

# Brief for the House of Commons Standing Committee on Environment and Sustainable Development

Prepared by  
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The [GRIL](#) is a research group based in Québec that is actively engaged in research in fundamental and applied limnology. It is one of FRQNT's ([Fonds de recherche du Québec – Nature et technologies](#)) strategic clusters, representing researchers from 10 Québec universities. Since its inception in 1989, the GRIL has become established as an international leader in freshwater ecological research. The Director of the GRIL is Dr. Beatrix Beisner, Professor at the Université du Québec à Montréal ([beisner.beatrix@uqam.ca](mailto:beisner.beatrix@uqam.ca)) and the Associate Director is Dr. Jean-François Lapierre, Professor at the Université de Montréal ([jean-francois.lapierre.1@umontreal.ca](mailto:jean-francois.lapierre.1@umontreal.ca)).



In this brief, we respond to the questions for stakeholders to aid the House of Commons Standing Committee on Environment and Sustainable Development's study on freshwater

## **1. Introductory information**

### **a) Which issues related to protecting and managing freshwater does your organization work on?**

The Groupe de recherche interuniversitaire en limnologie (GRIL) is a research cluster actively engaged in research in fundamental and applied limnology, i.e., the study of inland waters. The GRIL's mission is to facilitate novel and cutting-edge research on freshwaters by answering fundamental questions and paradigms in the aquatic sciences and by studying local and regional problems associated with climatic and environmental change, including those related to human activities. The group's specific objectives are to assist its members and the various actors engaged with Québec's freshwaters in the study of complex questions relating to aquatic ecosystems, at regional to global scales, by enabling integrated approaches, the collaboration of researchers from multiple disciplines and the use of cutting-edge technologies.

## **2. Interaction and collaboration with federal departments and agencies**

### **a) Does your organization interact with federal departments and/or agencies on freshwater issues? If so, on which issues and with which departments and/or agencies?**

GRIL members collaborate with, or conduct research funded by, various federal departments and agencies. The majority of our interaction is with DFO and ECCC, but also includes Public Health Canada on issues related to wildlife disease transmission. A non-exhaustive list of recent collaborations includes the following:

- 1) The NSERC Canadian Lake Pulse Network (referred to as LakePulse below) is a collaborative network (led by GRIL member Yannick Huot) involving heavy collaboration with ECCC and Public Health Canada (<https://lakepulse.ca/lake-pulse-partners/>). This network sampled more than 660 lakes across Canada of different types in order to establish a baseline of lake ecosystem health using an extremely wide variety of indicators (e.g., plankton, nutrients, contaminants, land use, morphometry, paleolimnology).
- 2) The FishHab project ([fishab.weebly.com](http://fishab.weebly.com)) led by GRIL Director Beatrix Beisner is an on-going DFO-funded project (from Freshwater Habitat Science Initiative) that aims to better understand factors driving fish habitat quality in inland lakes and streams. This project is co-funded by the GRIL and involves the collaboration of several other GRIL members (Pascale Biron, Paul del Giorgio, Vincent Fugère, Yannick Huot, Isabelle Lavoie, Marco Rodriguez, Katrine Turgeon, David Walsh) and the Lake Pulse Network. The DFO partners lead the FHIN and include Lynn Bouvier, Karin Ponander and Glenn Benoy.
- 3) Participation of GRIL researchers (Paul del Giorgio, Yves Prairie, Jean-François Lapierre, Julie Talbot) in the Canadian Carbon Cycle Research Workshop, aimed at

better quantifying Canada's carbon footprint (ECCC 2020, [Canadian Carbon Cycle Research Workshop : report on key gaps and next steps.: En4-417/2020E-PDF - Government of Canada Publications - Canada.ca](#))

- 4) GRIL members Philippe Juneau and Beatrix Beisner recently held a DFO National Contaminants Advisory Group grant (2017-2020) entitled: Effects of pesticides on ecologically relevant Arctic phytoplankton and zooplankton: comparison with temperate species responses and implications for standard toxicity tests for ecological risk assessments in Arctic waters.
- 5) HydroNet was a previous national research network that was in collaboration with DFO (<http://www.hydronet.umontreal.ca>). Their overall goal was to investigate and mitigate effects of hydroelectric influences on fish and fish habitat health. It was co-led by GRIL researcher Daniel Boisclair.
- 6) GRIL member Marc Amyot works with ECCC on issues related to the rare earth elements in aquatic systems, and on the interactions between climate change and contaminants; with DFO on a 20 year-long, whole-ecosystem called METAALICUS on the impact of mercury deposition on aquatic food web contamination; with Health Canada and Agriculture and Agri-Food Canada on issues related to human exposure to contaminants in food.

**b) Do the specific freshwater issues targeted by your organization fit within the mandate of a given federal department and/or agency or do they relate to more than one department and/or agency? If more than one, have you been able to identify a lead department and/or agency with which to engage?**

As evident from our response to question 2a) our research activities are most in line with the mandates of ECCC, DFO and Public Health Canada. ECCC is arguably the most appropriate fit with GRIL research activities as they are also concerned mostly with environmental health of aquatic ecosystems. However several of our researchers who work on fish and fish habitat are well within the mandate of DFO's research activities as well. While there has been so far limited collaboration with the GRIL to date, Agriculture Canada is also a natural collaborator as they assess sustainability of Canadian Agriculture and examine its impact on lakes and other waterbodies (as mentioned in this [document](#)).

