

Rendez-vous Saint-Laurent 2006
13 et 14 juin / June 13 and 14
Rendez-vous St. Lawrence 2006



Toward Integrated Environmental Monitoring

REPORT



Canada 

Québec 

As part of the current Canada-Quebec Agreement *The St. Lawrence Plan: For a Sustainable Development*, six government partners – Environment Canada, the Ministère du Développement durable, de l'Environnement et des Parcs du Québec [Quebec department of sustainable development, the environment and parks], Fisheries and Oceans Canada, the Ministère des Ressources naturelles et de la Faune du Québec [Quebec department of natural resources and fauna], the Canada Space Agency and the Parks Canada Agency – and Stratégies Saint-Laurent [St. Laurent Strategies], a non-governmental organization that is active with river communities, are pooling their expertise provide regular reports on the condition of and changes to the St. Lawrence.

Under the theme *Toward integrated environmental monitoring*, the **Rendez-vous St. Lawrence 2006** reported on activities undertaken since the 2003 launch of the *Monitoring the State of the St. Lawrence* program. This public forum, which was held June 13 and 14, 2006 in Nicolet, was an opportunity to present an update on the knowledge of the St. Lawrence, acquired from environmental indicators. This event brought together more than 175 people from non-governmental organizations, industry, universities, municipalities and the government. This report provides a summary of the event's highlights.

UPDATING OF THE INDICATORS FOR MONITORING THE STATE OF THE ST. LAWRENCE

The most recent results from some environmental indicators in the *Monitoring the State of the St. Lawrence* program were presented on water and sediment quality, wetlands as well as marine birds, fish and belugas. Specialists also addressed some development indicators, notably on shoreline components and usages.

Water Quality

In terms of the toxins studied, the 2003 trends are continuing. No criteria on chronic toxicity for aquatic life were exceeded. Most metals levels were low. There was, however, an increase in mercury content; the source is most probably linked to atmospheric contributions, the origin of which could even be beyond the St. Lawrence basin.

Although the Great Lakes represent a significant source of the annual pesticide contents observed in the river above Québec City, the tributaries on the south shore of the St. Lawrence Lowlands make

significant contribution to it during the summer season. The physico-chemical quality of the water in the St. Lawrence has degraded between the periods of 1995 to 2001 and 2003 to 2005. An increase in turbidity and phosphorus in the water, connected to a drop in the St. Lawrence flow, would be the principal cause.

Sediment Quality – Saint-Pierre Lake

The quality of the sediment in Saint-Pierre Lake has greatly improved since the 70s and 80s. Mercury and polychlorinated biphenyl (PCB) content has diminished by more than 90%. The archipelago sector of the Îles de Sorel still remains vulnerable to the accumulation of contaminated sediments. Analysis results for polybrominated diphenyl ether (PBDE) content in sediment and suspended matter in Saint-Pierre Lake revealed a significant increase since the 80s.

Wetlands

The interpretation of images collected at the beginning of this decade made it possible to validate that the loss of wetlands, over the St. Lawrence as a whole, has stabilized and even reversed. In fact, the majority of the reaches had a positive result, translating into surface area gains between 1990 and 2002. However, certain sectors of the Montreal and Saint-Pierre Lake region still posted negative results, a net loss in wetland surface area. The results show the transformation and the dynamics of these areas, both in terms of space and composition. In terms of the problems with invasive plants likely to threaten the biodiversity of the wetlands, they are based mainly on the abundance of reed phalaris and water reeds.

Biological Resources

The highlights from the ichthyological follow-up seem to indicate that the number of species present in the St. Lawrence are relatively stable. Moreover, the reintroduction of the striped bass seems to have been a success and efforts in that regard are ongoing. Among the issues of concern, is the disappearance of the coho and chinook, and the increased presence of the tench and the round goby, exotic invasive species.

Marine Birds

Recent telemetry studies have revealed that the Northern gannet can travel distances of up to 200 km per day. This species now numbers over 50,000. This growth is inversely proportional to reduced DDE contamination of eggs. The reproductive success of this species is now around 67%, guaranteeing the maintenance and possibly the growth of this species. Since 2003, there has been stability in the population of the herring gull and a decrease in the common murre and the Atlantic puffin. Razorbill numbers have increased rapidly, while the Caspian tern, which almost disappeared, seems to be making a timid return.

REGIONAL PORTRAITS

The hydrographic regions of the St. Lawrence present very distinct characteristics; consequently, the environmental issues facing these regions are also different. Two presentations on the environmental problems of the St. Lawrence were developed in the form of regional. First, André Talbot of Environment Canada addressed *the ecological impacts of water level variations in the freshwater reach*, followed by Denis Gilbert of Fisheries and Oceans Canada, who presented the *hypoxic conditions in the Laurentian Channel*.

