ST. LAWRENCE Action Plan 2011-2026

FORUM SAINT-LAURENT

Proceedings of the 2015 Forum on the St. Lawrence

Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques
and
Environment et Climate Change Canada

November 2015

Canada

www.planstlaurent.qc.ca

Québec

This document should be cited as follows:

Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques and Environment and Climate Change Canada, 2016. Proceedings of the 2015 Forum on the St. Lawrence, Quebec. 33 pages

Cover photos: © Aurélie Mutz, Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques

Cat.No.:En154-82/2015E-PDF

ISBN: 978-0-660-06393-5

Aussi disponible en français sous le titre: *Actes du Forum Saint-Laurent 2015*

FORUM SAINT-LAURENT

Table of contents

Welcome – 2015 Edition

The fifth edition of the Forum on the St. Lawrence was held in Quebec City on November 3 and 4, 2015, on the theme of "Improving Water Quality: How Can We Do More."

The Forum brings together stakeholders in the integrated management of the St. Lawrence to engage in discussion in order to share knowledge, expertise, tools and resources and to reflect on the best ways to address specific issues.

At the 2015 Forum on the St. Lawrence, participants from environmental, community and recreational non-profit organizations, private-sector businesses and industries, education and research, First Nations, and the federal, provincial and municipal governments were asked to describe the impacts on St. Lawrence water quality that were causing them concern and to reflect together on actions that would help improve water quality. The 2015 Forum participants developed directions (annex C) that will guide stakeholders toward implementation of consistent integrated management initiatives. The participants also developed projects (annex D) and identified partnerships, and some committed to taking concrete action in their respective areas.

Program

Tuesday, November 3, 2015

8:45 a.m. – 9:30 a.m.	**Reception**			
9:30 a.m. – 9:40 a.m.	**Word of Welcome by Hélène Raymond**			
9:40 a.m. – 10:15 a.m.	**Opening Remarks** Government achievements in improving water quality Co-chairs of the St. Lawrence Action Plan 2011–2026			
10:15 a.m. – 10:45 a.m.	**Lecture 1** Water Quality of the St. Lawrence River: Actions Taken by the City of Quebec François Proulx, Director, Water Quality Division, Environmental Services, City of Quebec			
10:45 a.m. – 11:15 a.m.	**Lecture 2** Sources and Transport of Contaminants in the St. Lawrence River – Update on Water Quality Myriam Rondeau, Senior Specialist in Fluvial Geochemistry, Environment Canada			
11:1 5 a.m. – 12:00 p.m.	**Invitation to the poster session** Review of collaborative projects related to the themes of the 2014 Forum and 2015 Forum			
12:00 p.m.– 1:15 p.m.	**Lunch Break**			
1:15 p.m.– 4:30 p.m.	**Workshop 1** ***Common Directions***			
	Freshwater			**Saltwater**
	Group 1 **Water Supply** Miro Room	**Group 2** **Recreational and Traditional Uses** Monet Room	**Group 3** **Aquatic Life** Van Gogh Room	**Group 4** **Aquatic Life + Recreational and Traditional Uses** Morisot Room
4:30 p.m. – 7:00 p.m.	**Cocktail Hour and *Poster Session***			

Wednesday, November 4, 2015

08:15 a.m. – 08:45 a.m.	**Reception**			
08:45 a.m. – 09:00 a.m.	**Recap of Day 1** Hélène Raymond, Emcee			
09:00 a.m. – 12:00 p.m.	**Workshop 2** ***Development of Potential Projects and Collaborations***			
	Freshwater			**Saltwater**
	Group 1 **Water Supply** Miro Room	**Group 2** **Recreational and Traditional Uses** Monet Room	**Group 3** **Aquatic Life** Van Gogh Room	**Group 4** **Aquatic Life + Recreational and Traditional Uses** Morisot Room
12:00 p.m. – 1:30 p.m.	**Lunch Break**			
1:30 p.m. – 3:00 p.m.	**Plenary Session – Review of Consultation Activities** Hélène Raymond, Emcee			
3:00 p.m. – 3:15 p.m.	**Looking Ahead** Co-chairs of the St. Lawrence Action Plan 2011–2026			
3:15 p.m. – 3:20 p.m.	**Closing Remarks** Co-chairs of the St. Lawrence Action Plan 2011–2026			

Speakers

Mr François Proulx

Water Quality of the St. Lawrence River: Actions Taken by the City of Quebec

Summary

Quebec City uses three sources of drinking water on its territory, one of which is the St. Lawrence River. This water source is abundant, and its overall water quality is good. However, the use of the river as a drinking water supply involves issues related to shipping and industrial, agricultural or municipal activities upstream. To ensure optimal water quality for its residents, the City has adopted a “source-to-tap” management approach.

The City is also taking action to ensure the preservation and improvement of the water in the river. The presentation covered the various programs that have been put in place to control releases of contaminated water into the river, such as control at the source, wastewater treatment, and management of overflows and cross-connections.

Biographical notes

François Proulx is the Director of the Water Quality Division at the Environmental Services department of the City of Quebec. He has bachelor’s and master’s degrees in chemistry, a graduate diploma in environment, and a PhD in land use and development, specializing in drinking water quality. He began his career in 1986 in the pharmaceutical industry before entering the field of environmental chemistry by joining the public health engineering laboratory of Quebec in 1990. In 1999, he was promoted to laboratory team leader at the City of Quebec, and in 2002 he was appointed director of the Laboratory Division. Since 2009, he has been responsible for water quality across the entire area of the agglomeration of Quebec City.

Mrs Myriam Rondeau

Source and Transport of Contaminants in the St. Lawrence – Update on Water Quality

Summary

Although the water in the St. Lawrence comes primarily from Lake Ontario, the same is not necessarily true for contaminants. In the St. Lawrence, it is the affinity of contaminants with suspended solids that will dictate, in large part, the source of contaminants. Thus, since Lake Ontario acts as a vast settling pond, contaminants associated with particulates will tend to remain in the lake in the form of sediments. In the St. Lawrence, suspended particles and the related contaminants (metals and polybromodiphenylethers, or PBDEs) are not from the Great Lakes, but instead from erosion, urban or industrial effluents (wastewater disposal), and the river's tributaries. However, more soluble contaminants, such as pesticides, are, to a significant degree, from Lake Ontario, while pharmaceutical products are from urban effluents. Concentrations of metals in the St. Lawrence do not exceed the water quality criteria for protection of aquatic life. At the Quebec City station, higher concentrations of pesticides are observed in the summer due to the spreading of pesticides on crops located in the St. Lawrence lowlands, particularly in the Lake Saint-Pierre basin. The maximum concentrations of PBDEs and pharmaceuticals and personal care products (PPCPs) are found downstream from the Montreal region. Since 1995, concentrations of PBDEs have increased considerably at the outlet of the river. Although we cannot evaluate the trend for PPCPs, the numbers and sometimes the concentrations (e.g. for hormones) are areas of concern.

