrient loading by land use type through the installation of BMPs and investment in clean water projects.

Developed Lands

Adopt BMPs and stormwater regulations for new development projects and increased implementation of retrofit projects for existing development.

Use the Watershed Model to determine loading reduction goals for the developed lands in the watershed and to evaluate the efficiency and effectiveness of BMPs over time and under climate change scenarios in both Quebec and Vermont.

Ensure that all new development is in compliance with environmental regulations and occurs in a way that minimizes impact on the environment.

Ensure that stormwater regulation at the state, provincial and MRC level is updated to reflect current technologies.

Provide support for municipal and regional planning to ensure that stormwater management and technologies are incorporated into town planning and infrastructure updates.

Provide incentives for private landowners to adopt stormwater retrofits.

Provide funding for municipal stormwater assessments and implementation of BMPs.

3.2.4. Natural Lands

Input from breakout group session

- Natural lands are currently conserved where it is easier to do so, not necessarily where it is most needed.
- Priority-setting is needed and local organizations are the best-placed to identify the most important and most viable opportunities for land conservation.
- There is a fiscal disincentive for municipalities to conserve lands. Municipalities should be compensated for the loss of tax revenues associated with conservation.
- The management of conserved lands should be clarified and incentives should be provided to help with the associated financial burden.
- The public should be educated about the benefits of natural lands.
- Like for other issues, Lake Memphremagog does not get the same level of attention that other areas are getting, such as Lake Champlain.

Report Recommendation #2: Adopt practical solutions to reduce nutrient loading by land use type through the installation of BMPs and investment in clean water projects.

Natural Lands

Identify priority conservation areas that support essential ecological services provided by natural lands in the watershed and implement programs and provide incentives to conserve and restore these lands.

Develop a Land Management Study to identify high-priority areas for conservation, and restoration, taking into account climate change scenarios for Quebec and Vermont.

Ensure financial investment for conservation and restoration projects from state, provincial, and federal governments to meet land management goals.

Expand and increase financial incentives for programs to conserve and restore natural lands of ecological interest.

Provide assistance for regional planning efforts to maintain natural land cover understanding that land-use conversion is inevitable. Efforts can be made to direct residential expansion, control development in natural areas and offset development through restoration.

3.2.5. Quebec/Vermont Steering Committee

Input from breakout group session

- A communication plan is needed as a lot of people do not know what the Committee does.
- The Committee needs to develop a long-term strategy to sustain efforts and provide leadership. There should also be an exercise undertaken to define specific outcomes of interest for each stakeholder. There is a lack of acknowledgment by the political agenda.
- Participants expressed the view that the MOU between the two parties needs to be renewed.
- A new MOU should lead to a renewed action plan that would be more action-oriented and would include data sharing protocols.
- It is also necessary to improve reporting and accountability. The Committee should be transparent and track progress towards the achievement of its objectives.

Report Recommendation #3: Support the cooperation through Quebec/Vermont Steering Committee.

The Quebec Vermont Steering Committee provides coordination, oversight, and leadership for the binational approaches and initiatives to reduce nutrient loading outlined in this report and any resulting initiatives.

Expand the leadership role of the Quebec Vermont Steering Committee through: increasing meeting frequency of the technical subcommittee; increasing binational knowledge sharing; ensuring that all necessary stakeholders are represented on the committee; and providing leadership for climate change impacts and awareness.

Develop a website for the Steering Committee, which includes a public face and a private portal. This website would be bilingual and provide a binational and coordinated message on the efforts underway in the Memphremagog Watershed. The website can be used to present a unified message to the public and raise awareness for nutrient loading concerns and promote successes in the watershed. The private portal on the website can provide members of the Steering Committee with access to internal documents such as meeting minutes, presentations, handouts, and data.

State, provincial, or federal governments to provide financial resources to be used at the Quebec Vermont Steering Committees discretion to meet these objectives.

3.3 Conclusions and next steps

To conclude the workshop, the co-chairs of the MSAG provided a summary of the day and Pierre-Yves Caux, from the Canadian section of the IJC, presented the next steps and thanked all participants for their input to the process.

