

## Day One - Track One

Wednesday, March 22<sup>nd</sup>, 2017

9:30 a.m. – 10:00 a.m.

## LID Measures for Water Supply Source Protection: The Case of Quebec City and St-Charles Lake

**Presenter:** Gilles Rivard, Lasalle/NHC

### Biography



Gilles has 34 years of experience in civil engineering in the fields of hydrological studies, urban networks and water resources. In the last twenty years, he has specialized in storm water management, has written a book for storm water management concepts (1998) and is the author of the Quebec provincial guide on storm water management. He is now with Lasalle-NHC, as Vice-President, Urban Hydrology. He is also actively involved at the national level, being the President of the Quebec Branches of CWRA and of IECA, and at the international level, being since 2002 the Chairman of the SOCOMA (Source Control Management), which is part of the international Joint Committee on Urban Drainage (IWA/IAHR).

### Abstract

Lake Saint-Charles is the largest source of water supply for the population of Quebec City, with an intake being located since 1854 on the St-Charles River, 11 km downstream the outlet of the Lake. The intake supplies raw water to the main treatment plant that produces potable water for about 300 000 persons. Due to its critical importance, the water quality in Lake St-Charles is therefore carefully monitored and it has been observed in recent years that the pressures from development and human activities in the watershed had increasingly negative impacts on the water quality. Concluding that this situation necessitated a concerted action plan to reverse the trend, the Association for the Protection of the Environment of Lake St-Charles (APEL) and Quebec City (with its Environmental and Engineering Planning Services) developed a global plan that should decrease the pollutant inputs to the lake and therefore maintain its water quality to the highest level.

One of the main action item of the plan was to pass bylaws regulation to control urban development within the global watershed and hydrographic system draining water towards Lake St-Charles. This has proven difficult as the watershed areas include territories from different municipalities. Another one, which is the main topic of this presentation, is the retrofit of creeks and ditches around Lake St-Charles with Low Impact Development (LID) measures to minimize the runoff volume and input of pollutants. Many different options for retrofitting were reviewed and

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extensively discussed with representatives of different services within Quebec City (Engineering, Environment, Public Works) to ensure that the different solutions were deemed optimal not only for control objectives but also for long-term maintenance and performance.

The presentation will first present results of monitoring in recent years to put the project into a more global context. The bylaw and regulation, with the encountered institutional difficulties, will then be briefly discussed. The actual project of retrofitting ditches with bioretention swales and other LID measures will then be presented. Each major input to the lake was modeled and analyzed to provide the necessary inputs for a preliminary design. One of the retrofit, which has been completed during 2016, will finally be discussed.

## **Learning Objectives**

1. Review of the potential impacts of stormwater runoff on the water quality of lakes and water supply sources;
2. Discussion of difficulties and barriers to implement watershed regulation to protect water supply sources; and
3. Evaluation of potential benefits of LID measures to maintain water quality and key elements to consider for successful implementation.