Biographical notes

With a background in geology and a master's degree in geochemistry from the University of Quebec in Montreal (UQAM), Myriam Rondeau has worked at Environment and Climate Change Canada since 1990 as a project manager on projects involving water quality, especially the presence and transport of contaminants in the St. Lawrence River. Since 2006, she has been the senior specialist in fluvial geochemistry and has worked on many national projects, including the implementation of the national risk-based water quality monitoring network.

For copies of these presentations, write to psl@mddelcc.gouv.qc.ca or ec.plandactionsaint-laurent-st-lawrenceactionplan.ec@canada.ca.

Workshops and plenary session

From dialogue to action

Various workshops on the theme of improving water quality were organized to enable discussions among the stakeholders in the integrated management of the St. Lawrence (annex A). The workshops covered the following topics:

1) Water Supply (freshwater) ;
2) Aquatic Life (freshwater) ;
3) Recreational Uses (freshwater) ;
4) Recreational Uses and Aquatic Life (saltwater).

Participants received a list of questions for reflection ahead of time to help them prepare for the Forum.

- How does the water quality of the St. Lawrence affect your activities?
- What steps are you taking to improve the water quality of the St. Lawrence, and what constraints are you facing?
- What tools, information or expertise do you have that are essential to all initiatives to improve the water quality of the St. Lawrence?
- What tools, information or expertise do you need in order to carry out actions that will improve the water quality of the St. Lawrence?
- What joint actions should be taken to improve the quality of the water returning to the St. Lawrence in order to maintain uses and services that rely on the waters of the St. Lawrence?

Dialogue activities took place during the workshops. At the first workshop (November 3), the stakeholders studying the issue of improving the water quality of the St. Lawrence identified pressures on water quality and their adverse impacts.

They shared their knowledge, expertise, resources and tools to come up with ways of reducing these pressures and the impacts that they had identified. A list of 12 directions (annex C) were selected at the end of the first workshop.

At the second workshop (November 4), the participants developed collaborative projects (annex D) that would improve or contribute to improving the water quality of the St. Lawrence. The 11 projects were presented at the plenary session.

The 2015 Forum was an opportunity for the participants to follow through on their willingness to take action. They were asked to commit to an action or a new attitude that would apply their know-how to the challenge of improving water quality. A total of 25 commitments were made, more than half of which require the cooperation of one or more partners. The commitments fall into three main categories:

- **Disseminate and share the issues discussed and experience from the Forum**

Examples include:

  - Discuss the concerns raised at the Forum with my colleagues in order to find solutions
  - Share my experience and the proposals that affect us
  - Share information

- **Support or implement actions**

Examples include:

  - Promote the flow of knowledge
  - Guide agricultural producers in agri-environmental actions

- **Implement the projects developed at the Forum**

Poster session

In all, 11 posters were presented at the poster session. Three of the posters related to the commitments made at the end of the 2014 Forum on the St. Lawrence, the theme of which was “Adaptation to Climate Change.”

The other eight posters were about collaborative projects on the theme of the 2015 Forum, “Improving Water Quality: How Can We Do More.”

Adaptation to climate change

Grand Council of the Waban-aki Nation

Climate change adaptation plan for the communities of Wôlinak and Odanak

From April 2014 to June 2015, working in collaboration with the First Nations of Quebec and Labrador Sustainable Development Institute and the Quebec Department of Sustainable Development, Environment and the Fight Against Climate Change (MDDELCC), the Grand Council of the Waban-aki Nation produced a climate change adaptation plan for the Abenaki communities of Wôlinak and Odanak. Interviews were conducted with residents, the heads of various local organizations, stakeholders and elected officials to gather information on climate impacts and patterns in the communities. Repercussions were identified for two tributaries of the St. Lawrence River: the Bécancour River and the Saint-François River. Notable impacts included a decline in the amount of aquatic species that could be fished in those rivers, the disappearance of mussel species harvested for traditional purposes and used to produce items such as wampum (objects made with shells beads), the emergence of issues caused by bank erosion, and the alteration of water quality. To address these problems, adaptation measures were implemented, such as improving the quality of the two rivers and the activities for which they are used by the communities. In summary, by working on these two rivers, the project made it possible to document the impacts of climate change on the St. Lawrence River. Future adaptation measures will be based on field studies that will describe all of these aspects using a scientific approach. Actions such as planting and stabilizing banks or introducing certain endangered species could be undertaken as a result.

First Nations of Quebec and Labrador Sustainable Development Institute

Planning climate change adaptation: the experience of the Innu First Nations of Ekuanitshit and Essipit

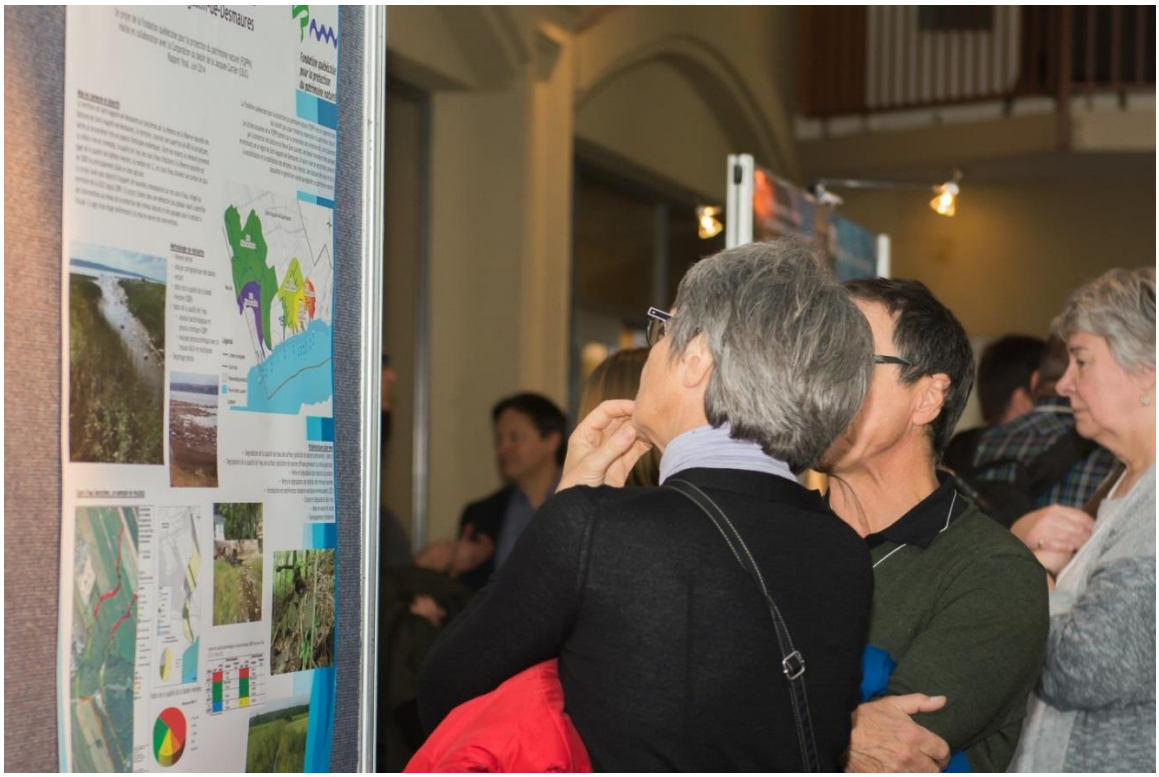
The project began on April 1, 2015, and ends on March 31, 2016. It is being carried out by the First Nations of Quebec and Labrador Sustainable Development Institute (FNQLSDI), in collaboration with the Council of the Innu of Ekuanitshit and the Council of the Innu First Nation of Essipit. The Laboratory of Coastal Zone Dynamics and

