# Mon fleuve et moi: THE ST. LAWRENCE

### Introduction and general history

Since time immemorial, the bountiful St. Lawrence has offered populations along its shores an abundance of resources, a means of communication and magnificent scenery. In the 15<sup>th</sup> century, the sought after passage to the many riches of Asia and known to the Algonquin as Magtogoek or "the path that walks" was christened the St. Lawrence by Jacques Cartier, a hydronym decreed a few years later by Samuel de Champlain. At the heart of the North American continent, the river pioneered a history greater than nature, our history. But what do we really know about this river that has shaped Quebec as we know it today, that has modeled our environment, influenced art and culture and currently spearheads our economy?



#### Main characteristics

- Continent: North America.
- Classification: continent, 3rd world, 17th.
- **Source**: the St. Lawrence River has its source at the outflow of Lake Ontario in Kingston.
- **Length**: 1 400 km (about 3 260 km including the Great Lakes). It ranks among the 25 longest rivers in the world.
- Average discharge: 12 600 m<sup>3</sup>/s (average discharge is 7 800 m<sup>3</sup>/s near Cornwall, Ontario, 9 800 m<sup>3</sup>/s in Montréal, rises to 12 300 m<sup>3</sup>/s in Québec City and reaches 17 000 m<sup>3</sup>/s at the entry to the Gulf). Of all watercourses in Canada, the flow rate of the St. Lawrence is the greatest. The St. Lawrence draws water from seven of 13 hydrographic regions in Quebec grouping together 430 major watersheds in Quebec, more than one third of all watersheds across Quebec.

- River mouth: Atlantic Ocean.
- Countries touched: Canada, United States (In Ontario, the St. Lawrence serves as the border with the state of New York.)
- Cities touched: Kingston, Montréal, Trois-Rivières, Québec, Lévis, Rimouski.
- Tributaries: Outaouais (20%), Saint-Maurice, Saguenay, Richelieu, Saint-François, Manicouagan.
- **Basin**: the St. Lawrence Basin is part of a larger basin known as the Great Lakes Basin. It extends from the western tip of Lake Superior to the Gulf of St. Lawrence. This watershed extending over 1 610 000 km contains close to 20% of the world's fresh water. Of all watersheds in Canada, the St. Lawrence Basin is the most southern.
- **Morphology**: the St. Lawrence is made up of three distinct parts: the river section (from Kingston, Ontario to Lac Saint-Pierre); the estuary (from Lac Saint-Pierre to the western point of Île d'Anticosti this section is subdivided into the riverine estuary, the upper estuary and the lower estuary); and the Gulf of St. Lawrence (it occupies an area of some 150 000 km<sup>2</sup> located in the prolongation of the river. It is a re-entrant of the coastline, a kind of great bay that is part of a greater whole, the Atlantic Ocean).
- **Precipitation**: in Quebec, rainfall is abundant throughout the year, generally exceeding 900 mm annually. The river alone collects 1% of the water that falls on the planet in the form of rain.
- **Temperatures**: four contrasting seasons prevail in Quebec, resulting in great temperature changes (difference between high and low temperatures). Temperatures sometimes reach 35°C in summer and drop below -40°C in winter. This climate is known as a humid continental climate. By 2030, a 2°C temperature increase is forecast, as is a longer growing season, a decline in ice cover and a 12% to 17% increase in evaporation. These changes may lead to chronic drops in water levels between 0.2 to 0.7 metres in the Great Lakes, and a reduction of up to 20% in the discharge of Lake Ontario towards the St. Lawrence.

## **BIODIVERSITY AND TOURISM**

### Julie Bordeleau, Marine Biologist

"The St. Lawrence River is a unique jewel of biodiversity and our ecological heritage, encompassing more than 19 marine mammal species, over 230 species of birds, some 35 species of amphibians and reptiles, close to 200 species of saltwater and freshwater fish, 2 200 invertebrates and almost 2 000 vascular plants! Indeed, the number of species living in the St. Lawrence is estimated at nearly 27 000 (three-quarters of which remain to be described scientifically, if not yet to be discovered).

However, this magnificent array of biological wealth is threatened by several kinds of human activity. Shoreline hardening and the loss of wetlands to farming, urbanization and other uses are partly responsible, as are commercial overfishing and the chemical contamination of water and sediment. Biodiversity in the St. Lawrence also faces another serious threat, although the threat is 'natural' and, for the most part, overlooked by many. New species of foreign origin have begun to appear. These invasive exotic species compete with indigenous species for food and habitat. In the case of the St. Lawrence River, such species include the zebra mussel, the round goby, the green crab, the Chinese mitten crab and certain aquatic plants found along the shoreline. For the Great Lakes, the biggest threat may come from the Asian carp."





The St. Lawrence boasts four sites recognized by the Ramsar Convention on Wetlands, including Lac Saint-Pierre, which is part of the World Network of Biosphere Reserves. The tremendous diversity of ecosystems of the St. Lawrence also provides supply services (e.g., drinking water, agriculture) and control mechanisms (e.g., water purification, sediment retention, protection against erosion), in addition to social and economic services (e.g., swimming, commercial fishing, shipping).



Likewise, several touristic regions offer opportunities for discovering the beauty and opulence of the St. Lawrence. For example, in the Côte-Nord region visitors can follow the "Route des Baleines" (the whale route), Gaspésie and Îles-de-la-Madeleine are renowned for their spectacular scenery, multiple holiday resorts and seafood, and the Lower St. Lawrence area has its "Route des Navigateurs" (the sailors' route) to showcase the region's maritime heritage. In addition, many national parks along the St. Lawrence attract large numbers of tourists and outdoor enthusiasts: the Saguenay-St. Lawrence Marine Park located at the confluence of the Saguenay and St. Lawrence rivers, Parc national du Bic in the St. Lawrence Estuary and Forillon National Park of Canada, found at the farthest reaches of the Gaspé Peninsula. However, despite sustained efforts in recent years, new marine parks and protected marine areas must be created in order that international goals of 10% protected marine areas in Quebec be achieved by 2015 (contrary to the less than current 1%), as promised by the Quebec Government.

