



WATER

SEDIMENTS

SHORELINES

BIOLOGICAL RESOURCES

USES

SAFETY OF POTENTIAL FRESHWATER SWIMMING SITES

Background

“On summer evenings when the tide was high, the beaches were filled with bathers from Queen’s Quay, now Napoleon Quay, all the way to the recently built quays on the Saint-Charles River, at the far western end of the Palais. We children spent part of the day in the

water, like little ducks.” (Philippe-Aubert de Gaspé, *Les Anciens Canadiens* [*The Canadians of Old*])

This image of swimming in Quebec City around 1800 evoked by Philippe-Aubert de Gaspé reminds us that in the days of our forefathers the St. Lawrence River was a favourite spot for recreational activities. The increasing pollution



Photo: MENV



Photo: MENV

of the St. Lawrence River during the 20th century and an awareness of the public health problems associated with poor water quality for swimming eventually led to the closure of the public beaches in the 1960s.

Most of Quebec’s population live near the St. Lawrence River. It therefore receives large volumes of wastewater from treatment plants, some of which do not disinfect the wastewater they treat before discharging it into the St. Lawrence River. Contaminated water also comes from sewer systems that overflow during periods of heavy rain. Finally, a significant amount of contamination is contributed by certain rivers. Over the past 20 years, various wastewater treatment programs have nevertheless resulted

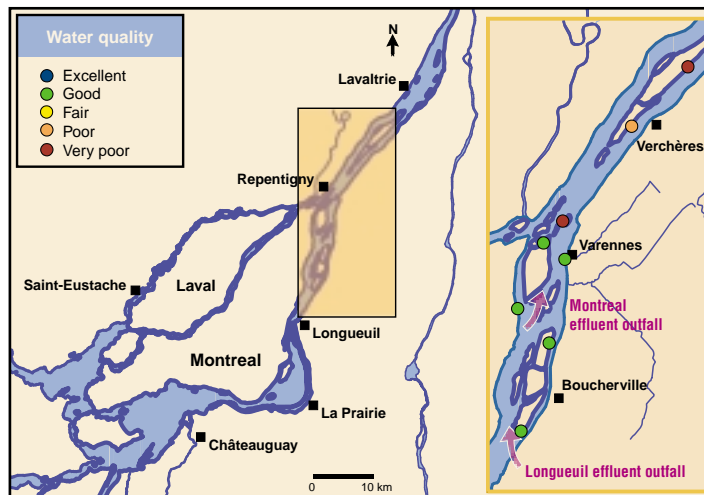
in a significant improvement in water quality. Swimming in the St. Lawrence River is one of the uses that shoreline residents would most like to have available to them, but most of the previously used sites are now considered unfit for swimming on the presumed basis of poor bacteriological quality.

Overview of the Situation

In order to provide an up-to-date assessment of the potential swimming in the St. Lawrence River, the ministère de l'Environnement du Québec conducted a study on the bacteriological quality of the water at 44 sites between Montreal and Île d'Orléans. Nearly half of these sites were found to be good candidates, with the level of contamination generally (more than 70% of the time) meeting the guideline for swimming. Non-disinfected discharges from the Montreal area, from the Longueuil and Montreal wastewater treatment plants, compromise recreational uses over a large portion of the St. Lawrence River, essentially in the shipping channel and immediately north of it. However, there are a number of areas where the bacteriological quality of the water is good.

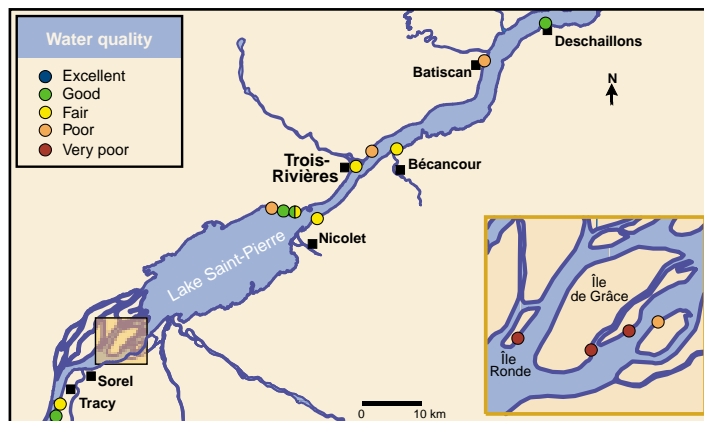
In the Montreal area (Figure 1), data collected between 1999 and 2001 show that swimming may be safe upstream from the archipelago, in the water of Lake Saint-Louis and Lake Saint-François. Of the potential swimming sites studied, the ones in the Boucherville archipelago area have good water quality. However, the sectors affected by the effluent from the Montreal treatment plant, which discharges the treated wastewater from 1.8 million residents without

Figure 1. Bacteriological water quality along the shoreline in the Montreal area, 1999–2001



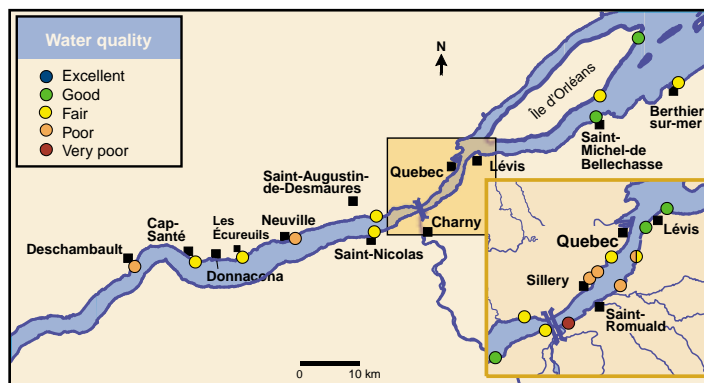
Source: Government of Quebec

Figure 2. Bacteriological water quality along the shoreline in the Lake Saint-Pierre area, 1999–2001



Source: Government of Quebec

Figure 3. Bacteriological water quality along the shoreline in the Quebec City area, 1999–2001



Source: Government of Quebec



Photo: MENY

disinfection, are unfit for swimming and even for other recreational uses such as canoeing. This contamination extends as far as Lake Saint-Pierre and is detectable as far as Bécancour, approximately 125 km downstream from Montreal.