Integrated Management of the University of Quebec in Rimouski (UQAR) is also a key partner. The project, which is funded by Indigenous and Northern Affairs Canada (INAC), covers the entire Nitassinan (traditional territory) of the First Nations partners, including their coastal zones along the Estuary and Gulf of St. Lawrence, as well as the rivers in the territory, which also discharge into the St. Lawrence. The project involves working with partners to launch a community-wide climate change adaptation initiative with the goal of producing a climate change adaptation plan (CAAP). To complete this initiative, the project has four specific objectives:

- To engage elected officials, staff and members of the community on the issue of climate change adaptation
- To profile the community and assess its vulnerabilities and ability to adapt to the impacts of climate variations and coastal georisks
- To propose an adaptation plan that includes concrete, realistic, appropriate measures, particularly with regard to coastal georisks
- To issue recommendations for incorporating the measures into community plans and decision-making tools

2014 Forum on the St. Lawrence: Adaptation to climate change – Commitments (French and English versions)

The participants in the 2014 Forum on the St. Lawrence were asked to commit to an action or a new attitude that would apply their know-how to the challenge of adapting to climate change. This poster presented some of their commitments.



Improving water quality

World Wildlife Fund

Watershed Reports

Since 2011, the World Wildlife Fund (WWF) has been working with the top freshwater experts in the country to develop a practical, science-based approach that could be applied across Canada to increase understanding of the health of our watersheds and the threats they face. WWF-Canada's *Watershed Reports* focus on four indicators of health (water quality, flow, benthic invertebrates and fish) and seven key threats (pollution, climate change, habitat loss and fragmentation, water overuse, flow alteration and invasive species). To date, WWF has completed Watershed Reports for half of the watersheds in Canada. The St. Lawrence watershed is one of the few to receive a good score for overall health. However, the results in the report on the St. Lawrence watershed vary considerably across the different parts of the watershed and across the various indicators. The poster presented the general and local results from this report in an informative, stimulating way and focused on both the health of the watershed and the threats it faces. Special attention was paid to the scores for water quality in the St. Lawrence River and surrounding sub-watersheds. Although the overall water quality of the watershed could not be measured owing to a lack of data, the results revealed key observations for local water quality where enough data was available. These results were highlighted in the poster.

Fondation québécoise pour la protection du patrimoine naturel

Action plan for the protection of the main tributaries of the St. Lawrence River in and around the Battures-de-Saint-Augustin-de-Desmaures Nature Reserve

The Battures-de-Saint-Augustin-de-Desmaures Nature Reserve is located along the St. Lawrence River, near an area of urban development and agricultural activity. The Fondation québécoise pour la protection du patrimoine naturel (FQPPN), in collaboration with the Corporation du bassin de la Jacques-Cartier, characterized 12 streams that discharge into the nature reserve in order to inventory and map problems affecting these orphan streams (erosion, bank degradation, presence of invasive plant species or water pollution, poor water quality, observation of point features), which do not belong to any major watershed. The characterization, which involved field surveys of each stream, identified threats to the integrity of the nature reserve and tributaries. Following this work, the FQPPN produced a report in June 2014 titled [translation] "Action Plan for the Protection of the Main Tributaries to the St. Lawrence River in the Battures-de-Saint-Augustin-de-Desmaures Nature Reserve Sector." Based on the report, the FQPPN developed an action plan outlining concrete measures for addressing these problems and identifying stakeholders who could help. The participants are now ready to take action and are already working with the municipality of Saint-Augustin-de-Desmaures.

This project is all the more important because this part of the metropolitan community of Quebec City is expanding rapidly.

Fédération québécoise des chasseurs et pêcheurs

The Boisé Héritage Faune wildlife heritage park

The purpose of this project is to restore a wooded area through which the Charland River flows on its way to join the St. Lawrence River in Saint-Augustin-de-Desmaures. The project involves restoring a severely contaminated site that was formerly used as a dumping ground for cars.

Québec'ERE

Training: "Moi? Je ne contamine pas!" [translation: "Me? I Don't Pollute!"]

The poster is about activities to be delivered in schools in partnership with the City of Quebec. The project is intended to be transposable and inspiring. Actions and outreach activities are designed to reduce domestic water consumption and use of cleaning products and pharmaceuticals, which end up in the sewers.

Comité ZIP du lac Saint-Pierre

Improving the water quality of Lake Saint-Pierre and the St. Lawrence River, one stream at a time

Using its expertise, the Comité ZIP du lac Saint-Pierre is continuing its efforts to improve the water quality of Lake Saint-Pierre and the St. Lawrence, one stream at a time. To promote the recovery of yellow perch and other early-spawning species in Lake Saint-Pierre, it is important to improve water quality and to restore and protect available habitats for these species. The Comité ZIP du lac Saint-Pierre and its partners in the fields of agriculture and wildlife have been working together for several years to create wildlife developments that help limit nonpoint source pollution and sedimentation in the minor tributaries to Lake Saint-Pierre. The restoration projects on these small agricultural streams consist of enhancing the streams and drainage ditches and replacing culverts to restore the free movement of water and fish. The banks are reshaped and planted with trees, shrubs and grass seeds to create a riparian buffer strip that will improve the quality and area of habitat available to birds and fish while reducing inputs of contaminants and sediments to the streams.

