WATER | SEDIMENTS | SHORELINES | BIOLOGICAL RESOURCES | USES

3rd edition

Monitoring Marine Water Quality in Shellfish Areas

Photo: © Martin Rodrigue, Environment Canada

Cap Piailleur, Magdalen Islands

Background

The primary role of Environment Canada's Marine Water Quality Monitoring (MWQM) program is to assess the sanitary conditions in bivalve molluscan shellfish harvesting areas. This is accomplished by conducting sanitary shoreline surveys and measuring levels of fecal coliform bacteria in overlay growing waters in support of the Canadian Shellfish Sanitation Program (CSSP).

When a shellfish bed is contaminated by fecal coliform bacteria, the molluscs living there absorb and concentrate these contaminants. Fecal coliform bacteria have no effect on shellfish survival or growth, but they can render them unfit for human consumption given the close association with pathogenic viruses and bacteria found in sewage. The classification of shellfish growing areas according to their sanitary conditions ensures the health of consumers is protected. Fecal coliform bacteria are indicator organisms used to determine the presence of sewage or fecal matter and thus serve as indicators of unsanitary conditions in the aquatic environment. Consequently, the information collated by the MWQM unit can also be used to track trends in the sanitary quality of the waters along the shores of the Estuary and Gulf of St. Lawrence.

Photo: © Yves Lamontagne, Environment Canada

Anse à Mercier, Lower St.Lawrence

Canada

St. Lawrence Plan
For a Sustainable Development

Québec

This includes such information as the location of shellfish beds, fecal coliform concentrations in water and pollution sources. In Quebec, the monitoring activities under the CSSP take place in the coastal areas stretching from Baie-Sainte-Catherine to Blanc-Sablon, on the North Shore, and along the shores of Lower St. Lawrence and the Gaspé peninsula from Cacouna to Miguasha, as well as in the Magdalen Islands region (Figure 1).

Overview of the Situation

The number of shellfish areas assessed by the MWQM unit in Quebec has grown over the past 22 years, jumping from 10 areas in 1987 to 277 areas in 2009 (Figure 2). Of this number, 129 areas are open to shellfish harvesting, 115 of them are permanently open, with the remaining 14 being open part of the year. However, 148 areas have remained closed[1] due to persistent bacterial contamination (Figure 3).

1. Includes the recommended classification Restricted and Prohibited.

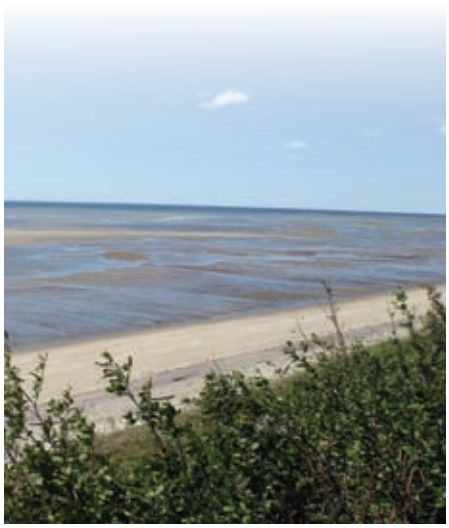


Photo: © Julie Savaria, Environment Canada

Anse de la Grosse Pointe, North Shore

Figure 1 Marine area covered by the MWQM program in Quebec

Between 2005 and 2009, the number of shellfish areas assessed under the program grew from 254 to 277 as shown in Table 1. Although the number of classified shellfish areas increased, the proportion of approved, conditionally approved or closed areas in the territory covered by the program remained stable. The bacterial quality of the waters surrounding the Magdalen Islands and along the North Shore is still better than in the Gaspésie and Lower St. Lawrence regions. Indeed, in the Magdalen Islands, only 14 areas were closed out of a total of 61, whereas 79 areas of a total of 100 were permanently closed in Gaspésie–Lower St Lawrence. These shutdowns are due