In the section of the St. Lawrence River between the Sorel archipelago and Deschaillons (Figure 2), the data show that the water quality at a number of sites is good or fair, notably at Tracy, Pointe-du-Lac (opposite Nicolet), Port-Saint-François (Nicolet), Bécancour and Trois-Rivières (Saint-Quentin Island). At other locations, however, water quality is poor or very poor. This is the case for the four sites located on the islands of Berthier and Sorel, which are affected by the discharges from the Montreal wastewater treatment plant. The other sites are mainly affected by local sources.

Between Deschaillons and île d'Orléans (Figure 3), the water quality is highly variable depending on the site studied: it is good or fair at the majority of the sites, but poor or very poor at Deschambault, Neuville and Quebec City. In this entire section of the St. Lawrence River, the contamination comes from local sources, mainly sewage overflows during heavy rain.



Photo: Trois-Rivières

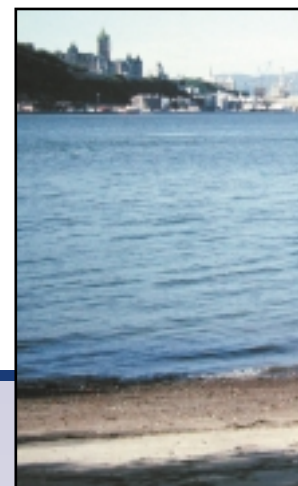


Photo: MENY

KEY VARIABLES

The bacteriological quality of a freshwater site is evaluated by using the geometric mean of the fecal coliform concentrations measured in all the samples taken at this site. Each site is visited at least ten times, and six samples are taken at each visit. The classification system provided below is then used.

- Class A (excellent quality): 0 to 20 fecal coliforms/100 mL
- Class B (good quality): 21 to 100 fecal coliforms/100 mL
- Class C (fair quality): 101 to 200 fecal coliforms/100 mL
- Class D (poor quality): 201 to 1000 fecal coliforms/100 mL
- Class E (very poor quality): more than 1000 fecal coliforms/100 mL

The changes in the annual percentage of sites that fall into the various quality classes as well as the changes in the percentage of days (all sites combined) when the quality criterion for swimming (200 fecal coliforms/100 mL) is met indicates whether the bacteriological quality of the water in the St. Lawrence is improving or deteriorating.

Outlook

Of all the sites characterized since 1999, 15 could be selected as “sentinel” sites for long-term monitoring beginning in the summer of 2003. A new analysis method for *Escherichia coli* was evaluated in 2001. This new method, recommended by the U.S. Environmental Protection Agency, has led us to use, in addition to fecal coliforms, *E. coli* as

an indicator of fecal pollution during the 2002 program. The final choice of the indicator to be used will be made after studying the results. This monitoring should reveal any improvements resulting from the reduction in overflows during heavy rain or the installation of disinfection equipment.



Photo: MENV

To Know More

HÉBERT, S., 2000. *Évaluation de la qualité bactériologique de sites potentiels de baignade dans le Saint-Laurent, été 1999*, ministère de l'Environnement, Québec, Direction du suivi de l'état de l'environnement, 11 pp. and 4 appendices.

HÉBERT, S., 2001. *Évaluation de la qualité bactériologique de sites potentiels de baignade dans le Saint-Laurent, été 2000*, Direction du suivi de l'état de l'environnement, ministère de l'Environnement, Québec, 9 pp. and 3 appendices.

HÉBERT, S., 2002. *Évaluation de la qualité bactériologique de sites potentiels de baignade dans le Saint-Laurent, été 2001*, Direction du suivi de l'état de l'environnement, ministère de l'Environnement, Québec, 9 pp. and 3 appendices.

Prepared by:

Serge Hébert
Direction du suivi de l'état
de l'environnement
Ministère de l'Environnement
du Québec

State of the St. Lawrence Monitoring Program

Four government partners — Environment Canada, the ministère de l'Environnement du Québec, the Société de la faune et des parcs du Québec, and Fisheries and Oceans Canada — are pooling their expertise and efforts to provide Canadians with information on the state of the St. Lawrence and long-term trends affecting it. To this end, environmental indicators have been developed on the basis of data collected

as part of each organization's ongoing environmental monitoring activities. These activities cover the main components of the environment, namely water (quality and quantity), sediments, biological resources (species diversity and condition), uses and, eventually, shorelines.

For additional copies or the complete collection of fact sheets, contact the

St. Lawrence Vision 2000 Coordination Office:

1141 Route de l'Église
P.O. Box 10 100
Sainte-Foy, Québec G1V 4H5
Tel.: (418) 648-3444

The fact sheets and additional information about the program are also available on the Web site: www.slv2000.qc.ca.

Published by Authority of the Minister of the Environment
© Her Majesty the Queen in Right of Canada, 2002
Published by Authority of the Ministre d'État aux Affaires municipales
et à la Métropole, à l'Environnement et à l'Eau du Québec
© Gouvernement du Québec, 2002
Catalogue No: En4-12/2002E
ISBN 0-662-33247-4
Envirodoq: ENV/2002/0347A
Legal deposit – National Library of Canada, 2002
Aussi disponible en français sous le titre: *La salubrité des sites potentiels de baignade en eau douce*