Institut des sciences de la mer de Rimouski

Consultation, collaboration and research infrastructure in Quebec: finding ways to do more together

This is a consultation project that has been funded since last fall. Its purpose is to found a network for disseminating information. The tools are research vessels of the St. Lawrence Global Observatory (SLGO; http://notregolfe.ca/). The consultation, which

is conducted before the research work, involves consulting our members to identify the research topics for which sufficient data is available to support decision making and planning. The issues driving this project are the development of marine transportation and oil and gas development, which can have an impact on water quality, river habitats and riverside communities.

Nature Conservancy of Canada

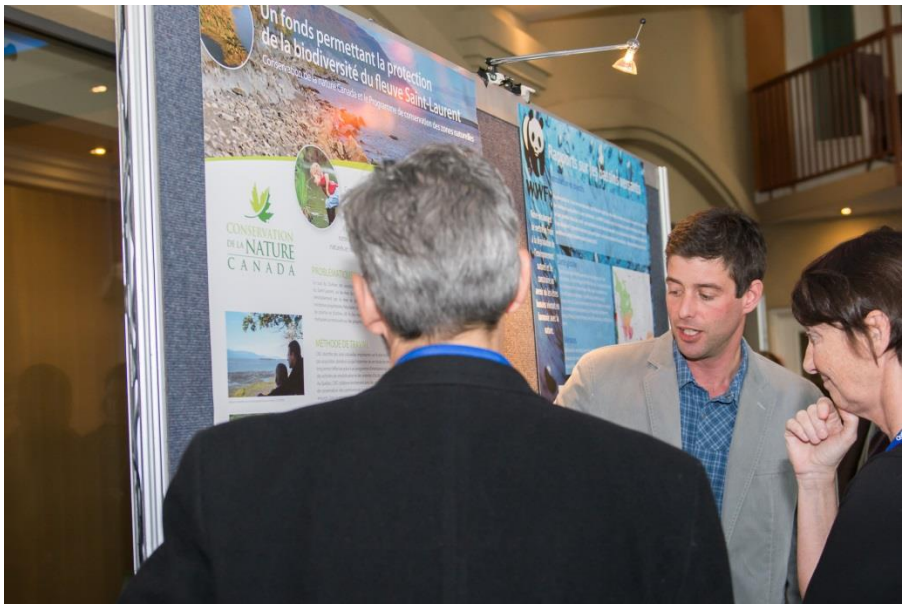
St. Lawrence River biodiversity protection fund

The Nature Conservancy of Canada (NCC) has access to part of the funds of the (federal) National Conservation Plan and is committed to doubling government investments using funding from other sources. The poster outlines this funding and the St. Lawrence shoreline conservation projects that have been made possible thanks to this partnership. NCC has carried out projects in the Outaouais region, along the Richelieu River, in Montreal, in the freshwater estuary, at Isle-aux-Grues, in the Gaspé Peninsula and in the Magdalen Islands. All of these projects align with the objectives of the St. Lawrence Action Plan, which include protecting and preserving access to the shoreline and improving water quality and fish habitat quality.

Water quality improvement monitoring committee / St. Lawrence Action Plan 2011–2026

Ongoing joint projects of the 2011–2015 water quality improvement monitoring committee

This poster lists the titles of the joint projects carried out at the water quality improvement monitoring committee. Participants interested in learning more about these projects, which concern nonpoint source pollution, sediment management and toxic substances, are encouraged to visit the St. Lawrence Action Plan website.



Participating organizations

Post-secondary research

- St.Lawrence Global Observatory
- Réseau Trans-tech

First Nations

- Mi'gmaq Maliseet Aboriginal Fisheries Management Association
- Grand Council of the Waban-aki Nation
- First Nations of Quebec and Labrador Sustainable Development Institute

Non-profit organizations – recreational users

- Centre de la Biodiversité du Québec
- Fédération québécoise pour le saumon atlantique
- Fédération québécoise des chasseurs et pêcheurs

Non-profit organizations – environment and community

- Amis de la Vallée du Saint-Laurent
- Ducks Unlimited Canada
- Comité ZIP de Québec et Chaudière-Appalaches
- Nature Conservancy of Canada
- Fondation québécoise pour la protection du patrimoine naturel
- Nature Québec
- Saint-Pierre Biosphere Reserve
- World Wildlife Fund Canada

Associations and professional orders

- Association des aménagistes régionaux du Québec
- Ordre des agronomes du Québec

Private businesses and industries

- Armateurs du Saint-Laurent
- Association maritime du Québec
- Société de développement économique de Montmagny
- Tourisme Bas-Saint-Laurent
- Tourisme Nicolet-Yamaska
- Union des producteurs agricoles

Education

- Groupe uni des éducateurs-naturalistes et professionnels en environnement
- Québec'ERE
- Education and Water Monitoring Action Group
- Cégep de La Pocatière

Concertation

- Regroupement des organismes de bassins versants du Québec
- Stratégies Saint-Laurent
- Table de concertation régionale de l'estuaire fluvial
- Table de concertation régionale de la zone de Québec
- Table de concertation régionale de la zone des Îles-de-la-Madeleine
- Table de concertation régionale du Haut-Saint-Laurent et du Grand Montréal
- Table de concertation régionale de la zone du lac Saint-Pierre
- Table de concertation régionale de la zone du Sud de l'estuaire moyen

Gouvernement of Canada

- Canadian Space Agency
- Agriculture and Agri-Food Canada
- Environment and Climate Change Canada
- Fisheries and Oceans Canada
- Health Canada
- Transports Canada
- Public Works and Government Services Canada

Gouvernement of Quebec

- Institut national de santé publique du Québec
- Deparatment of Municipal Affairs and Land Occupancy
- Department of Sustainable Development, Environment and the Fight Against

Municipal administration

- L'Alliance des villes des Grands Lacs et du Saint-Laurent
- Regional County Municipality of Nicolet-Yamaska
- Regional County Municipality of Vaudreuil-Soulanges
- Municipality of Îles-de-la-Madeleine
- City of Quebec
- City of Repentigny
- City of Trois-Rivières

Annex A – Results by workshop

Workshop on water supply (freshwater resources)

In this workshop, the participants identified pressures on water quality, as well as the adverse impacts they have on water quality and supply. Some examples include:

- Release of drug residues and other organic micropollutants;
- Non-point source pollution;
- Point source pollution;
- Lack of awareness of the quantity of water consumed and quality of water discharged;
- Uses that can contaminate drinking water supply areas;
- Wastewater discharges and overflows (municipal and industrial);
- Increase in suspended solids in water caused by navigation, erosion and impervious surfaces, which has an impact on treatment costs;
- Overuse of water due to over-extraction, which can lead to contamination by salt water intrusion;
- Complex and costly treatments when water quality is degraded;
- Impact of poor water quality on crop irrigation and ecosystem health;
- Absence of natural filters in agricultural areas, resulting in frequent cleaning and increased drinking water facility maintenance costs.

