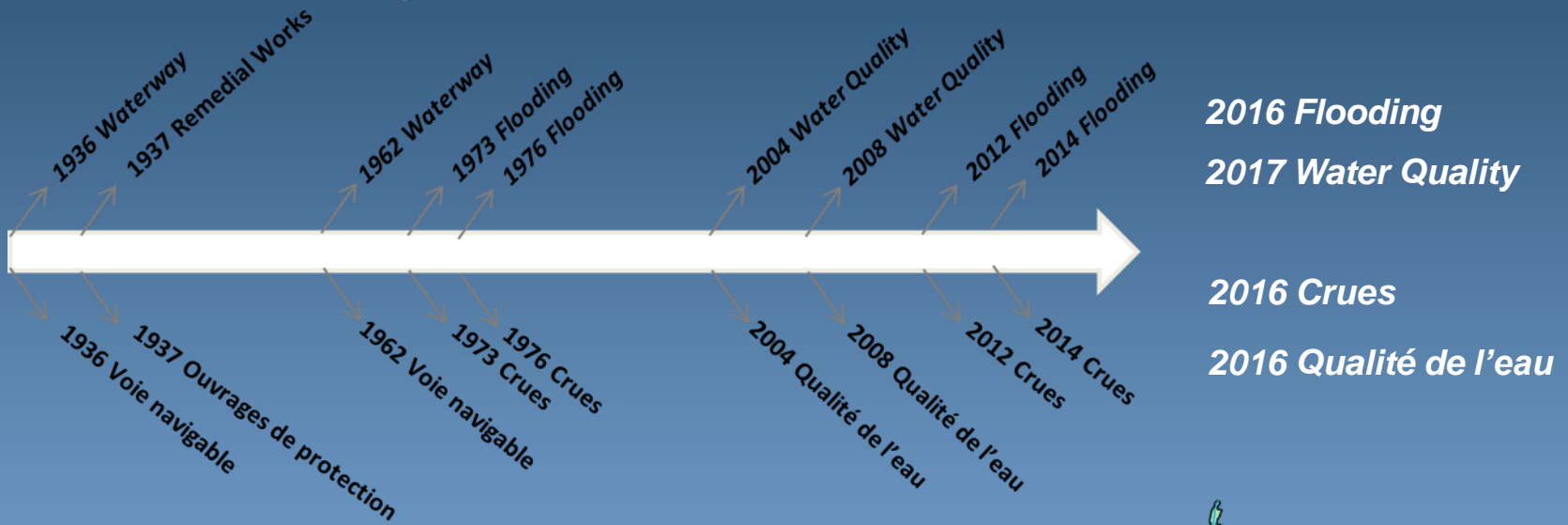


International Joint Commission

Flooding Reference

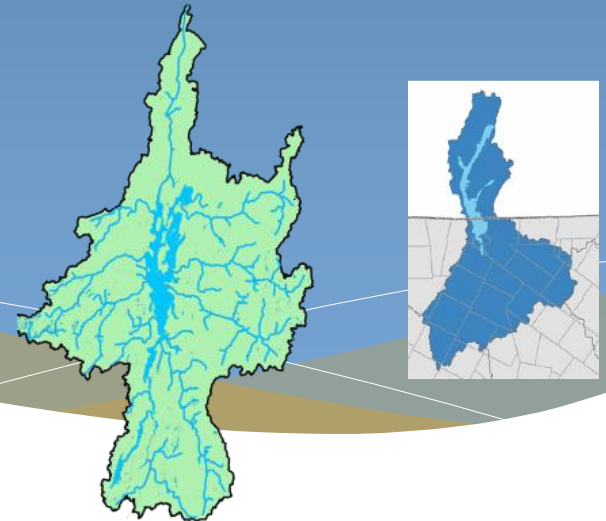
Water Quality Reference



Michael Laitta, IJC US Section
Pierre-Yves Caux, IJC Canadian Section
Glenn Benoy, IJC Canadian Section