Summary of the workshop

Julie Grenier and Ben Copans pointed out that it is almost impossible to summarize a full day of discussion in a few words, especially for an issue as complex as nutrient loading in Lake Memphremagog. The following bullets capture the highlights of their summary:

- It is of foremost importance to "*get Lake Memphremagog on the map*". Its importance needs to be highlighted to politicians, citizens and stakeholders.
- There is a need for more specific studies, more engagement and more funding.
- We need to communicate better, show what we do and report progress.
- A long-term bi-national water quality monitoring program is needed.
- Climate change must be integrated into every project.
- Viable incentives are desperately needed to generate action from farmers, municipalities and citizens.

Next steps

The two basin organizations (Memphremagog Conservation Inc. (MCI) and Memphremagog Watershed Association (MWA)) will consider the input received during this workshop and will produce a revised version of the study report. The IJC is planning online public consultation on the report in November. Public comments will be reviewed and integrated as appropriate following the consultation period. It is expected that the final report will be available during Winter 2020.

Appendix I: List of Workshop Participants

Facilitator: René Drolet*, René Drolet Consulting Services

Attendees from Canada:

Robert Benoit, Memphrémagog Conservation Inc. (MCI)
Sébastien Bourget, Ministère de l'Environnement et de la Lutte contre les changements climatiques
Pierre-Yves Caux*, International Joint Commission (IJC)/Commission mixte internationale (CMI)
Jean-François Cloutier, Ministère de l'Environnement et de la Lutte contre les changements climatiques
Michèle D'Amours*, International Joint Commission (IJC)/Commission mixte internationale (CMI)
Céline Desjardins*, International Joint Commission (IJC)/Commission mixte internationale (CMI)
Jean-Pierre Fortier, Ville de Sherbrooke
Julie Grenier*, Conseil de gouvernance de l'eau des bassins versants de la rivière St-François (COGESAF)
David Largy-Nadeau, MRC de Memphrémagog
Patrice Leroux, Regroupement des Associations pour la Protection de l'Environnement des Lacs et des bassins versants
Lisette Maillé, Municipalité d'Austin
Ali Nazemi, Concordia University
Ariane Orjikh*, Memphrémagog Conservation Inc. (MCI)
Robert Philipps, International Joint Commission (IJC)/Commission mixte internationale (CMI)
Josiane Pouliot, Ville de Magog
Yves Prairie, Université du Québec à Montréal (UQAM)
Nathalie Provost, Ministère de l'Environnement et de la Lutte contre les changements climatiques
Alain Rousseau, Institut national de la recherche scientifique (INRS)
Alexandra Roy, Circonscription d'Orford
Cynthia Sherrer, Municipalité du Canton de Potton
Henrique Vieira, Concordia University
Serge Villeneuve, Environment and Climate Change Canada (ECCC)
Joan Westland Eby, Municipalité de Bolton-Est

Attendees from the United States:

Dave Blodgett, US Department of Agriculture, Natural Resources Conservation Service
Jessica Booth, City of Newport
Meg Carter, Northwoods Stewardship Center
Henry Coe, Don't Undermine Memphremagog's Purity (DUMP)
Ben Copans*, Vermont Department of Environmental Conservation (VDEC)
Clarice Cutler, Vermont Agency of Agriculture, Food & Markets (VAAFM)
Sarah Damsell, Orleans County, Natural Resources Conservation District
Peter Emerson, Vermont Fish & Wildlife Department
Mark Gabriel, International Joint Commission (IJC) – US Section
Joe Gay, Casella Waste Systems Inc.
Katie Gehr, Vermont Agency of Agriculture, Food & Markets (VAAFM)
Fritz Gerhardt, Connecticut River Conservancy
Chuck Goulding, Memphremagog Watershed Association (MWA)
Mary Pat Goulding, Memphremagog Watershed Association (MWA)
Craig Heindel, Waite-Heindel Environmental Management
Eric Howe, Lake Champlain Basin Program (LCBP)
Emily Irwin, Orleans County, Natural Resources Conservation District
Ellen Kujawa, Lake Champlain Basin Program (LCBP)
Peter LaFlamme, Vermont Department of Environmental Conservation (VDEC)
Michael Laitta*, International Joint Commission (IJC) – US Section