Under the revised plan to regulate water levels in Lake Ontario and the St. Lawrence, several water level scenarios have been modelled in order to examine the impacts on navigation as well as on certain physical and biological components of the St. Lawrence. The results reveal that extreme scenarios would have impacts on the navigable surface area, plant biomass, the shoreline, erosion, sedimentation, not to mention impacts on the transportation of contaminants and the distribution of fish influenced by water temperature. In conclusion, the sustainable development of the St. Lawrence must be based on an adjusting plan that would respect the natural hydrodynamics of the St. Lawrence while satisfying the greatest number of potential users.

Although the issue has recently become the subject of media attention, the reduction in oxygen in the Laurentian Channel has been observed since the 80s. The hypoxia phenomenon is mostly seen in the estuary, but certain sectors such as the Saint-Pierre Lake could encounter the same problem. Contributions in nitrogen and organic carbon from agricultural areas could have an impact on oxygen reduction in the water. There is therefore a need to measure nitrates and phosphates in order to prevent this phenomenon.

There has also been a reduction in the currents favouring the warm waters of the Gulf Stream at the mouth of the river estuary. These warmer waters have an impact on dissolved oxygen. The current hypoxic conditions in the estuary could cause a 15% loss in fish habitat surface area and a 20% loss in productivity. The drop in cod stocks could be caused by over-fishing and/or hypoxic conditions. One of the measures used to understand deep water conditions consist in monitoring silica in the water. The measuring of silica represents a fundamental parameter in studying the marine area.

INDICATORS TO BE DEVELOPED, A DIAGNOSTIC TO BE CLARIFIED

In a plenary session, participants discussed the development of new partnerships that could contribute to monitoring the St. Lawrence. The main elements raised were the following:

- A social activity could be developed in partnership with the organizations involved because there is a need to update the knowledge on the people's perceptions regarding the river as well as the recreational activities.
- The commitment of communities regarding the St. Lawrence is a lever for contributing to the Monitoring the State of the St. Lawrence Program (MSSLP). There is a desire to know more about rehabilitation and awareness-raising initiatives as well as traditional know-how in terms of usages.
- The concept of environmental landscapes should be integrated into the monitoring of land occupancy. However, the consolidation and improvement of the monitoring activities require a commitment by new partners to meet the objectives of the MSSLP: collect and interpret the information and report on them.
- The current MSSLP partners have made a long-term commitment to maintain their monitoring activities and to distribute the results on a regular basis. The arrival of new partners and the addition of new activities must meet these requirements.
- Recurrent events, like the Rendez-vous St. Lawrence 2006, focusing on such things as the sharing of knowledge between

scientists and communities, are needed to ensure good program collaboration and management.

COMMUNITY MONITORING AND TRADITIONAL KNOW-HOW

Luc Proulx, director of water policy at the Ministère du Développement durable, Environnement et Parcs du Québec gave the welcoming address on the second day. In a spirit of sharing experiences, he invited participants to tour the kiosks organized under the theme of *Place for communities*. Presentations on traditional know-how, partnerships for environmental monitoring, pilot projects on protocol development and evaluation, observation networks, etc., they were all topics of discussion and exchanges between communities and participants.

GLOBAL ISSUES ON THE STATE OF THE ST. LAWRENCE

Environmental monitoring panels of scientists and experts were held. Four topics of interest were addressed, in their current situation, from the angle of current and emerging issues pertaining to the state of the St. Lawrence. The panellists presented their thoughts and concerns, followed by discussions with participants.

INVASIVE AQUATIC SPECIES – The Star Candidates of this Decade

Panellists:

Yves De Lafontaine, Environment Canada

Chris McKindsey, Fisheries and Oceans Canada

Marcel Bernard, Ressources naturelles et Faune Québec

Claude Lavoie, Université Laval

The problem of invasive species is not new, but it has been raising serious concerns over the last fifteen years or so. In the past, we witnessed voluntary introduction of species such as carp, but now we are trying to halt that. The Great Lakes have nearly 170 invasive species and the St. Lawrence has 86, most of which come from the Great Lakes. Among the most problematic species, are the zebra mussel, the round goby, the Chinese mitten crab, the tench and the water chestnut. But what are the real impacts of exotic species on indigenous species? Researchers at this stage agree that the issue has

not been sufficiently documented. The nuisances that might be caused by exotic species on an area's biodiversity are sometimes debatable. We need to question the cause of a species' invasion to realize that biodiversity is sometimes threatened by an underlying problem. Finally, actions were suggested regarding this problem: establishment of alarm networks based on existing monitoring activities, creation of awareness-raising tools (navigation, selection methods), increased regulations (ballast water from ships, commercial sale), etc.