Figure 2 Number of MWQM-classified shellfish areas in Quebec, 1987 to 2009

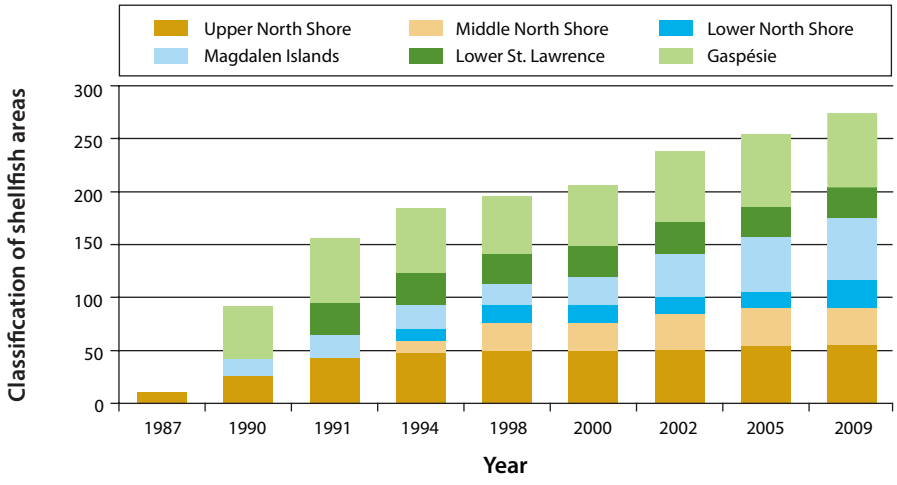
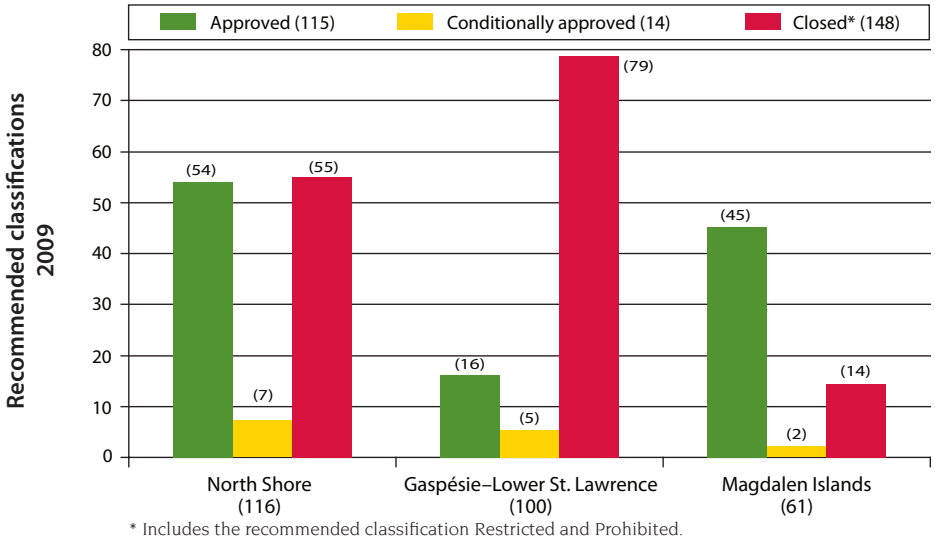


Figure 3 **MWQM classification of Quebec shellfish areas, by region, in 2009**



* Includes the recommended classification Restricted and Prohibited.

Table 1 **Classification of shellfish areas in 1988, 1998, 2002, 2005 and 2009**

		Shellfish areas			
	Region	Approved	Conditionally approved	Closed*	Total
1988	Magdalen Islands	–	–	–	**0**
	Gaspésie–Lower St. Lawrence	4	–	15	**19**
	Côte-Nord	7	–	4	**11**
	Total	**11**	**–**	**19**	**30**
1998	Magdalen Islands	14	2	4	**20**
	Gaspésie–Lower St. Lawrence	7	6	69	**82**
	North Shore	35	11	47	**93**
	Total	**56**	**19**	**120**	**195**
2002	Magdalen Islands	34	3	4	**41**
	Gaspésie–Lower St. Lawrence	5	10	71	**96**
	North Shore	47	7	47	**101**
	Total	**96**	**20**	**122**	**238**
2005	Magdalen Islands	40	3	8	**51**
	Gaspésie–Lower St. Lawrence	15	11	71	**97**
	North Shore	48	7	51	**106**
	Total	**103**	**21**	**130**	**254**
2009	Magdalen Islands	45	2	14	**61**
	Gaspésie–Lower St. Lawrence	16	5	79	**100**
	North Shore	54	7	55	**116**
	Total	**115**	**14**	**148**	**277**

