

EFFECT OF WATER-LEVEL FLUCTUATIONS ON TRIBUTARIES OF THE ST. LAWRENCE RIVER: A PERSPECTIVE ON SUSTAINABLE DEVELOPMENT



PROJECT LENGTH

3 years • Completed in 2007

Information:

projet@ouranos.ca

514 282-6464

www.ouranos.ca

CONTEXT

At a time when climate change is expected to have a major impact on the water levels of the St. Lawrence River, it would seem important to study the sequence of adjustments that will occur on its tributaries and predict the associated repercussions for the river. Decreased water levels of from 0.5 to 1 metre, as well as changes to the tributaries' flow regime, have been predicted. Recent observations show that a 50-cm reduction in the water levels of the St. Lawrence would be accompanied by significant amounts of sediment. The local impact of such sedimentary input is critical for the river's dynamics and ecology.

OBJECTIVE

The project will make it possible to estimate the river's sediment supply and target the most sensitive and at-risk areas. An assessment of the effects on human infrastructures and riparian habitats is one of the expected results of the research.

PROJECT OVERVIEW

The project used a modelling approach to assess the sensitivity of tributaries to declines in water levels and determine impacts on the river. The study combined a field-mapping approach with a sediment-transport model adjusted for conditions specific to St. Lawrence Lowlands waterways.

RESULTS

- A new hydraulic, bathymetric, hydrological, sedimentological and suspension-load database on five tributaries of the St. Lawrence (the Richelieu, Saint-François, Yamachiche, Saint-Maurice and Batiscan rivers) was created.
- Tributary sediment input was estimated for the last 200 years based on changes in two deltas.
- A model for estimating adjustments in the longitudinal profile of the tributaries in response to fluctuations in base levels and flow-rate changes was developed.
- Simulations based on potential flow-regime and water-level fluctuation scenarios in the context of climate change, as well as estimates of sediment input from the tributaries to the river for the 2010 – 2099 period, were established.
- Tributary vulnerability to changes in the river's base level and flow regime was assessed.

For more details, see:

www.geog.umontreal.ca/hydro/TributairesSt-Laurent/. [In French]

IMPACT

The project was associated with the needs of partners looking to understand how the river will adjust to this new context, as well as those of users (more particularly, riverside populations, who will have major decisions to make if there are effects to be offset).

PARTNERS

- Université de Montréal
- Concordia University
- Université du Québec à Montréal (UQAM)
- Ouranos
- Environment Canada
- Hydro-Québec

FUNDING

- Natural Sciences and Engineering Research Council of Canada (NSERC) – Strategic
- Ouranos

TEAM

Lead Researcher

André Roy

Université de Montréal

Associate Researchers

Michel Lamothe

Université du Québec à Montréal

Pascale Biron

Concordia University

Claudine Boyer

Université de Montréal

(Project Manager)

Isabelle Charron

Université de Montréal

(Postdoctoral researcher)

Jean Morin

Environment Canada

René Roy

Hydro-Québec

External contributors

Rob Ferguson

University of Durham,

Department of Geography

Trevor Hoey

University of Glasgow,

Geography and Geomatics