Finally, the St. Lawrence represents an important asset for the development of tourism in the maritime regions in Quebec. Each year, more than 2.5 million tourists invest close to \$500 million in the economy. For example, the number of international cruise ship passengers docking in Québec City increased from 39 000 in 1995 to 70 000 in 2002 and now exceeds 100 000 passengers per year. In recent years, cruise travel has increased constantly, especially in autumn, when fall colours provide a spectacular view of the scenery from aboard ship.

### Of whales and men

Did you know that the Saguenay-St. Lawrence Marine Park located at the confluence of the St. Lawrence and Saguenay rivers is one of the best places in the world for whale watching? This unique location is home to several species of whales, such as the beluga (year round) and the blue and humpback whales that come to feed after an

annual migration of thousands of kilometres. The topography of the seabed in the region is conducive to the development of krill and small fish that provide food sources for marine mammals. Several thousand tourists visit this magnificent jewel of the St. Lawrence each year and take advantage of the whale watching cruises offered. In recent years, whale watching cruise companies have revolutionized their practices. Often accused of harming the whales by approaching them too closely, the companies are now increasingly aware of the fact that the disappearance of the whales will also signal the end of the whale watching industry. As a result, sustainable observation practices have been implemented and become the norm.



#### What you can do:

- Learn about the wealth and beauty of the St. Lawrence through the "St. Lawrence: Our Living River" poster provided by the David Suzuki Foundation. A better understanding of the river's ecosystems and the organisms that inhabit it will lead to greater importance attached to its protection.
- Do not facilitate the propagation of animal and plant species of foreign origin. Comply with Canadian legislation and do not voluntarily import animals or seeds while traveling. Then again, do not flush live animals (fish, snails, turtles) kept in aquariums down the toilet or release them into nature. Bring them to a pet shop.
- Look into the *Trousse éducative sur les mammifères marins en péril du Saint-Laurent* prepared by the Réseau d'observation de mammifères marins (ROMM): refer to their website at www.romm.ca under the "réalisation éducation et sensibilisation" tab.

- Convention on biological diversity www.cbd.int/
- Biodiversity portrait of the St. Lawrence www.qc.ec.gc.ca/faune/biodiv/
- La biodiversité du Saint-Laurent accessible... d'un simple clic www.planstlaurent.qc.ca/centre\_ref/publications/ lefleuve/vol11\_05/vol11\_5\_f.PDF
- Ramsar Convention and its mission www.ramsar.org/cda/fr/ramsar-about-mission/main/ramsar/ 1-36-53\_4000\_1\_\_\_
- Le Saint-laurent : une attraction www.lesaint-laurent.com/pages/tourisme.asp
- A natural food storehouse for whales the result of a fragile and unique ocean equilibrium www.dfo-mpo.gc.ca/science/publications/article/2011/02-03-11-fra.html
- Les espèces envahissantes : des organismes en mouvement www.mddep.gouv.qc.ca/jeunesse/chronique/ 2004/0404-esp-envahissantes.htm.
- Saguenay-St. Lawrence Marine Park www.parcmarin.qc.ca/1508\_fr.html and www.youtube.com/watch?v=cqkF2yns8kA (Video)

## FARMING AND FOOD

#### Yvon Deschamps, Agronomist

"The St. Lawrence Valley is a very fertile breadbasket particularly well-adapted to farming. Water supply is abundant, the soil rich and the terrain generally level. Fertile soil remains in the wake of the withdrawal of the Champlain Sea that originally covered the land and was created as the ice receded some 13 000 years ago.

Today, farmland accounts for nearly 2% of the land in Quebec and arable land is responsible for most agricultural production (e.g., corn and soya crops, maple groves, dairy farms and hog farms). Farming is associated with several ecological challenges and more particularly with the quality of water in the St. Lawrence and its tributaries.

It is important to note that farming practices have improved considerably in recent years with major reductions in the use of pesticides and the spread of synthetic fertilizers and barnyard manure/slurry. There are also more riparian strips along watercourses that serve as buffering agents and natural filtration. All these measures contribute to improving the health of the St. Lawrence and its ecosystems."



From the very onset of colonization, the St. Lawrence River served to structure land use and the landscape. The perpendicular layout of land in relation to the river was devised to facilitate access to the water and smooth the way for farming, transportation and fishing. This is why rural roads and highways often run parallel to the river.

The St. Lawrence Valley abounds in farm enterprises that take advantage of the fertile soil of the valley. According to the Union des producteurs agricoles (UPA), close to 43 000 agricultural producers generated nearly \$7 billion of revenue in Quebec in 2010. However, for a very long time, the poor storage of barnyard manure, improper spreading of fertilizers, use of pesticides, drainage and the elimination of protective riparian strips contributed to contaminating the waters of the St. Lawrence. Despite efforts and remarkable improvements in recent years, several of these practices continue to persist and contribute to excess nutriments (e.g., nitrogen, phosphorus) and microbial contamination, as well as an increase in

suspended solids and pesticides in the water. These contaminants affect ecosystems and, inevitably, human health. It is a problem that will require a great deal of effort to resolve in years to come.

The St. Lawrence is also an abundant source of seafood. According to the St.Lawrence Economic Development Council (SODES), more than 8 000 people work in the commercial fishing industry in Quebec, generating important economic spinoffs. In addition to production economics, the St. Lawrence (river, estuary and gulf) has an abundance of resources, much to the delight of restaurant chefs! Specific offerings from river and sea include the eel, the sea urchin, the harbour seal, the glasswort, the sea cucumber, etc. Many of the offerings are harvested for sale abroad, particularly in Japanese and major North American markets.