ACCESSIBILITY – A Question of Compromise

Panellists:

Daniel Groulx, City of Montreal

Luc Bergeron, Ville-Marie ZIP Committee

Jean-Éric Turcotte, Nature Québec / UQCN

Several factors have and continue to contribute, in certain cases, to reducing access to the waterway: artificial banks, urbanization, erosion, etc. A few initiatives were recently undertaken regarding accessibility to the waterways including the St. Lawrence, on various geographic scales. The committee for the Zone d'Intervention Prioritaire (ZIP) Ville-Marie participated in the strategic planning for Montréal's Blue Network. Nature Québec is working on developing an activity that would monitor usage and access to the river, focused on use of the accesses (demand). This work will begin this year at the Saint-Pierre Lake (pilot area) to validate the observation tools. The City of Montréal, coordinates the Blue Network, which evaluates the clienteles, characterizes the banks, current and potential access, and examines the legal aspects. The City of Montréal has thereby adopted a strategic access development perspective in order, specifically, to check the driving force on other riverside municipalities. In addition, access development within a context of integrated management presupposes layouts designed with the intent of minimizing impacts on the quality of the area and on the flora and fauna resources. Solutions rest in better management of the area where the protection and maintenance of the integrity of certain areas presenting a particular ecologic value is part of a long-term plan. In terms of the future, shoreline access development requires that banks be re-appropriated by the relevant municipalities or government authorities. The Canal Lachine in Montréal and the Jacques-Cartier beach in Québec City are examples of this although, generally speaking, people still feel that the public does not have sufficient public access. This aspect certainly deserves greater attention in the

St. Lawrence Plan. Definitely, access to the river and the development of related uses must be addressed in a more integrated manner, taking into consideration various perspectives: privatization of the shores, water and landscape quality, physical difficulty in accessing the areas and proximity of citizens, fees for usage and public safety. Taking all of this into consideration is necessary in order to develop useful compromises in reconciling access supply and demand.

CLIMATE CHANGE – Current Impacts and Future Disruptive Effects

Panellists:

Alain Bourque, Ouranos

Christiane Hudon, Environment Canada

François Morneau, Sécurité publique Québec [Quebec public security]

Denis Gilbert, Fisheries and Oceans Canada

Since 1990, temperatures have risen and there is less abundant precipitation. Increased evaporation has caused a decrease in the level of the Great Lakes and consequently a drop in the level of the St. Lawrence while sea levels have increased. Water levels in the St. Lawrence were particularly low in the summers of 1995, 1999 and 2001 and variations have particularly significant effects on Saint-Pierre Lake, notably on wetland dynamics. Upstream, climate changes have caused a western migration in salinity, into the Île d'Orléans sector. In addition, it is expected that sea levels will rise by 50 cm by the end of this century. The melting ice threatens the reproduction of some animal species as well as the stabilization of the banks. The more precise the climate scenario models, the better we will be able to forecast the short-term impacts. The development of new tools will be necessary and we must learn to work with uncertainties. As part of a monitoring program, we can expect to monitor vulnerability and adaptation indicators linked to climate change, such as the temperature of the St. Lawrence, water levels or biological indicators, such as the surface area of the wetlands, productivity, etc.

EMERGING CONTAMINANTS – Potential Repercussions on Species and on Human Health

Panellists:

Michel Lebeuf, Fisheries and Oceans Canada;

David Berryman, Développement durable, Environnement et Parcs

Québec;
Christian Gagnon, Environment Canada;
Philip Spear, TOXEN-UQAM

There are an estimated 100,000 substances used commercially: 500 to 1000 new substances added every year. This means that the scope of new emerging substances is colossal. Therefore, it is becoming important to prioritize them by criteria: bioaccumulation, persistence and toxicity. Over the last twenty years, work has been conducted on PCBs and mercury. Since 2000, there has been monitoring of ethoxylated nonylphenols, which are surfactants used in the production of textiles, pulp and paper, petroleum, metals and leather. They are known to disrupt the endocrine systems of aquatic organisms. Research on their future both in wastewater and drinking water is currently underway. Other substances such as metabolites, antibiotics as well as nanotechnology products should also hold our attention, given their potential impacts on the environment.

The *Canadian Environmental Protection Act*, governing the control of toxic substances, must extend its application to new substances. However, the evaluation and development of criteria remains to be done. A principle of precaution should be adopted, in order to educate industry. The number of industries complying with these regulations could serve as a response indicator as do ISO certifications. The monitoring of effects on an aquatic organism must encompass the combined effects of its exposure to several contaminants, not just one. However, it is a complex undertaking to understand their cumulative effects. Lastly, substances that act as an endocrine modulator (e.g. ethoxylated nonylphenols, pharmaceutical products) must be monitored, because their potential effects are biochemical, genetic and biological. An integrated approach should be favoured. The implementation of a monitoring network to detect emerging contaminants is recommended within a perspective of potential environmental monitoring. Lots of work remains to be done in developing tools for detecting the subtle effects in organisms, in order to establish a better picture of the situation.

CONCLUSION

The Rendez-vous St. Lawrence 2006 made it possible to raise several options to consolidate and improve the Monitoring the State of the St. Lawrence Program (e.g. usages, alert network for invasive species, endocrine disruptors, etc). It should be remembered that the

commitment of partners is indispensable in maintaining monitoring activities and reporting the results on a regular basis. One of the program's objectives is to provide information on the state of the St. Lawrence; the Internet site for the *St. Lawrence Plan for a Sustainable Development* posts the program's most recent results. You can visit the site at: <http://www.planstlaurent.qc.ca/>. Since the Rendez-vous St. Lawrence takes place triennially, the next Rendez-vous St. Lawrence 2009 is not to be missed!