**c) Have you encountered notable successes in engaging with the federal government on freshwater issues? If so, please specify. If you have not had success in doing so, what in your opinion is the reason (e.g., no program available tailored to your needs, no identifiable service or unit within a department and/or agency with which to engage)?**

GRIL members have repeatedly and successfully engaged with the federal government in terms of obtaining funding and collaborations for novel research projects and as participants in consultations and workshops. In some cases, there were tangible results from this partnership, but it often remains unclear to what level GRIL research is leveraged for final decision-making at the Government level as there is not always feedback to researchers when this is done.

Additionally, while research collaborations are relatively easy to set-up, interaction with policy makers within the same agencies are much harder to establish. Our experience is that problems which may have long term consequences are of much less interest to them than short term ‘emergency situations’.

As an example of a notable success, the work by GRIL member Marc Amyot with DFO on METAALICUS received international exposure and was influential in developing policies in Canada. A paper in Nature led by a DFO researcher on the phase simulating lower deposition of Hg is currently in revision. The work on mercury and climate change led to Amyot being involved in the writing of the last international AMAP (Arctic Council) report on mercury, led by an ECCC researcher.

**d) Do you foresee engaging with the new Canada Water Agency? If so, in what way? What are your organization’s expectations with respect to the Agency?**

The exact nature (mission, breadth) of the new Canada Water Agency (CWA) remains unclear to us. Thus, it is hard to foresee how, and to what level the GRIL would engage with the new CWA. However, as one of Canada’s leading research organizations on freshwater ecosystems, we are extremely enthusiastic and positive about the creation of a national agency focused on water. We hope that this agency will contribute to establish a stable, nation-wide expertise for freshwater ecosystem management and protection, that it will foster fundamental and applied research (through funding, collaboration with CWA researchers, and publicly available data) on freshwater ecosystems, and that it will help to maintain an open communication channel between academic and government researchers, as well as with policy and decision makers.

### **3. Federal water legislation, policies and regulations**

**a) Does your organization interact with federal departments and/or agencies on policies, legislation, regulations, or funding programs related to freshwater? If so, please specify.**

As stated in response to question 2b), there have been successful interactions leading more directly to regulations. GRIL members have contributed to documents that aim to guide policies and legislation, as for example, the [Canadian Carbon Cycle Research Workshop : report on key gaps and next steps.: En4-417/2020E-PDF - Government of Canada Publications - Canada.ca](#). Other examples come from Marc Amyot’s research: work with Health Canada and AAG on Hg in food, is now being discussed by the Health Canada Methylmercury Resource Group. Moreover, his team’s work on rare earth elements in water is presented yearly to ECCC and has helped shape new guidelines for rare earth elements.

We hope that the CWA will foster more tangible impacts of GRIL research for federal policies, legislation, regulations or funding programs related to freshwaters.

**b) Can you identify any current gaps in federal water legislation, policies, regulations, and/or initiatives, or in general across jurisdictions? If so, please specify.**

As we have discovered through the NSERC Lake Pulse Network and our interaction with EEECC, there is a great lack of nationally consistent data. In part, this is due to a lack of long-

term funding of research networks that include government and academic scientists, capable of assessing the health, quantity and quality of freshwaters across Canada. American researchers greatly benefit from organizations like NOAA and EPA for research. The need for such long-term networks and monitoring is increasing owing to environmental conditions that are changing quickly across Canada with climate change, urbanization and world population growth and demands for agriculture products from Canada. Therefore, because of this acute knowledge gap (and lack of ability to access data in a coherent and organized fashion), policy gaps are difficult to assess.

One gap in federal water policies is with respect to pollution by emerging contaminants. Generally, our researchers feel that there is not enough consideration of the “precautionary principle”, leading to the acceptance and release of potentially harmful substances, when compared to other legislations.

**c) Do you feel the federal government could play a more effective role in protecting watersheds in Canada? If so, which watersheds and how?**

Being aware that jurisdictional issues are at play, we recognize that there are challenges to integrating protection of transboundary watersheds. However, providing financial, logistical and human resources support to provinces would probably go a long way to help them achieve watershed protection. Having personnel directly responsible to work and communicate with each province would likely be an efficient way to support this.

Furthermore, given the larger impacts of climate change in the north, as well as increasing human encroachment as conditions warm, it will be essential to protect our northern, currently more forested watersheds from development. The easiest approach would be to set such lands (and their waterways) aside as national parks or other protected area status where they are already crown lands.

**d) Are there areas of freshwater policy, legislation and/or regulation where you feel the federal government should play a greater role?**

We believe that the erosion of the Fisheries Act by the Harper government was never completely reversed, and such a reversal should be assured. Also, re-establishment of funding for long-term freshwater research sites such as the Experimental Lakes Area (ELA) should be considered. Such sites enable not just long-term monitoring, critical in a time of rapid climate change, but also the experimental manipulation of some lakes - which has and will continue to lead to important insights regarding established and novel perturbations to our freshwater ecosystems.