Despite the wealth of food sources found in the St. Lawrence, sustainable commercial fishing is increasingly desirable to ensure the long-term survival of these valuable resources. In light of this, the aquaculture of some species of fish is a component of sustainable fishing that warrants consideration. Is it an attractive and feasible path to pursue in Quebec, given the accompanying environmental challenges? Certifications and sustainable fishing guidelines do exist (including aquaculture) to further explore the idea. The *Seachoice* guidelines (available in English only: www.seachoice.org/) are a good example.

#### Aquaculture and the Gulf of St. Lawrence

In the past decade, aquaculture has breathed new life into the economies of many rural and coastal communities of the Gulf of St. Lawrence. Industry growth is stimulated by increased world demand for seafood and the decline in

fishing of several commercial species. In the Gulf of St. Lawrence, aquaculture is dominated by mollusc farming, in particular the oyster and the blue mussel. The region boasts some 1 800 aquaculture operations, 96% of which are found in New Brunswick, Nova Scotia and Prince Edward Island. The aquaculture industry is governed by federal and provincial law. In Quebec, aquaculture is characterized by companies specializing in fish farming and shellfish culture. In cooperation with the Réseau aquaculture Québec, the Ministère de l'Agriculture, des Pêcheries et de l'Alimentation (MAPAQ) prepared an action plan to improve the viability of the fishing industry and commercial aquaculture. The aim is to stimulate job creation and generate economic spinoffs in maritime regions in Quebec.



### What you can do

- Buy fruit and vegetables from local organic farmers to reduce the pressure on the St. Lawrence.
- Check whether the products from fishing or aquaculture (fish, seafood) that you purchase are from Quebec and comply with the principles of sustainable fishing. Inquire about this where you make your purchases!

- LeSaint-Laurent.com Un peu d'histoire www.lesaint-laurent.com/pages/merdechamplain.asp
- Ministère du Développement durable, de l'Environnement et des Parcs Contamination de l'eau par les pesticides dans les régions de culture de maïs et de soya au Québec www.mddep.gouv.qc.ca/pesticides/mais\_soya/rapportfinal.pdf
- Environment Canada The St. Lawrence www.ec.gc.ca/stl/default.asp?
- Fisheries and Ocean Canada Aquaculture www.dfo-mpo.gc.ca/aquaculture/aquaculture-fra.htm
- David Suzuki Fondation les 10 meilleurs choix de produit de la mer de David Suzuki www.davidsuzuki.org/fr/ce-que-vous-pouvez-faire/renouez-avec-le-fleuve/les-10-meilleurs-choix-de-produit-de-la-mer-de-david-suzuki/

## HEALTH AND WATER SUPPLY

### Raymond Laprise, Hydrological Engineer

"The waters of the St. Lawrence have several uses: drinking water supply, navigation, farmland irrigation, industrial use, etc. But what of water quality, since ultimately and sometimes in a very roundabout way, it returns to the river? This is an important question, since human health is intimately linked to that of the river from which millions of Quebecers drink water every day.

Drinking water must be treated to ensure good quality and compliance with standards established by specialists. Such is the case with water drawn from the St. Lawrence that provides drinking water for some 3.5 million Quebecers. Drinking 'treated' water obtained from the St. Lawrence is completely safe and it is also 'free'. However, contrary to what one might be led to believe, drinking water is not really free, because taxes paid by citizens serve to maintain filtration and treatment plants. There is no reason to buy bottled water from stores when consumers need only turn on the tap and fill a glass. But a ready supply provides no reasonable motive for failing to value this essential resource by polluting and wasting it. We are privileged to live in a country where water is abundant. In some countries of the world water is a rare and very costly resource. Let us care for it."





Before water drawn from the St. Lawrence flows to the tap, it must comply with the requirements of the *Regulation respecting the quality of drinking water.* The regulation was adopted and implemented in 2001 by the Government of Quebec to establish standards and controls among the most rigorous in North America in order to protect public health. Thus, water drawn for human consumption must be treated to eliminate pathogenic organisms and fecal contamination indicator organisms such as fecal coliforms, *Escherichia coli* bacteria, enterococcus bacteria and F-specific coliphage viruses.

Despite the good quality of water in the St. Lawrence, municipal facilities ensuring the treatment of water might still be improved. Indeed, most wastewater (refer to the Pollution and Solutions theme) in the province is treated physically and chemically, but not subjected to secondary treatment, as is the case in some municipalities. Primary treatment can process enormous quantities of water within a short period of time, but does not eliminate certain contaminants or the large majority of pharmaceutical products found in increasing abundance in the waters of the St. Lawrence.

A report published by the governments of Quebec and Canada revealed that the river plays host to different types of chemical substances, but that concentrations of these substances in the water decease substantially through the action of natural phenomena associated with dilution and chemical or biological degradation. Notwithstanding this extraordinary "universal solvent" capability, the waters of the St. Lawrence might become increasingly saturated with contaminants that could have impacts on human and animal health (refer to the Pollution and Solutions theme).



The impact of climate change is another important issue associated with the water supply. Environment Canada reports that the level of water in the Great Lakes could decrease by 0.5 m to 1 m during the next 30 years; as a result, the flow of the St. Lawrence, which is currently 12 000 m<sup>3</sup>/second near Québec City, might decrease by 20%. Shoreline residents would be affected by poorer water quality and damage to riparian ecosystems that generally act as powerful regulators. The increasingly pressing impacts of climate change will oblige decision makers to rethink the water intake systems of certain municipalities, given lower water levels (Montréal) or increased provision of brackish water, as would be the case in Québec City and all the costs such adaptations would entail.