Joanna Lidback, Orleans County, Natural Resources Conservation District
Frank Maloney, Northeastern Vermont Development Association
Brad Maxwell, Orleans County, Natural Resources Conservation District
Mark Mitchell, Vermont Department of Environmental Conservation (VDEC)
Colleen Moore de Ortiz, Vermont Department of Health (VDH)
Jared Nunnery, Orleans County Forester
Angela Shambaugh, Vermont Department of Environmental Conservation (VDEC)
Beth Torpey*, Memphremagog Watershed Association (MWA)
Bruce Urie, Vermont Land Trust (VLT)

* Denotes members of the Workshop Planning Committee.

Appendix II: Workshop Agenda

International Joint Commission
Lake Memphremagog Study
Science and Policy Workshop

Date: September 20, 2019, Time: 9:00-3:30 PM,
Coffee, pastries, fruits, and registration at 8:30AM
Location: Emory Hebard State Office Building, 100 Main Street, Room 250, Newport, VT 05855

Organizers and presenters

US Section:
Ben Copans, Vermont Department of Environmental Conservation (VDEC)

Pete LaFlamme, Vermont Department of Environmental Conservation (VDEC)

Michael Laitta, International Joint Commission (IJC), US Section

Kendall Lambert, Memphremagog Watershed Association (MWA)

Beth Torpey, Memphremagog Watershed Association (MWA)

CAD Section:
Pierre-Yves Caux, International Joint Commission (IJC), CAD Section

Julie Grenier, Saint-François Watershed Steering Committee (COGESAF)

Ariane Orjikh, Memphremagog Conservation inc. (MCI)

Nathalie Provost, Quebec Ministry of Environment and Fight against Climate Change (MELCC)

Alexandra Roy, Orford County

Guest Speaker:
Alain Rousseau, PhD, National Institute for Scientific Research (INRS)

Facilitator:
Rene Drolet

Agenda

9:00 (10mn)	Welcome address by IJC and Memphremagog Study Advisory Group (MSAG)	*Pierre-Yves Caux* *Michael Laitta* *Ben Copans* *Julie Grenier*
9:10 (10mn)	Welcome and introduction by Quebec/ Vermont Steering Committee Cochairs	*Pete LaFlamme* *Nathalie Provost*
9:20 (10mn)	Objectives of the Meeting	*Rene Drolet*
9:30 (60 mn)	Presentation of the Science and Policy of the Memphremagog Preliminary Report	*Ben Copans* *Alexandra Roy* *Pete LaFlamme* *Nathalie Provost*
10:30 (15mn)	Break	
10:45 (45mn)	World Literature Review Presentation	*Alain Rousseau*
11:30 (15mn)	Explanation of Breakout Sessions	*Rene Drolet*
11:45 (60mn)	Lunch : Walk to the Gateway Center	
12:45 (80 mn)	Breakout Sessions to discuss report recommendations	
2:05 (15mn)	Break	
2:20 (45mn)	Discussion on breakout session results	
3:05 (10mn)	Wrap-up of the breakout session results	*Ben Copans* *Julie Grenier*
3:15 (10 mn)	Closing words from Quebec/Vermont Steering Committee Co-Chairs	*Nathalie Provost* *Pete LaFlamme*
3:25 (5 mn)	Next steps and opportunities for further feedback	*Pierre-Yves Caux* *Michael Laitta*
3:30	End of the workshop	

Appendix III: Breakout Sessions Reporting Sheet

International Joint Commission
Lake Memphremagog Study – Science and Policy Workshop
Newport, VT – September 20, 2019

Breakout session: 12:45pm-2:05pm

Table Number: Note Taker/Facilitator:

Theme:

Question 1: Is there any gap(s) in the report recommendations regarding this theme? Any missing recommendation or adjustments you would like to make to the proposed recommendations?

Question 2: In terms of implementing the recommendations, what do you see as the critical factors to consider and the expected challenges? Do you have any comment on the feasibility of these recommendations?

Question 3: Please provide some additional input regarding the recommendations in the report.

- What do you particularly like in these recommendations?

- Do you have any ideas or suggestions to make the recommendations more impactful?