Successful collaborative programs such as the NSERC Lake Pulse Network provide an interesting template to support data gathering toward these efforts. In LakePulse, academics collaborated with provincial and federal departments, allowing a vast assessment of Canadian freshwaters beyond what provinces and the federal government can do (often due to jurisdictional issues). They also provide opportunities to advance basic and applied science, as well as training students.

**e) Are there areas of freshwater policy, legislation and/or regulation that you feel the federal government should vacate and leave to another level of government or to the private sector?**

As a natural “commons”, freshwater quality and quantity is too easily eroded by private interests. Safe and healthy freshwaters are critical to all Canadians and should be maintained as a national resource by our governments. In our view, a national strategy that involves government agencies at both the federal and provincial level is urgently needed to protect freshwaters in Canada - the precautionary principle demands it. In this ideal scenario, common goals would be identified and work towards these goals would be achieved by using the synergy possible from the different jurisdictions of both levels of government.

**f) Are you aware of instances where federal freshwater policy, legislation, regulations, and/or initiatives have clearly benefitted from your organization’s input?**

As mentioned earlier, though we have provided scientific knowledge and data on issues ranging from plastics to pesticides to eutrophication - which in our opinion should foster policy changes - the impact of this science remains unclear. We know that researchers in federal departments are aware of the science, but the policy side of government does not show a strong interest in pursuing this knowledge. They have, in fact, at times been dismissive of what we feel is clear evidence, not only coming from our work but also from their own scientists. This said, perhaps work is being done and noticeable science-driven policy shifts are just very slow. One notable exception has been the work by Marc Amyot’s group on rare earth elements in water that has been presented yearly to ECCC and has helped shape new guidelines.

#### **4. Collection of information and data**

**a) Do you believe that there is sufficient data collected and made available publicly about freshwater in Canada?**

No, data collection, done in a consistent way across Canada and over the long-term, as appropriate to current challenges affecting aquatic ecosystems, is insufficient. Furthermore, it is difficult to know what data exist within government agencies.

Academic data is also hard to access, although there is new pressure from federal funding agencies to make data more publicly available. However, progress on this is slow because of a lack of database support for the majority of researchers (including government researchers from discussions we have had with our collaborators). Beyond this, even if all the data were made available, academics are generally tasked with advancing scientific knowledge and as a result, their datasets are generally not designed to support policy making. Monitoring work is strongly discouraged by funding agencies. Programs such as the NSERC Lake Pulse Network are the exception and show that novel science and environmental assessment can work hand in hand.

**b) Do you believe there should be improvement in freshwater-related data-sharing?**

Definitely! However, the roadblock of lack of database input and management support is one of the main hurdles. Also, there is an increasing number of data portals and some national

strategy on this will soon be needed to avoid increasing difficulty in finding data that is spread amongst different database platforms.

**c) Is there any specific type of data or information you would like the federal government to provide to freshwater stakeholders?**

Data on aquatic environmental water quality and quantity as well as fish stocks in inland waters are essential for our needs in the GRIL. In many cases, such data could complement our own short and long-term studies. Programs such as the US EPA National Lake Assessment provide great templates for what the federal government could do to provide such types of datasets.

**d) Has your organization experienced challenges obtaining well-organized data from the federal government on issues relating to freshwater?**

It can be challenging to find data without a central repository and central contact person/information. Overall, for the moment it does remain challenging to find the data that exist, without even getting into the question of its organization. In our experience, data organization requires dedicated staff trained in this area.

**e) Is the lack of standardized data or information across government jurisdictions a problem or challenge for your organization in accomplishing its objectives with respect to protecting and managing freshwater?**

Yes, it can be, as having longer-term or more spatially distributed data can be useful for many research projects conducted by GRIL researchers.

## **5. International and business issues**

These issues go beyond those normally addressed by our researchers in the GRIL and we have thus not commented on the following two questions; only part c.

**a) Should Canada play a greater role internationally in helping find solutions, either through government and/or the private-sector involvement, to the challenge of global freshwater security?**

N/A

**b) Do you feel Canadian private-sector companies, including financial institutions, can and should play a role internationally?**

N/A

**c) What role can the federal government play in better supporting freshwater-related academic research, R&D, businesses, products, and services?**

Overall, funding for projects involving government and university researchers, as well as skilled academic teams to address questions of relevance to the health of freshwater ecosystems is essential. The federal government and the new Canada Water Agency could play a particular role in ensuring long-term monitoring of freshwater ecosystems across Canada in a consistent way; monitoring that is not normally otherwise supported by provincial and federal research

funding agencies (e.g., NSERC, FRQNT). Additionally, developing and maintaining collaborations between governmental and academic researchers would benefit both parties by providing access to field and lab infrastructure that are not available to single academic labs, and by providing research and training opportunities for highly qualified personnel from our labs. Finally, as stated, having exchanges on nation-wide, high quality data on freshwater ecosystems would be of tremendous help for academic and government researchers alike.