Another threat looms over available water levels, affecting both the Great Lakes and the St. Lawrence River. Although these concerns are not all based in fact at the present time, the existence of projects to divert this precious resource towards central and southern states of the United States (the country's breadbasket, which is already suffering from a scarcity of water) is very real. What will happen when these states no longer have enough water to supply their populations, grow crops and water thousands of heads of cattle. What scenario will await us then?

## The health of the St. Lawrence is intrinsic to our health!

Nearly 45% of Quebecers, some 3.5 million people, drink water originating from the St. Lawrence. Since our bodies are made up of 70% of this water, this means that the health of the river is very closely linked to our own health. The quality of the water in the St. Lawrence can affect us in different ways, from drinking water supply to the consumption of produce originating from fishing and even activities involving contact with the river itself (swimming, sailing, etc.). Isn't that food for thought?



#### What you can do

- Water from the St. Lawrence is easily comparable to many brands of bottled water. Instead of buying bottled water, why not simply drink water from the tap? It is more ecological and much cheaper!
- Embrace good habits and limit personal water consumption.
- Do not pour chemical and pharmaceutical substances into sinks or flush down toilets. Bring them to an eco-centre or drug store.
- Limit shower time to five minutes.
- Do not leave water running when washing vehicles and do not hose down driveways.

- Le Saint-Laurent et la santé humaine L'état de la question II http://dsp-psd.pwgsc.gc.ca/Collection/H21-223-2004F.pdf
- The St. Lawrence River and Climate Warming www.ec.gc.ca/stl/default.asp?lang=Fr&n=4BF0EF0C-1
- Ouranos Impacts and Adaptation: Water Resources www.ouranos.ca/fr/programmation-scientifique/impacts-etadaptation/ressources-hydriques.php
- Regulation on the quality of drinking water Overview www.mddep.gouv.qc.ca/eau/potable/brochure/index. htm#reglement

## POLLUTION AND SOLUTIONS

### Paul and Saül Hussions, Environmental Project Officers

"Each year, more than 90 billion litres of wastewater, the equivalent of 30 000 Olympic-sized pools, is discharged into the Great Lakes and the St. Lawrence River. The most disturbing aspect is that the wastewater contains more than 200 different synthetic chemical compounds. There are multiple pollution sources, from households to industry and farming communities (refer to the Farming and Food theme).

In addition to health problems associated with the waters of the St. Lawrence (refer to the Health and Water Supply theme), there are increasingly high economic costs associated with treating and depolluting the water before it is discharged into nature or redistributed again. Happily, technology has progressed in leaps and bounds in recent years and the results obtained today are truly encouraging. But technology is expensive, and in Quebec and the Great Lakes region not all municipalities are able to implement such solutions. In any case, you and I both know that the answer to the pollution question is not steeped in technology alone. It is above all a question of practices and efforts made on a daily basis and each and every one of us is capable of that."





One of the main sources of pollution of the St. Lawrence is wastewater. Wastewater refers to any form of water having been used for something. It can originate from household sewer systems and industrial processes. Wastewater in municipal sewer systems comes from three sources: homes, industry and rainwater. Household wastewater basically comprises water from toilets, sinks, bathtubs and household appliances. Industrial wastewater originates from industry, businesses and institutions. Rainwater, of course, comes from runoff on paved surfaces. During heavy rainfall, sewer systems may not



be able to cope with the flow, and untreated surplus water ends up in the St. Lawrence, directly affecting water quality. For your information, the water purification plant in Montréal treats wastewater from two million citizens and 4 000 industrial and commercial establishments!

The issue of oil and gas development and potential risks of pollution inherent in this kind of industry also raise concern for the health of the St. Lawrence. The energy, gas and oil pathway has spawned a rash of debate in recent months in Quebec and mobilized many citizens. The David Suzuki Foundation has posted online simulations of the potential impact of an oil spill in the Gulf of St. Lawrence in the event this non-renewable natural resource is exploited.

Finally, different options are open to us to improve the quality of wastewater. Pollution reduction at source through the implementation of municipal regulations could lead to a decrease in pollutants discarded, more efficient treatment of wastewater, better management of hazardous household waste and the use of certified biodegradable products. These are examples of solutions that can contribute to improving the health of our river and making it more accessible to all.

#### The beluga: a dangerous animal?

Did you know that despite their sweet and harmless appearance, the belugas of the St. Lawrence Estuary are, for the most part, contaminated with toxic substances resulting from the phenomenon of bioaccumulation? Indeed, chemical pollution has a serious impact on all levels of biodiversity in the river. The beluga is at the top of the food chain and accumulates all the toxins present in the fish it eats. During a certain era, pollution was so great that dead belugas washed ashore were treated like hazardous waste! Today, the belugas' situation is much improved, but this does not mean that the little white whale is completely out of danger.



#### What you can do

- Simple gestures avoided on a daily basis offer solutions to improving the quality of the water in the St. Lawrence. The David Suzuki Foundation proposes eight "blue gestures" to improve the health of the St. Lawrence. Among them, not using bottled water, avoiding the use of chemical products that will make their way to the St. Lawrence after being poured into sinks or flushed down toilets (e.g., drugs, household cleaning products, etc.).
- Use phosphate-free organic household products. But beware: just because the label is green does not mean that the product is. Read labels carefully before purchasing.
- Adopt a beluga or a whale. This is possible by contacting the Group for Research and Education on Marine Mammals (GREMM) at www.gremm.org

- The Great Lakes Sewage Report Card www.ecojustice.ca/publications/reports/the-great-lakes-sewage-report-card
- David Suzuki Foundation www.davidsuzuki.org/fr/ce-que-vous-pouvez-faire/ajoutez-votre-nom-et-vos-gestes-a-la-carte-du-saint-laurent/
- Les Bélugas www.radio-canada.ca/actualite/decouverte/dossiers/16\_beluga/index.html

## **CULTURE AND TRADITION**

### **Guy Saint-Laurent, Historian**

"The Algonquin originally referred to the St. Lawrence as Magtogoek, the path that walks. This majestic river travels some 3 260 km from the Great Lakes to the Atlantic Ocean, endlessly sculpting coastlines and shaping the evolution of animals, plants and civilizations along its shores. The St. Lawrence commands respect through its myriad colours, changing moods and impetuous power.