**BREE PTAC Meeting
November 28, 2017**

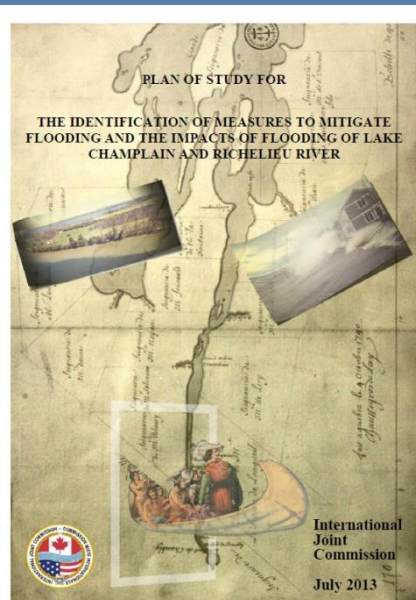


The IJC Reference in Response to the 2011 Flooding Event



- 4,000 Homes Damaged
- ± \$90 Million in damages
 - 79% in QC
 - 11% in NY and VT
- > 30 Municipalities directly affected
- Long history of IJC involvement

Subsequent to the 2011 Flooding



- 2013 Plan of Study providing 3 options for future work
- 2015 Reference calling for the establishment of a **Technical Working Group** with the purpose of:

- Improving flood forecasting
- Modeled the lake and upper Richelieu River
- Produced initial static inundation maps



International Joint Commission



A Real-Time Flood Forecasting and Flood Inundation Mapping System for the Lake Champlain-Richelieu River Watershed

December, 2015

2015 Technical Working Group



Cartographie statique des plaines inondables du lac Champlain et de la rivière Richelieu...

Static flood inundation mapping for Lake Champlain and Richelieu River

No issues detected x

Edit x

Commission mixte internationale (CMI)   



- Disclaimer
- Sommaire
- Rapport
- Report
- Scénario 1
- Scénario 2
- Scénario 3
- Scénario 4
- Scénario 5
- Scénario 6
- Scénario 7
- Scénario 8
- Scénario 9
- Scénario 10
- Scénario 11
- Compare (m)
- Compare (ft)

Scénario 7:

Débit de 1539 m³/s et niveau d'eau à Rouses Point de 31.32 m (NAVD88)

Scénario 7

Limite de la zone inondée

Profondeurs d'eau mètres

- < -0.2 | <-0.65 ft
- 0.2 m - 0.2 m | -0.65 ft - 0.64 ft
- 0.2 m - 0.4 m | 0.64 ft - 1.3 ft
- 0.4 m - 0.6 m | 1.3 ft - 1.9 ft
- 0.6 m - 0.8 m | 1.9 ft - 2.6 ft
- 0.8 m - 1.0 m | 2.6 ft - 3.2 ft
- 1.0 m - 1.2 m | 3.2 ft - 3.9 ft
- 1.2 m - 1.4 m | 3.9 ft - 4.6 ft
- 1.4 m - 1.6 m | 4.6 ft - 5.2 ft
- 1.6 m - 1.8 m | 5.2 ft - 5.9 ft
- 1.8 m - 2.0 m | 5.9 ft - 6.5 ft
- 2.0 m < | 6.5 ft <