Four of the above elements were selected for follow-up, and three projects resulted.

1- Lack of outreach, training and engagement

Proposed solutions:

- Train primary school-age populations;
- Promote training;
- Increase awareness among decision-makers;
- Carry out stand-out, high impact advertising.

Strategy identified: Integrate training and education in all funding programs.

Project 1: Develop a program for integrating training into St. Lawrence River water supply projects.

Project objectives:

- Ensure investment in training and target the most effective approaches and stakeholders to be considered;
- Establish project development criteria (Training-Education-Outreach);
- Introduce financial incentives.

Location: provincial scale in Quebec and the local and regional scales.

Potential partners:

- Funders, regional groups (regional round tables, ZIP committees, watershed groups, etc.).

2- Lack of access to decision support tools for integrated water resources management (IWRM)

Proposed solutions:

- Design easy-to use tools that are accessible to a non-technical audience;
- Recognize the role of IWRM organizations, such as local or regional centres of expertise.

Direction chosen: Ensure better alignment between information producers and users (municipalities, RCMs, non-governmental organizations NGOs).

Project 2: Establish a partnership between producers of information and the agricultural sector.

Project objectives:

- Share decision support tools through the use of all available sources of information;
- Promote proactive agricultural practices;
- Share information that is tailored to needs and accessible to clients.

Location: Priority watershed of Lac Saint-Pierre.

Potential partners:

- Information producers: Environment and Climate Change Canada (ECCC), Centre d'expertise hydrique du Québec (CEHQ), Financière agricole du Québec (FADQ), Agriculture and Agri-Food Canada (AAFC), Quebec Department of Agriculture, Fisheries and Food (MAPAQ), universities and advisory clubs;
- Users: RCMs, municipalities, Union des producteurs agricoles (UPA) (advisory and producers' clubs).

3- Management of suspended solids, nutrients, and agricultural, municipal and industrial non-point source pollution

Proposed solutions:

- Apply and comply with existing regulations;
- Document agricultural and industrial issues in order to target effects on the St. Lawrence;
- Protect water quality at source;
- Provide guidance and support to the various stakeholders;

- Ensure better management of urban development;
- Disseminate and apply best practices.

Direction chosen: Develop quantitative pollutant load reduction targets and timelines with the means required to achieve them.

Project 3: Develop an overall drinking water supply cleanup plan.

Project objectives:

- Establish overall targets to reduce agricultural, municipal, industrial and navigation-related pollutant loads;
- Make contaminants associated with drinking water treatment a priority.

Location: freshwater portion of the St. Lawrence River.

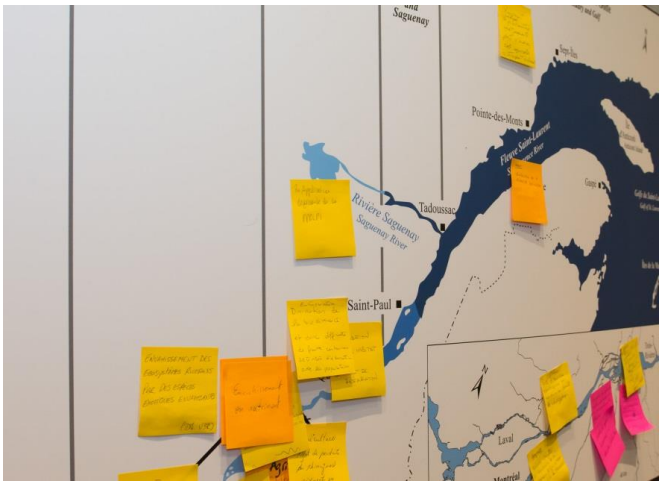
Potential partners:

- Quantitative objectives: MDDELCC, ECCC, AAFC, municipalities, watershed groups, ZIP committees, universities;
- Means: MDDELCC, MAMOT, MAPAQ, TC, New Building Canada Fund, Green Municipal Fund, municipalities.

4- Overconsumption of water and limited access to water

Proposed solutions:

- Increase awareness among the various parties involved;
- Use taxation and water meters;
- Make funding of water infrastructure conditional on the implementation of best consumption practices;
- Inform the public;
- Improve our knowledge of hydrology and take climate change into consideration.



No direction for follow-up activity was identified for this point.

Workshop on recreational and traditional uses of freshwater environments

During this workshop, the participants identified various pressures on water quality, as well as their impacts on water quality and recreational and traditional uses of freshwater. Examples include:

- Wetland loss or disturbance;
- Discharges of treated and untreated wastewater, Montreal-Longueuil and Quebec City sectors;
- Emerging substances often associated with sediments;
- Water flows directed into the River, causing impacts on the shoreline;
- Vessel speed and sediment resuspension;
- Climate change and invasive species;
- Loss of fishing areas and species;
- Shoreline erosion caused by wave action in the navigable channel;
- Contaminant discharges to water and deposition in sediment (contaminant sinks); the contaminants can be easily remobilized for long periods (fluvial section and Lac Saint-Louis);
- Boating speed and shoreline erosion;
- Pollution of swimming areas by detritus;
- Poor water quality, which compromises swimming;
- Loss of use of water for swimming and boating due to agriculture and to urban and industrial discharges;
- Poor perception of water quality, resulting in a loss of uses (swimming, fishing, etc.);
- Fish consumption and fishery (no striped bass in the region);
- Negative perception of the St. Lawrence River;
- Management of water levels: loss of access for shoreline residents;
- Problems of overflows and faulty connections, which restrict swimming use;
- Degradation of bacteriological quality and loss of water use for swimming as a result of urban discharges;
- Impact of pharmaceuticals and personal care products and endocrine (hormonal) disruptors on salmon populations;
- Hydrocarbon development and transportation, which could lead to loss of water use (for fishing, boating, nature watching);
- Poor water quality, which has an impact on fish communities and therefore on recreational and traditional fisheries;
- Lack of knowledge of issues and of the state of aquatic ecosystems, which results in inappropriate actions or choices in terms of resource use or the pursuit of activities.

Five of the above elements were selected for follow-up, and two projects resulted.