The river also provides a backdrop for painters, poets, storytellers, filmmakers and songwriters who, in the course of centuries, have used pen and brush to craft extraordinary and moving works of art: Cornelius Krieghoff, Gilles Vigneault, Pierre Perreault, Clarence Gagnon, Robert Charlebois, Félix Leclerc, Morrice, Marc-Aurèle Fortin, Frédéric Back to name but a few. These artists have paid homage to this beautiful river, contributing significantly to our greater understanding of its majesty.

The St. Lawrence is an integral part of culture and life in Quebec. The French language in Quebec even has words based on our maritime history, such as embarquer, virer, baliser, mouiller, etc. Do you know of any others?"





Long before the arrival of the first European settlers along the shores of the St. Lawrence, Aboriginal peoples had already been living in the area for thousands of years, using the river as both a means of transportation and a source of sustenance. With the arrival of the Europeans, the face of the St. Lawrence gradually changed.

During the 16<sup>th</sup> century and perhaps even earlier, Basques sailed the shores of the St. Lawrence hunting North Atlantic right whales and grey whales. After harpooning a whale to death, they would tow it to shore to melt the blubber and obtain oil. The oil was used to make different products, in particular for lighting (oil lamps). On Île-aux-Basques, facing the city of Trois-Pistoles, there are remnants of a stone oven used to melt whale blubber shipped to Europe in the fall after hunting season.



A few decades later, new ships appeared to fill their holds with the furs of wild animals abundant in the land for the commercial profit of powerful European merchants. During the 17<sup>th</sup> and 18<sup>th</sup> centuries, the fur trade accounted for 70% of trade exports from New France.

Transformation accelerated with the establishment of colonization projects and the creation of cities and villages along the St. Lawrence. For nearly two centuries, the St. Lawrence was the gateway for millions of European immigrants seeking asylum and hope for a better life across the ocean. Indeed, 19<sup>th</sup> century Europe was plagued with cholera and smallpox epidemics. Each year, some 30 000 immigrants arrived in Quebec. Most were from Ireland, fleeing the great famine raging in their country. Until World War I, Grosse-Île served as a quarantine station mandated to safeguard public health. During this same period, the lumber trade (owing to the Napoleonic wood

embargo against the British) and naval construction were growing rapidly throughout the St. Lawrence Valley and, more particularly in the Québec City area, which boasted many shipyards. Different types of ships were built for both the export and local markets, including the famous "goélette" (schooner), the uncontested symbol of the great era of coastal shipping along the St. Lawrence.

Hundreds of these boats were built in shipyards along the St. Lawrence Valley, a hallmark product and source of great pride. Yet today, scarcely a trace remains of their existence. Contrary to the situation in other places in the world, our heritage and maritime national treasures have drowned heart and soul in the cold waters of the St. Lawrence and our collective memory. Some impassioned individuals have attempted to save what can be saved, but little remains of this important part of our cultural heritage.

#### The ice canoe: between profession, tradition and extreme sport

In the early days of the colony and until the appearance of powerful steamships towards the end of the 19<sup>th</sup> century, there were two ways to cross the river in winter: ice bridges, and, when these failed to freeze, the canoe. In the 1860s, more than two hundred boaters ensured the liaison between Lévis and Québec for passengers and cargo

alike. The first sporting event for canoes was organized in 1894 during the Québec Winter Carnival. In 1955, under the impetus of Alfred Renaud, the canoe race between Québec and Lévis was organized once again. Since 1955, the race has taken place every year without fail. Until 1984, only men participated in the classic event, but thereafter, mixed teams were entered. Since 1987, teams made up entirely of women now participate in this strenuous event. In the opinion of many, the canoe race is the most spectacular activity of the Québec Winter Carnival. In recent years, the Société québécoise d'ethnologie has campaigned to gain recognition for the ice canoe as part of our living and immaterial heritage.



#### What can you do

- To learn more about this unique river your own way and find out how it has marked culture and tradition in Quebec, we invite you to participate in the *Mon fleuve et moi* contest. There is no better way to meet the river, learn more about it and establish close ties with it through an educational and artistic endeavour!
- Visit maritime museums in Quebec and the Musée de la civilisation de Québec, in particular the *Portés par le fleuve* exhibit. Experience a unique opportunity for exploring founding moments in the history of Canada over the centuries, with the St. Lawrence River as your guide.

- Library and Archives Canada Immigrants at Grosse-Île www.lac-bac.gc.ca/databases/grosse-ile-immigration/ 001053-130-f.html
- Parks Canada Grosse-Île and the Irish Memorial National Historic Site of Canada www.pc.gc.ca/fra/lhn-nhs/qc/ grosseile/natcul/natcul1/a.aspx
- Musée de la civilisation Exposition Portés par le fleuve www.mcq.org/fr/mcq/expositions.php?idEx=w3002
- Association des coureurs en canot à glace www.canotaglace.org/node/11
- Le fleuve aux grandes eaux www.fredericback.com/cineaste/filmographie/le-fleuve-aux-grandes-eaux/index.fr.shtml
- La chasse à la baleine www.romm.ca/page.php?menu=4\_15\_84

## ACCESS TO THE RIVER AND ITS MANY USES

### Mario Tremblay, Urban Planner

"Can you imagine that less than fifty years ago, thousands of people flocked to the beaches dotting the St. Lawrence with the arrival of warm weather? Then one day, people realized that the river was truly contaminated and bathing in its waters could have adverse effects on human health. Inevitably, beaches along its shores were closed and people turned away from the river. Thereafter, the St. Lawrence gained a poor reputation and such is the case even today, although scientific analyses have revealed that the health of the river is improving constantly.