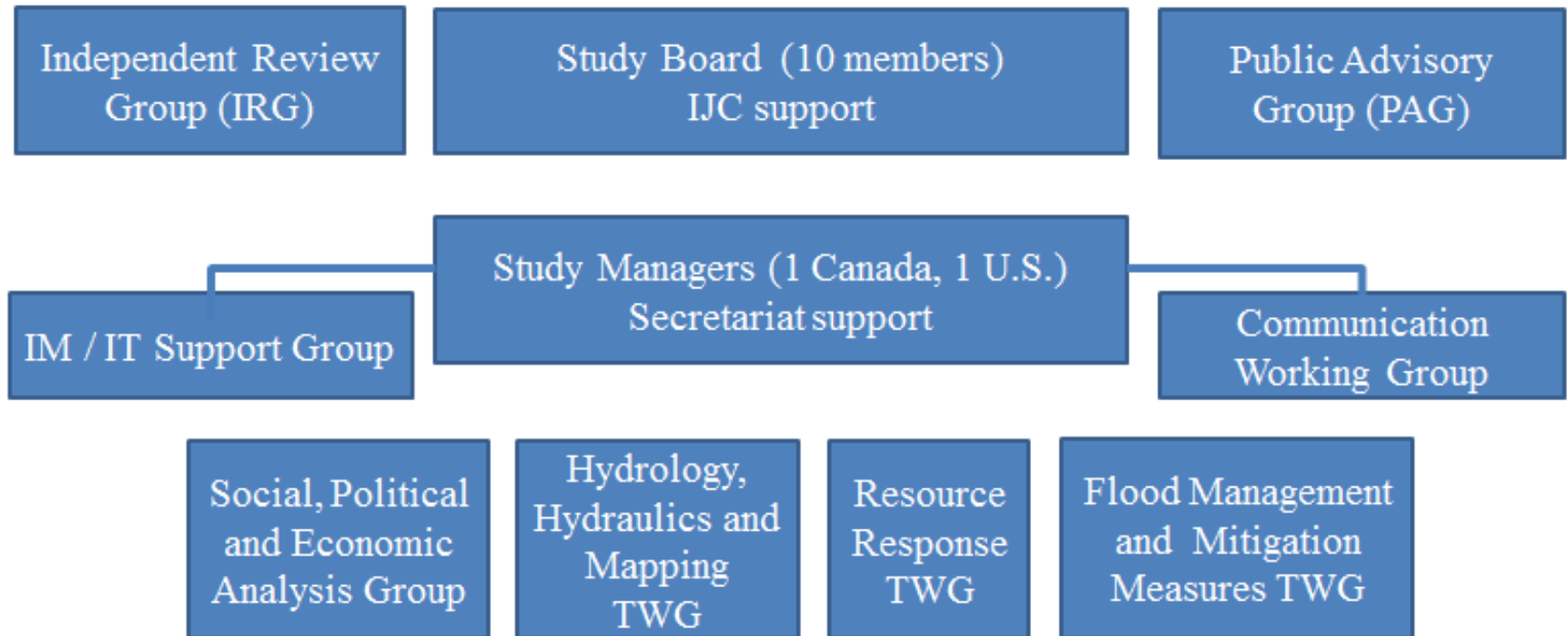


2016 Reference and Directive



- September 2016 – Reference to IJC
 - To complete Option B of the 2013 Plan of Study
 - To explore causes, impacts, and risks
 - Investigate possible solutions to flooding in the LCRR
 - To create an operational flood forecasting and mapping tools.
- 2016 IJC Directive to the ***International Lake Champlain – Richelieu River Study Board***

Governance Structure of the International Lake Champlain – Richelieu River Study Board



Study Components of the 2016 Reference



1. Evaluating the causes and impacts of past floods, especially the event of 2011
2. Assessing the possibilities offered by floodplain best management practices
3. Evaluating possible adaptation strategies based on expected future variability regarding water supplies.
4. Developing and making recommendations for implementing, as appropriate, an operational, real-time flood forecasting and flood inundation mapping system for the Lake Champlain-Richelieu River watershed.

Study Components of the 2016 Reference Continued



5. Conducting an in-depth study of current social and political perception on structural and other mitigation measures to support and confirm the desirability of potential structural mitigation solutions.
6. Performing a quantitative and qualitative assessment of potential flood management and mitigation measures (non-structural and/or moderate structural works) and their impacts on important resources of the system: (the wetland and fauna, recreational, domestic, industrial and municipal uses of water, shoreline and floodplain built environment and agriculture)
7. Developing resource response models that include basic indicators for water resources response to water levels fluctuations, with special attention on the data inventory and identification of thresholds. Climatic projections, wind wave and ice models, additional new data for the evolution of watershed physiographic characteristics over time and a complete digital terrain model should be produced to allow the planning, evaluation and ranking of potential flood mitigation solutions, using a shared-vision approach (decision-support tool).