1. Poor perception of water quality and its impacts on swimming and sport fishing

Proposed solutions:

- Develop a website showing real-time bacteriological water quality;
- Improve dissemination of information in a simple, effective and consistent manner (e.g., red, yellow and blue codes);
- Use a unique dissemination platform;
- Increase data monitoring (rapid analysis);
- Obtain information, particularly for swimming;
- Engage the community and municipalities to ensure monitoring of swimming water quality;
- Disseminate information, and make it public and accessible;
- Educate the public through better communication on water and fish tissue quality.

Strategy identified: Promote and support swimming and sport fishing in the St. Lawrence River.

Project 4: Take a dip in the St. Lawrence!

Project objectives:

- Implement a water quality monitoring network for potential swimming sites in the St. Lawrence River;
- Develop a tool for promoting contact recreational activities.

Location: fluvial section and upper estuary.

Potential partners:

- Departments, RCMs, municipalities, regional issues committee(s) (TCR), ZIP comittees, watershed groups, SLGO, etc.

2. Overflows and wastewater discharges

Proposed solutions:

- Adapt funding to the upgrading of wastewater treatment plans;
- Construct holding tanks;
- Manage stormwater before it reaches the network by promoting green technologies, such as green roofs;
- Correct faulty connections;
- Increase public awareness of what it discharges in wastewater.

Direction chosen: Optimize the control of overflows and ensure proper wastewater treatment to allow safe pursuit of contact recreational activities.

No project was developed for this direction.

3. Agriculture and the floodplain

Proposed solutions:

- Change agricultural practices through economic incentives for producers and municipalities;
- Create buffer zones;
- Promote crop rotation;
- Limit and control agricultural drainage;
- Enforce acts and regulations.

Direction chosen: Change and adapt agricultural practices in the floodplain of Lac Saint-Pierre (LSP) to restore the yellow perch fishery

Project 5: Co-existence of agriculture and yellow perch – Creation of a showcase on the various agricultural practices in the LSP floodplain and their effect on yellow perch reproduction

Project objectives:

- Test the impact of the various agricultural practices on yellow perch reproductive success;
- Promote new agricultural practices among stakeholders.

Location: Saint-Barthélemy, Ducks Unlimited Canada (DUC) property.

Potential partners:

- Lac Saint-Pierre ZIP Committee, Quebec Department of Forests, Wildlife and Parks (MFFP), Ducks Unlimited Canada, ECCC (Community Interaction Program and sediment expertise), RCM, Fondation de la faune du Québec, Union des Producteurs agricoles du Québec (UPA), outfitters, commercial fishers, Aire faunique communautaire du lac Saint-Pierre.

4. Wave action and sediment resuspension

Proposed solution:

- Increase stream monitoring.

No direction was identified for follow-up on this element.

5. Management of water levels and ice

Proposed solutions:

- Develop adaptive management;
- Ensure that the management approach is as natural as possible;
- Reduce dredging.

No direction for follow-up activity was identified for this point.

Workshop on freshwater aquatic life

In this workshop, the participants identified pressures on water quality, as well as the adverse impacts they have on water quality and freshwater aquatic life. Some examples include:

- Nutrient enrichment, which causes increased growth of algae and cyanobacteria;
- Reduction in physicochemical water quality;
- Invasion of riparian ecosystems by invasive alien species;
- Heavy pesticide use;
- Suspended sediments;
- Encroachment on habitats and loss of aquatic grass beds;
- Constraints with respect to the application of the Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains (PPRLPI);
- Increased rainfall and erosion of agricultural soils (climate change), that result in sediment transport;
- The emergence of new molecules whose impact is under-evaluated;
- Municipal water overflows;
- Industrial activities and increased water temperatures;
- Accidental spills into the aquatic environment causing effects on wildlife and water quality;
- Decline in ecosystem health, which leads to a decline in the number of users of some shoreline parks;
- Decline in biological diversity;
- Feminization of organisms caused by endocrine disruptors in urban effluent;
- Fish kills due to algal bloom and anoxia (oxygen decline in water);
- Pressure from major industrial discharges on the aquatic life of the St. Lawrence;
- Alteration of bacterial communities as a result of release of antibiotics;
- Collapse in the yellow perch population in Lac Saint-Pierre.

Five of the above elements were selected for follow-up, and three projects resulted.

1- Impact of endocrine disruptors in municipal discharges

Proposed solutions:

- Improve treatment processes;
- Reduce these substances at source;
- Identify the main sources;
- Ban certain products;
- Look for green pharmaceutical and other products;
- Increase public awareness of the proper use of products.

Direction chosen: Promote the development of alternative “green” molecules to replace existing molecules (used by industry).

Project 6: Secondary effects beyond the patient

Project objectives:

- Develop an awareness document aimed at a change in culture and practice in the research community and industry, and among the public;
- Get the chief scientist interested in a research chair in green chemistry and mitigation measures;
- Present the issues and solutions to be explored: principle of cross-compliance (public funding conditional to environmental safety), polluter-pays principle, dissemination through social media, environmental certification.

Potential partners:

- Chapitre Saint-Laurent, MDDELCC, ECCC, academia, pharmaceutical industry, pharmacists.

2- Physicochemical changes in habitat caused by pesticides

Proposed solutions:

- Inform and support producers;
- Implement best agricultural practices;
- Rely on regulations to restrict or ban certain products;
- Create greener products having similar performance;
- Develop alternative cropping methods;
- Promote organic production;
- Apply the principle of cross-compliance;
- Change consumer attitudes;
- Educate, engage and promote community work.

Direction chosen: Support communities in a concerted effort to reduce releases of endocrine disruptors and pesticides.

Project 7: Adopt an orphan sub-watershed.

Objectives:

- Engage and mobilize producers at the local scale;
- Address the problem at the source and export the idea;
- Implement an exportable pilot project aimed at reducing agricultural discharges through changes to cultural methods.

Location: Baie-du-Febvre orphan watershed (trial with a view to exporting the project to other watershed) and an orphan watershed on the North Shore.

Potential partners:

- Producers, UPA, RCM, CIC, MAPAQ, Lac Saint-Pierre ZIP committee, NPOs, watershed groups, IRDA, Réserve de la biosphère, agri-environmental clubs, etc.

3- Habitat loss and degradation due to hazardous materials spills

Proposed solutions:

- Improve safety standards;
- Implement an effective risk management plan.

No direction for follow-up activity was identified for this point.

4- <u>Habitat loss due to encroachment (land use planning)</u>

Proposed solutions:

- Ensure a critical mass of expertise in small municipalities along the River;
- Group shoreline areas into units that are administered and managed together;
- Apply regulations respecting the protection of the floodplain and impose a moratorium on shoreline development;
- Obtain a better understanding of the area and geomatics aspect and map the floodplain;
- Promote efforts to ensure that natural areas are better taken into account in land use planning.