However, in recent years, a movement for a return to the river has emerged. Initiatives have been taken to return it to the citizens in order that it might once again become the huge playground of days gone by. This is good news indeed, because this jewel will be better protected if everyone becomes a guardian of the St. Lawrence and cares for it."



The question of access to the river has marked history and the countryside of the St. Lawrence Valley. In the earliest moments of colonization, land was divided into long narrow strips guaranteeing their new owners direct access to the river for the transportation of goods and merchandise. The system also provided access to an additional means of subsistence through fishing and leisure activities, although the term leisure had yet to be coined. The close relationship with the river year after year lasted for more than three centuries until the discovery in the 1960s and 1970s of high levels of contamination. Quebecers gradually turned away from the river. It was also the era of road and highway construction along the shoreline that finally separated the population from the river by limiting access to it and eventual use.

But at the same time, pockets of resistance were emerging, timidly at first. Over the years, more and more citizens and organizations grouped together, refusing to lose contact with their river. During the 1990s, initiatives taken to reclaim the river now become a priority. There was a multiplication of Sentiers maritimes du Saint-Laurent (St. Lawrence Water



Trails), better known as "Routes bleues", that allowed outdoor and water sport enthusiasts to take advantage of the beauty of the river.

Within the plan adopted by the Communauté métropolitaine de Québec (CMQ), this reclaiming of the St. Lawrence River is expressed through two major projects developed during the celebrations of the 400<sup>th</sup> anniversary of the establishment of the City of Québec. For the occasion, the Government of Quebec mandated the Commission de la capitale nationale du Québec (CCNQ) to "return the river to Quebecers." The Promenade Samuel-De Champlain, which extends over 2.5 km, has become one of the flagship symbols of the will to rehabilitate the shores the river. Given the popular success of this type of installation, a second phase has been launched. Another project of major importance is, without doubt, the Baie de Beauport (bay). New facilities located mere minutes from the downtown area allow privileged access to the river, even though swimming remains forbidden and access is controlled.

Citizens are in the process of reclaiming the river along its shoreline, but for many, things are advancing too slowly; for others, reclaiming might take the form of beach development at the very heart of the city in the Bassin Louise, owned by the Port of Québec. Although swimming has become an important symbol of the community reclaiming process, other recreational uses should also be envisioned (pleasure boating, sport fishing, nature study), which is far from the case in many locations.

#### Return of a beach at Anse au Foulon in 2015

For younger generations, the beach at Anse au Foulon means nothing, but for nearly 40 years it was symbolic of a place where the people of Québec City could meet and swim. The Anse au Foulon beach was created between 1927 and 1929 and attracted many bathers until it was closed in 1969 owing to the poor quality of the river water. Now, nearly 45 years later, the dream of a return of the beach at Anse au Foulon might become a reality by the summer of 2015. The project falls within Phase III of the Promenade Samuel-De Champlain and should begin in the spring of 2013. The project will require significant redevelopment efforts (pier extension, relocation of railroad rights-of-way, reconstruction of Boulevard Champlain closer to the cliff and the construction de



retention basins) with a budget currently estimated at \$95 million. The reclaiming of the river by citizens is underway and something to rejoice about until swimming is once again an option.

#### What you can do

- Become involved in more outdoor and water sports activities.
- Support the initiatives of local and national organizations promoting greater access to the St. Lawrence River.

- Stratégies Saint-Laurent www.strategiessl.qc.ca/
- Commission de la capitale nationale du Québec (CCNQ) www.capitale.gouv.qc.ca/
- Communauté métropolitaine de Québec (CMQ) www.cmquebec.qc.ca/
- Ministère du Développement durable, de l'Environnement et des Parcs Modélisation de la qualité bactériologique d'un site potentiel de baignade à l'anse au Foulon, Sillery – www.mddep.gouv.qc.ca/eau/eco\_aqua/foulon/ partie-1-2-3-4.htm
- La Société des Gens de Baignade www.gensdebaignade.org/

## MARITIME TRANSPORT AND OTHER ECONOMIC DIMENSIONS

#### Germaine Lavoie, Marine Traffic Manager

"Since the beginning of the colony, the St. Lawrence has always been a crucial shipping route. Great quantities of raw materials and manufactured goods can be shipped at low cost. The St. Lawrence is part of a huge maritime shipping route that extends over 3 700 km and includes the St. Lawrence Seaway and the Great Lakes. The St. Lawrence Seaway inaugurated in 1959 is, in fact, a series of locks connecting the river to the Great Lakes. It allows ships to reach the Great Lakes. Over the years, the waterway between Québec and Montréal has often been dredged to adjust to increasingly large ships.

Maritime transport is important to the economy in Quebec, contributing to our quality of life. Did you know that most of the products that we consume on a daily basis, including toys, fruit, vegetables, automobiles and clothing, travel the St. Lawrence in different kinds of ships? Each year, ships transport close to 120 million tonnes of merchandise to different ports along the St. Lawrence and Saguenay rivers. In Quebec, the maritime industry generates more than 27 000 jobs on land and sea. It is a very dynamic and interesting sector to further explore."





The transport of merchandise along the St. Lawrence River plays a vital role in trade in Quebec because the activity generates \$3 billion in economic spinoffs. Several products manufactured here and raw materials from Quebec and Canada are exported by ship to different countries around the world.

In the large majority of cases, international ship operators (meaning those involved in the commercial shipping operations as owners or lessees) ensure the overseas transport of merchandise departing via the St. Lawrence. National ship operators use ships registered in Canada and Canadian crews. There are twenty some organizations based in the St. Lawrence



region. They serve the St. Lawrence-Great Lakes system, but also New Quebec, the Canadian Arctic, Newfoundland, the Îles-dela-Madeleine, the Lower North Shore, Anticosti and the Maritime Provinces. National ship operators mainly provide cargo and passenger transportation services and other services such as dredging and towing.