Activities to-date



Burlington Vermont – June 11



St-Jean-sur-Richelieu – June 12



Plattsburgh, New York – June 13



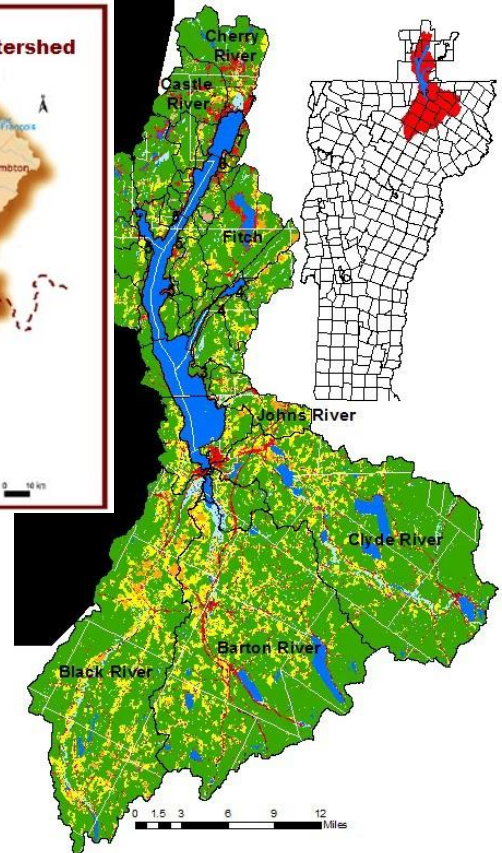
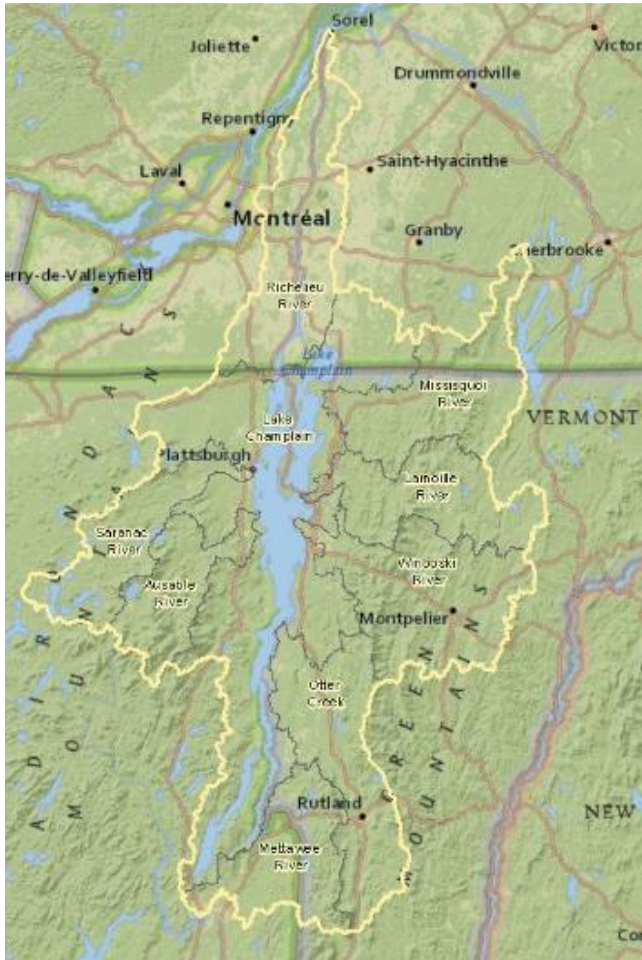
ILCRRSB Technical Workshop



**Burlington Vermont,
August 2017**

2017 Water Quality Reference

International Champlain-Richelieu-Memphremagog Study (ICRMS)



How the flooding reference can benefit the water quality reference



- Build upon existing technical collaborations
- Capitalize on data and information sharing
- Recycle model components
- Utilize established public engagement forums

Reference Requests of the IJC

Missisquoi Bay, Lake Champlain and the Richelieu River



1. Relevant to the reduction of nutrient loading and the causes of harmful algal blooms in Missisquoi Bay and the broader Lake Champlain and Richelieu River, ***gather and review information*** from federal, provincial, state and municipal agencies, academic institutions, and other entities in the region on existing monitoring programs and measures being taken to address the aforementioned water quality concerns.
2. Based on the information collected, provide recommendations on how ***current efforts can be strengthened*** (e.g., summarizing gaps or opportunities, identifying possible approaches to strengthen collaboration, efficiency, or impact).