Direction chosen: Facilitate access to knowledge for local stakeholders networking between experts (transmission of expertise).

Project 8: Mobilization of expertise on integrated shoreline management

Project objective:

- To model management scenarios based on networking among experts in order to identify high-priority problems and to disseminate information.

Location: territory of the Table de concertation de l'Estuaire fluvial - Saint-Antoine-de-Tilly – Bécancour.

Potential partners:

- Regional issues committee(s) (TCR), scientific and economic experts, urban planners, Quebec Department of Public Safety, etc.

5- Alteration of the water regime by climate change

Proposed solutions:

- Ensure increased consideration of climate change in land use planning to offset their impacts;
- Increase the area of pervious wetlands and green spaces in urban environments.

No direction for follow-up activity was identified for this point.

Workshop on marine aquatic life and recreational and traditional uses of marine environments

Aquatic life in marine environments and recreational and traditional uses of marine environments were addressed at the same workshop.

During this workshop, the participants identified various pressures on water quality, as well as their impacts on water quality, aquatic life and recreational and traditional uses of marine environments. Examples include:

- Non-point source pollution and sediment loads and their effects on saltwater (CO_2 and acidification);
- Erosion and loss of coastal marshes;
- Sediment and contaminant transport;
- Uptake of CO_2, which leads to acidification of water and affects crustaceans;
- Poor water quality, which has a huge economic impact on small communities;
- Poor water quality caused by wastewater, which affects vacation/holiday use;
- Increased primary production (organic matter produced by algae), which leads to increased sedimentation and decreased oxygen concentrations, which have an impact on fish;
- Biodiversity loss and habitat degradation if water quality is not optimal;
- Decline in populations of First Nations flagship species (e.g., Atlantic salmon, eels, marine mammals, etc.);
- Reduced access to high-quality country foods due to habitat losses and general pollution (e.g., untreated wastewater);
- Impact of acidification on certain organisms, primarily benthic organisms (living at the bottom of a stream);
- Poor water quality, which affects the reproduction of marine species;
- Contamination, which causes a decline in the beluga population;
- Economic and cultural impacts associated with declines in fish populations and fishing activity;
- Changes in populations at the bottom of the food chain, which affects higher trophic organisms ;
- Impacts of contaminants on ecosystem health;
- Increased vessel traffic and introduction of invasive alien species;
- Work in the marine environment and increased suspended solids locally, which disturb habitats;
- Commercial and community coastal fisheries, which are affected by a deterioration in water quality;
- Heavy metals, which affects traditional fisheries;
- Increased suspended solids and reduced oxygen levels, which cause an impact on fish;
- Contamination of shellfish beds by municipal wastewater;
- Wastewater discharges, which affect shellfish safety.

Five of the above elements were selected for follow-up, and three projects resulted.

1. Contamination by wastewater and its effects on shellfish areas, swimming, wildlife habitats, boating and fisheries

Proposed solutions:

- Provide financial and technical assistance to municipalities;
- Tax water;
- Reduce the quantity of wastewater discharged;
- Increase the quality of water discharged;
- Eliminate overflows during heavy rains.

Direction chosen: Improve the quality of wastewater discharged to the natural environment.

Project 9: Quebec strategy for high-quality water

Objectives:

- Reduce impacts of wastewater on ecosystems;
- Reduce the human health risks;
- Recover or maintain uses associated with resources and habitats affected by wastewater.

Location: communities of the St. Lawrence Gulf and Estuary.

Potential partners:

- Provincial and federal departments, municipalities, First Nations, NGOs, universities and transfer centres.

2. Degradation of biodiversity and invasive alien species

Proposed solutions:

- Create dynamic protected marine areas;
- Control sources of pollution;
- Increase monitoring of invasive species and biodiversity;
- Develop indicators and monitoring methods in the marine environment.

Direction chosen: Monitor the impacts of water quality degradation on human and ecosystem health.

Project 10: Integrated knowledge acquisition, dissemination and monitoring program for the assessment of human and ecosystem health.

Objective:

- Document the quality of the water, changes in the state of ecosystems and impacts on human health.

Location: St. Lawrence Gulf and Estuary.

Potential partners:

- Provincial and federal departments, municipalities, research centres, NGOs, media outlets and citizens.

3. Contamination by emerging pollutants and its effects on the food chain, uses, human health and wildlife

Proposed solutions:

- Regulate and conduct upstream research;
- Educate and raise awareness;
- Invest in research and development, and provide guidance to industry;
- Improve knowledge of the impacts of microbeads in the Estuary;
- Increase awareness and accountability of producers of products containing microbeads.

No direction for follow-up activity was identified for this point.

4. Contamination by hydrocarbons and destruction of fish habitats and populations, as well as impacts of hydrocarbons on human health, swimming and uses

Proposed solutions:

- Limit potential consequences through the development of emergency response plans;
- Reduce the dependency on hydrocarbons;
- Increase the knowledge of the possible impacts on the marine environment;
- Increase support for cities;
- Increase marine transportation safety requirements;
- Impose a moratorium on hydrocarbon exploration and development.

Direction chosen: Develop prevention and response measures associated with marine transportation and hydrocarbon exploration and development.

Project 11: Training, prevention and response program for hydrocarbon risks and impacts

Objectives:

- Equip coastal communities (training, equipment and response plans);
- Promote better practices within industry;
- Improve knowledge related to hydrocarbon impacts;
- Increase the responsibility of industry.

Location: St. Lawrence Gulf and Estuary

Potential partners:

- Provincial and federal departments, municipalities, Aboriginal organizations, research institutes, industries, NGOs, users.

5. Contribution of nutrient enrichment from agricultural uses to hypoxia and acidification

Proposed solutions:

- Increase riparian buffers to reduce agricultural inputs and deforestation;
- Reduce the pesticide and fertilizer use;
- Reduce agricultural inputs and deforestation;
- Increase technical and financial support to producers;
- Regulate and monitor regulatory enforcement;
- Promote incentives for environmentally sustainable agriculture.

No direction for follow-up activity was identified for this point.

Annex B – Main impacts and pressures identified by the participants

Water supply (freshwater)

- Release of drug residues and other organic micropollutants;
- Non-point source pollution;
- Point source pollution;
- Lack of awareness of the quantity of water consumed and the quality of water discharged;
- Uses that can contaminate drinking water supply areas;
- Wastewater discharges and overflows (municipal and industrial);
- Increase in suspended solids in water caused by navigation, erosion and impervious surfaces, which has an impact on treatment costs;
- Overuse of water due to over-extraction, which can lead to contamination by salt water intrusion;
- Complex and costly treatments when water quality is degraded;
- Impact of poor water quality on crop irrigation and ecosystem health;
- Absence of natural filters in agricultural areas, resulting in frequent cleaning and increased drinking water facility maintenance costs.