* Includes the recommended classification Restricted and Prohibited.

in large part to the lack of adequate wastewater treatment systems, storm-sewer overflows, and poorly maintained or obsolete septic tanks and cesspools near the shoreline, not to mention the inappropriate farming practices of some municipalities.

Since 1992, the staff of the MWQM have worked in cooperation with local and government partners to revitalize access to some 53[2] closed and potentially resource-rich shellfish areas (Figure 4). These areas were selected as indicators to measure changes in water quality along the shoreline of the Estuary and Gulf of St. Lawrence. Of these 53 areas, 23 are located in the Gaspé–Lower St. Lawrence region, 23 are on the North Shore, and 7 are in the Magdalen Islands.

Riverside municipalities in 14 out of the 53 identified areas have introduced or upgraded existing wastewater treatment systems and the water quality has been vastly improved. These efforts aside, only one shellfish area, located on the North Shore, was reopened to harvesting in 2004 due to improved water quality. Municipal wastewater overflows and contaminant loads from neglected septic systems on isolated properties continue to be sources of contamination that limit shellfish harvesting opportunities along the Quebec coast. However, two shellfish areas in the Magdalen Islands were reopened in 2005 and 2007 following the remediation of private wastewater treatment systems.

2. The number of shellfish areas to be recovered grew from 49 to 53 between 2005 and 2009 due to the subdivision of these areas. The surface area involved did not change.

Figure 4 Location map of 53 closed shellfish areas deemed a priority for reopening to shellfish harvesting

Outlook

The CSSP is a federal program, led by the Canadian Food Inspection Agency with support from Fisheries and Oceans Canada and Environment Canada, whose purpose is to provide reasonable assurance that shellfish are safe for consumption.

The Canadian Food Inspection Agency (www.inspection.gc.ca) is the lead agency for the overall CSSP coordination and liaison with foreign governments on matters relevant to shellfish sanitation. The Canadian Food Inspection Agency also controls the quality of shellfish destined for export or import and monitors marine biotoxins in shellfish.

The role of Environment Canada (www.ec.gc.ca) is to conduct sanitary surveys to evaluate pollution sources and assess the bacterial water quality in shellfish harvesting areas. Environment Canada recommends the opening or closure of these areas to Fisheries and Oceans Canada.

Fisheries and Oceans Canada (www.dfo-mpo.gc.ca) has the legal authority to open or close shellfish growing areas under the authority of the Fisheries Act and also conducts surveillance monitoring of closed areas.

Water contamination from municipal sewage overflows, faulty septic tanks and cesspools is the primary cause of shellfish area closures in Quebec.

In a bid to better disseminate the information generated by the CSSP, a website (www.mollusca.gc.ca) was launched in 2004 featuring an interactive map that provides real-time data on the classification of shellfish growing areas in Quebec (Figure 5).

Figure 5 CSSP website for the general public (www.mollusca.gc.ca)