Reference Requests of the IJC

Missisquoi Bay, Lake Champlain and the Richelieu River



Phosphorus TMDLs for Vermont Segments of Lake Champlain

June 17, 2016

U.S. Environmental Protection Agency
Region 1, New England
Boston, MA

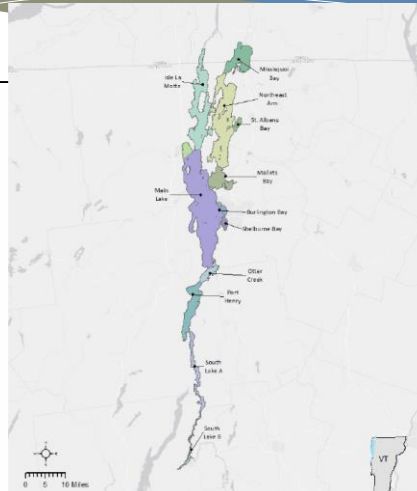


Figure 1: Lake Champlain's Vermont Phosphorus TMDLs
Data Source: EPA, Ten'Ponds

PLAN DIRECTEUR DE L'EAU
BASSIN VERSANT DE LA BAIE MISSISQUOI

Diagnostic

2015



2017-11-29

Reference Requests of the IJC

Lake Memphremagog



3. In collaboration with relevant government agencies, academic institutions and other entities in the region, identify the range of nutrient loading issues that are of concern in the Lake Memphremagog basin and make recommendations on how current efforts can be strengthened, including consideration of management approaches being take for Lake Champlain and Missisquoi Bay that may be applicable.

Reference Requests of the IJC Lake Memphremagog



LAKE
MEMPHREMAGOG
PHOSPHORUS TOTAL
MAXIMUM DAILY
LOAD

Approved: EPA Region 1, September 28, 2017
Vermont Department of Environmental Conservation

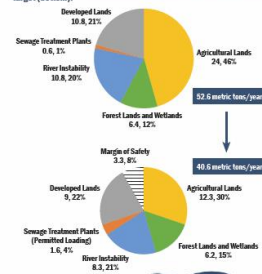
September
2017

Restoring Lake Memphremagog

Phosphorus pollution threatens clean water in Lake Memphremagog and throughout the watershed.

Sources of phosphorus pollution include runoff and erosion from farmland, barnyards, construction sites, parking lots, roads and other developed areas, unstable stream channels, and logging roads. Excess phosphorus contributes to occasional cyanobacteria or blue-green algae blooms, and supports increased plant and algae growth that can limit recreational use. Clean water is critical to our economy, health, and quality of life.

Phosphorus pollution sources by land use in the Vermont portion of the Memphremagog Watershed (top) and the Memphremagog TMDL target (bottom).



A Commitment to Clean Water

	Vermont	Quebec
Lake Area	27%	73%
Watershed Area	71%	29%

Land Use	Watershed Area
Developed Lands	6%
Agricultural Lands	17%
Forest Lands and Wetlands	77%

To achieve clean water we must meet new phosphorus pollution limits.

In September 2017 the US Environmental Protection Agency approved new phosphorus pollution limits (or Total Maximum Daily Load—TMDL) for Lake Memphremagog. The Lake Memphremagog, Coaticook and Tomiobia Rivers Basin Plan identifies specific pollution reduction actions to implement.

All in—we are all part of the solution.

Whether you are a landowner, farmer, municipal official, developer, or logger, as Vermonters, we all have a responsibility to ensure a legacy of clean water for this and future generations. Our efforts to achieve clean water require a long-term commitment.



Memphrémagog Conservation

We welcome your comments and questions regarding these IJC references...

Champlain-Richelieu flooding reference	Pierre-Yves Caux (Canadian Section)
	Michael Laitta (US Section)
Champlain-Memphremagog water quality reference	Glenn Benoy (Canadian Section)
	Michael Laitta (US Section)