Recreational and traditional uses in freshwater environments

- Wetland loss or disturbance;
- Discharges of treated and untreated wastewater, Montreal-Longueuil and Quebec City sectors;
- Emerging substances often associated with sediments;
- Water flows directed into the River, causing impacts on the shoreline;
- Vessel speed and sediment resuspension;
- Climate change and invasive species;
- Loss of fishing areas and species;
- Shoreline erosion caused by wave action induced by ships in the navigable channel;
- Contaminant discharges to water and deposition in sediment (contaminant sinks); the contaminants can be easily remobilized for long periods (fluvial section and Lac Saint-Louis);
- Boating speed and shoreline erosion;
- Pollution of swimming areas by detritus;
- Poor water quality, which compromises swimming;
- Loss of use of water for swimming and boating due to agriculture and to urban and industrial discharges;
- Poor perception of water quality, resulting in a loss of uses (swimming, fishing, etc.);
- Fish consumption and fishery (no striped bass in the region);
- Negative perception of the St. Lawrence River;
- Management of water levels: loss of access for shoreline residents;
- Problems of overflows and faulty connections, which restrict swimming use;

- Degradation of bacteriological quality and loss of water use for swimming as a result of urban discharges;
- Impact of pharmaceuticals and personal care products and endocrine disruptors on salmon populations;
- Hydrocarbon development and transportation, which could lead to loss of water use (for fishing, boating, nature watching);
- Poor water quality, which has an impact on fish communities and therefore recreational and traditional fisheries;
- Lack of knowledge of issues and of the state of aquatic ecosystems, which results in inappropriate actions or choices in terms of resource use or the pursuit of activities.

Freshwater aquatic life

- Nutrient enrichment, which causes increased growth of algae and cyanobacteria;
- Reduction in physicochemical water quality;
- Invasion of riparian ecosystems by invasive alien species;
- Heavy pesticide use;
- Suspended sediments;
- Encroachment on habitats and loss of aquatic grass beds;
- Constraints with respect to the application of the Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains (PPRLPI);
- Increased rainfall and erosion of agricultural soils (climate change), that result in sediment transport;
- The emergence of new molecules whose impact is under-evaluated;
- Municipal water overflows;
- Industrial activities and increased water temperatures;
- Accidental spills into the aquatic environment causing effects on wildlife and water quality;
- Decline in ecosystem health, which leads to a decline in the number of users of some shoreline parks;
- Decline in biological diversity;
- Feminization of organisms caused by endocrine disruptors in urban effluent;
- Fish kills due to algal bloom and anoxia;
- Pressure from major industrial discharges on the aquatic life of the St. Lawrence;
- Alteration of bacterial communities as a result of release of antibiotics;
- Collapse in the yellow perch population in Lac Saint-Pierre.

Marine aquatic life and recreational and traditional uses of marine environments

- Non-point source pollution and sediment loads and their effects on saltwater (CO_2 and acidification);
- Erosion and loss of coastal marshes;
- Sediment and contaminant transport;
- Uptake of CO_2, which leads to acidification of water and affects crustaceans;
- Poor water quality, which has a huge economic impact on small communities;
- Poor water quality caused by wastewater, which affects vacation/holiday use;

- Increased primary production, which leads to increased sedimentation and decreased oxygen concentrations, which have an impact on fish;
- Biodiversity loss and habitat degradation if water quality is not optimal;
- Decline in populations of First Nations flagship species (e.g., Atlantic salmon, eels, marine mammals, etc.);
- Reduced access to high-quality country foods due to habitat losses and general pollution (e.g., untreated wastewater);
- Impact of acidification on certain organisms, primarily benthic organisms;
- Poor water quality, which affects the reproduction of marine species;
- Contamination, which causes a decline in the beluga population;
- Economic and cultural impacts associated with declines in fish populations and fishing activity;
- Changes in populations at the bottom of the food chain, which affects higher trophic organisms;
- Impacts of contaminants on ecosystem health;
- Increased vessel traffic and introduction of invasive alien species;
- Work in the marine environment and increased suspended solids locally, which disturb habitats;
- Commercial and community coastal fisheries, which are affected by a deterioration in water quality;
- Heavy metals, which affects traditional fisheries;
- Increased suspended solids and reduced oxygen levels, which cause an impact on fish;
- Contamination of shellfish beds by municipal wastewater;
- Wastewater discharges, which affect shellfish safety.

Annex C – Directions

Water supply (freshwater)

- Integrate training and education in all funding programs;
- Ensure better alignment between information producers and users (municipalities, RCMs, non-governmental organizations NGOs);
- Develop quantitative pollutant load reduction targets and timelines with the means required to achieve them.

Recreational and traditional uses of freshwater environments

- Promote and support swimming and sport fishing in the St. Lawrence River;
- Optimize the control of overflows and ensure adequate treatment of wastewater to allow safe pursuit of contact recreational activities;
- Change and adapt agricultural practices in the floodplain of Lac Saint-Pierre (LSP) to re-establish the yellow perch fishery.

Freshwater aquatic life

- Promote the development of alternative “green” molecules to replace existing molecules (used by industry);
- Support communities in a concerted effort to reduce releases of endocrine disruptors and pesticides;
- Facilitate access to knowledge for local stakeholders networking between experts (transmission of expertise).

Marine aquatic life and recreational and traditional uses of marine environments

- Improve the quality of wastewater discharged to the natural environment;
- Monitor the impacts of water quality degradation on human and ecosystem health;
- Develop prevention and response measures associated with marine transportation and hydrocarbon exploration and development.

Annex D – Projects

Project 1: Develop a program for integrating training into St. Lawrence River water supply projects

Project 2: Establish a partnership between producers of information and the agricultural sector

Project 3: Develop an overall drinking water supply cleanup plan

Project 4: Take a dip in the St. Lawrence!

Project 5: Co-existence of agriculture and yellow perch – Creation of a showcase on the various agricultural practices in the LSP floodplain and their effect on yellow perch reproduction

Project 6: Secondary effects beyond the patient

Project 7: Adopt an orphan sub-watershed

Project 8: Mobilization of expertise on integrated shoreline management

Project 9: Quebec strategy for high-quality water

Project 10: Integrated knowledge acquisition, dissemination and monitoring program for the assessment of human and ecosystem health

Project 11: Training, prevention and response program for hydrocarbon risks and impacts

Environment and Climate Change Canada
Environnement et Changement climatique Canada

Développement durable, Environnement et Lutte contre les changements climatiques

Québec