There are some twenty ports along the St. Lawrence where cargo transport takes place. The biggest commercial ports in Quebec are the ports of Montréal, Québec, Saguenay, Sept-Îles and Trois-Rivières. The Port of Québec is one of the most important along the St. Lawrence, owing to the extent of its port activities. The Port of Québec is acknowledged as the main transit point for international cargo, since it is the last deepwater port before the Great Lakes.

The St. Lawrence is part of the following maritime transport system:

• A river portion (from the Gulf of St. Lawrence to Montréal); the river portion, also referred to as the navigation channel of the river, extends over a distance of 1 600 kilometres. This natural route where ships can travel freely constitutes one of the longest inland shipping lanes in the world.

- The St. Lawrence Seaway (from Montréal to lakes Ontario and Erie) begins upstream of Montréal at Saint-Lambert. It includes 15 locks and allows huge ships to reach the Great Lakes. It is divided into two sections: the first comprises seven locks connecting Montréal to Lake Ontario and the second, the Welland Canal with eight locks connecting Lake Ontario to Lake Erie.
- The other Great Lakes (Huron, Michigan and Superior).

Every year, between 11 000 and 13 000 cargo ships sail the river portion and more than 4 000 use the St. Lawrence Seaway.

Maritime transport offers many advantages, both economic and environmental. Did you know that with one litre of fuel, a ship can carry more cargo that a truck or train, making maritime transport one of the most ecological means of shipping goods? A single ship can carry as many as 870 truckloads of merchandise. Maritime transport is also the safest means because there are 75 times fewer accidents involving ships than road transport and 14 times fewer accidents than rail transport.

#### A bountiful river

The St. Lawrence is not only a great blue highway, as some like to refer to it; it is also the setting for lively economic activity such as the production of hydroelectricity, thanks to the Moses-Saunders and Beauharnois power stations that provide electricity to a portion of the population of Quebec. Another major sector of economic activity is commercial fishing. Every year, \$150 to \$200 million worth of commercial fishing takes place on the St. Lawrence. Species most prized include snow crab, lobster, shrimp, mackerel, herring and halibut. Commercial fishing on

the St. Lawrence is concentrated in the coastal areas of Gaspésie, Îles-de-la-Madeleine and Côte-Nord. The industry employs more than 8 000 people in Quebec, half of whom live in Gaspésie. More than 2 800 fishermen and fishermen's helpers contribute to the saltwater fishing industry in Quebec on more than 1 000 boats. Freshwater fishing in Quebec take place mostly along the river corridor of the St. Lawrence and on Lac Saint-Pierre. Main species include eel, sturgeon, catfish and yellow perch.



#### What you can do

- Participate in "Welcome Aboard!" careers activity organized by the Human Resources Sectorial Committee of the Maritime Industry (CSMOIM) held alternately in Québec City and Montréal. Information is available at: www.csmoim.qc.ca
- Learn about sport fishing by participating in the "Pêche en herbe" program organized by the Fondation de la faune du Québec. Information is available at: www.fondationdelafaune.qc.ca/
- Participate in the Rendez-vous Naval to visit ships, the Port of Quebec and meet sailors. The event takes place at the beginning of June at the Vieux-Port de Québec. Information is available at: www.rendezvousnaval.com

- Le transport maritime, au cœur de nos vies www.lesaint-laurent.com/pages/faitsetchiffres.asp
- Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec (MAPAQ) www.mapaq.gouv.qc.ca/fr/Peche/ pecheaquaculturecommerciales/Pages/pecheaquaculture.aspx
- Comité sectoriel de main-d'œuvre de l'industrie maritime (CSMOIM) www.csmoim.qc.ca
- The St. Lawrence Economic Development Council (SODES) www.st-laurent.org/

## MANAGEMENT AND GOVERNANCE

#### Patrick Boileau, Director, Regional Water Management Committee

"Failing to attend to business can lead to complications, even ruin. Something similar happened to the majestic St. Lawrence River. For a long time, people believed it could handle anything until one day, in the early 1970s, it became obvious that despite its might, the river was 'ailing.'

Thereafter, several programs and initiatives were launched by the Quebec and Canadian governments, leading ultimately in 1989 to the establishment of the St. Lawrence Action Plan. Then the governments created ZIP (area of prime concern) committees making each responsible for a portion of the river. In 2002, the Government of Quebec implemented a *Water Policy* to better protect water and the St. Lawrence River. Specialists proposed the establishment of what was referred to as the integrated management of the St. Lawrence. In fact, this simply meant that specialists, elected officials and users of the territory would meet to pool ideas and solutions to better protect and use the water. Properly managing the water is properly managing life. It is a duty shared by us all to gain access to this resource crucial to life..."





During most of its modern history, Quebec embraced the idea that its aquatic resources were inexhaustible, given nature's bounty and abundance. But the wake-up call was brutal in the early 1970s. The results of analyses showed that the St. Lawrence had reached critical levels of contamination and that the ailing river needed to be followed closely.