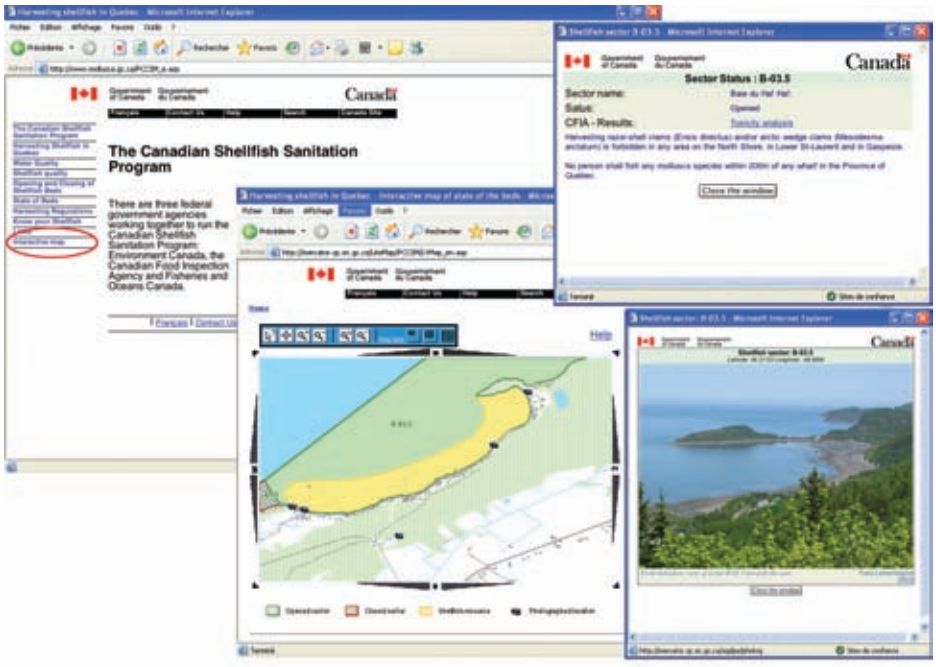


Photo: © Martin Rodrigue, Environment Canada

Rivière Nouvelle, Gaspésie

KEY VARIABLES

Shellfish growing areas may be classified as Approved, Conditionally Approved, Restricted, Conditionally Restricted and Prohibited on the basis of bacteriological water quality and the presence of actual or potential pollution sources. In order to be classified as Approved for harvesting, a shellfish area must meet all of the following requirements:

a) the area must not be contaminated with fecal matter or deleterious or poisonous substances to the extent that consumption of shellfish might be a health hazard;

b) the median value at each station may not exceed 14 fecal coliforms per 100 mL of water;

c) no more than 10% of the samples at each station exceed 43 fecal coliforms per 100 mL;

d) in case of paralytic shellfish poisoning (PSP),[3] toxin levels may not exceed 80 µg/100 g of shellfish meat, and no other shellfish neurotoxin may be detected.

When these standards are not respected, an area is classified as Restricted or Prohibited. Some areas are closed to harvesting only during specific periods, when pollution levels are known to increase (e. g. during heavy rainfall events or the summer; near campgrounds, small farms, cattle ranches); the area is thus classified as Conditionally Approved or Conditionally Restricted, depending on the level of contamination.

3. Monitored by the Canadian Food Inspection Agency.

Photo : © Yves Lamontagne, Environnement Canada

Municipal wastewater discharges

Photo: © Yves Lamontagne, Environment Canada

Baie-Sainte-Catherine, Charlevoix

To Know More

CANADIAN FOOD INSPECTION AGENCY. 2010. Website of the Canadian Shellfish Sanitation Program (CSSP): www.inspection.gc.ca/english/fssa/fispoi/csspccsme.shtml

ENVIRONMENT CANADA. 2010. Website of the Marine Water Quality Monitoring (MWQM) program: www.ec.gc.ca/marine/default.asp?lang=En

GOVERNMENT OF CANADA. 2006. Website of the Canadian Shellfish Sanitation Program (CSSP) serving the general public: www.mollusca.gc.ca

GOVERNMENT OF CANADA. 2004. *Harvesting Shellfish in Quebec*. Fact sheet. Fisheries and Oceans Canada, Environment Canada and Canadian Food Inspection Agency.

SCIENCE AND TECHNOLOGY BRANCH. 2007. *Marine Water Quality Monitoring: Protecting Public Health*. Fact sheet. Environment Canada, Montréal.

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State of the St. Lawrence Monitoring Program

Under 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, Fisheries and Oceans Canada, the Ministère des Ressources naturelles et de la Faune du Québec, the Canadian Space Agency, and the Parks Canada Agency—together with Stratégies Saint-Laurent, a non-governmental organization that works actively with riverside communities, are pooling their expertise to provide Canadians with information on the state of the St. Lawrence River at regular intervals.

To obtain the fact sheets and additional information about the State of the St. Lawrence Monitoring Program, please visit our website at:

www.planstlaurent.qc.ca

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