During the twenty years that followed, Quebec focused closely on water resource management. In 1978, the Government of Quebec launched the ambitious Programme d'assainissement des eaux du Québec (wastewater treatment program) integrating three phases covering the urban, agricultural and industrial sectors. In 1988, a first agreement was signed between the governments of Quebec and Canada. The St. Lawrence Action Plan was renewed in 1994 under the name of St. Lawrence Vision 2000. In September 1997, Montréal hosted the World Water **Congress**. Some raised the idea of massively exporting Quebec's drinking water to African countries and the Middle East. In December of the same year, the **Symposium sur la gestion** de l'eau (water management symposium) took place. Premier Lucien Bouchard announced that his government would not issue new permits to companies drawing water from groundwater sources for as long as the issue were not subjected to public debate. In



1998, Minister of the Environment Paul Bégin asked the Bureau d'audiences publiques sur l'environnement (BAPE) to hold a public consultation on water management. The consultation took place throughout Quebec in 1999 and the report was made public on May 3, 2000. In the fall of 2002, and for the first time in its history, Quebec established a **Water Policy (PNE)** whereby the government reaffirmed that water constituted an essential asset of the collective heritage of all Quebecers. The policy presented measures and government commitments intended "to implement watershed-based management to reform water governance" and "to apply this type of management to the St. Lawrence through special recognition of the special status of this important watercourse." According to the definition established by the government in the PNE:

"The integrated management of the St. Lawrence is a permanent process based on consensus-building among decision makers, users and civil society to plan and better harmonize protective measures and the use of resources of this important ecosystem, from a perspective of sustainable development."

The challenges associated with the proper and sound management of water are important and fundamental and will remain so in years to come because of climate change. The management of this resource is a matter of concern to us all in Quebec and the entire watershed of the Great Lakes and the St. Lawrence. Decision makers in Québec City understand this well and are spearheading the creation in Quebec of the Institut international des villes aqua-responsables, a project aimed at certifying cities that engage in sound water management.

#### A river under scrutiny

Are you aware of the IJC? If not, you will undoubtedly become familiar with it in years to come. Why? Because the International Joint Commission, an independent and binational organization (United States and Canada), is like the hand operating the great tap of the St. Lawrence, a tap that has become coveted and of strategic interest to all parties involved. The IJC was created in 1909 in the wake of the Boundary Waters Treaty governing border waters. The IJC is responsible for establishing the flow regulation and water level plan for Lake Ontario and the St. Lawrence River. The task is far from simple, since upstream and downstream, demands and needs are not necessarily shared. The situation has observers in



Quebec worried that the slightest decrease in current water flow would have important and serious consequences for the St. Lawrence, shoreline populations and the Quebec economy. In recent years, fears have been mounting in the face of potential water diversion projects and climate change where existing models forecast alternating periods of drought and heavy rainfall.

#### What you can do

- Become involved and involve family members in an organization to protect the St. Lawrence.
- Remain aware of action taken by decision makers and do not hesitate to inform them of your agreement or disagreement.

- Stratégie Saint-Laurent (SSL) www.strategiessl.qc.ca/
- St. Lawrence Action Plan www.planstlaurent.qc.ca/index\_f.html
- Les Amis de la vallée du Saint-Laurent www.avsl.qc.ca/champsdintervention.html
- Quebec Water Policy www.mddep.gouv.qc.ca/eau/politique/#orientation2

### **TO LEARN MORE**

#### The St. Lawrence and its tributaries

- Amis de la vallée du Saint-Laurent
- Attention FragÎles
- Écomaris
- Saguenay St. Lawrence Marine Park
- St. Lawrence Action Plan
- Regroupement des organismes de bassin versant du Québec – ROBVQ
- Réseau d'observation de mammifères marins ROMM
- Great Lakes United

#### Knowledge and research

- Ouranos Consortium on regional climatology and adaptation to climate change
- The group for research and education on marine mammals GREMM
- INRS, Eau Terre Environnement Research Centre
- Institut des sciences de la mer de Rimouski
- Institut maritime du Québec
- Institut Maurice Lamontagne
- St. Lawrence Global Observatory
- Québec Océan Groupe interinstitutionnel de recherché océanographiques du Québec

### Recreational activities, tourism and economic development

- Green Marine
- St. Lawrence Ship Operators
- Comité sectoriel de main d'oeuvre de l'industrie maritime - CSMOIM
  - An initiative of



#### In cooperation with











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Photos are identified in their order of presentation in the document.

- Musée maritime du Québec
- Great Lakes St. Lawrence Seaway System
- Sentier maritime du Saint-Laurent
- St. Lawrence Economic Development Council SODES
- Société des Gens de Baignade

#### **Government organizations**

- Great Lakes and St. Lawrence Cities Initiative
- International Joint Commission IJC
- Ministère du Développement durable, de l'Environnement et des Parcs du Québec
- Environment Canada
- Fisheries and Oceans Canada
- Ressources naturelles et Faune Québec
- Transport Canada
- Transports Québec

#### Environment

- Biosphere
- Fondation de la faune du Québec
- David Suzuki Foundation
- Nature Québec
- Regroupement national des conseils régionaux de l'environnement du Québec – RNCREQ
- International Network of Basin Organizations RIOB
- International Secretariat for Water ISW
- Canadian Parks and Wilderness Society

Map of the Great Lakes — St. Lawrence Basin: Wikipedia • 1-Biodiversity and Tourism: ZIP de Côte-Nord du Golfe - Blanc Sablon, A. Pérot / ZIP Ville-Marie, S. Miller • 2-Farming and Food: Photos.com / ZIP Jacques-Cartier, S. Miller / Laurélyse Pelletier Audette / ZIP Côte-Nord du Golfe • 3-Health and Water Supply: Ville de Québec / Svadilfari via Flicker / Ville de Québec / Barefootcollege via Flicker • 4-Pollution and Solutions: Ville de Québec / Stratégies Saint-Laurent / Photos.com / Ville de Québec / ROMM • 5-Culture and Traditions: Source unknown / Goélette Grosse-Île / Goélette Grosse-Île / Goélette Grosse-Île / Michel Corboz • 6-Access to the River and Its Many Uses: CCNQ, Jonathan Robert / Stéphane Arsenault / Stéphane Arsenault • 7-Maritime Transport and Other Economic Dimensions: Louis Rhéaume / Fisheries and Oceans Canada, Nathalie • 8-Management and Governance: Photos.com / Québec Port Authority / CCNQ, Jonathan/ Robert / Photos.com



Secteur de la géomatique, janvier 2012 Source : Environnement Canada, Centre Saint-Laurent











