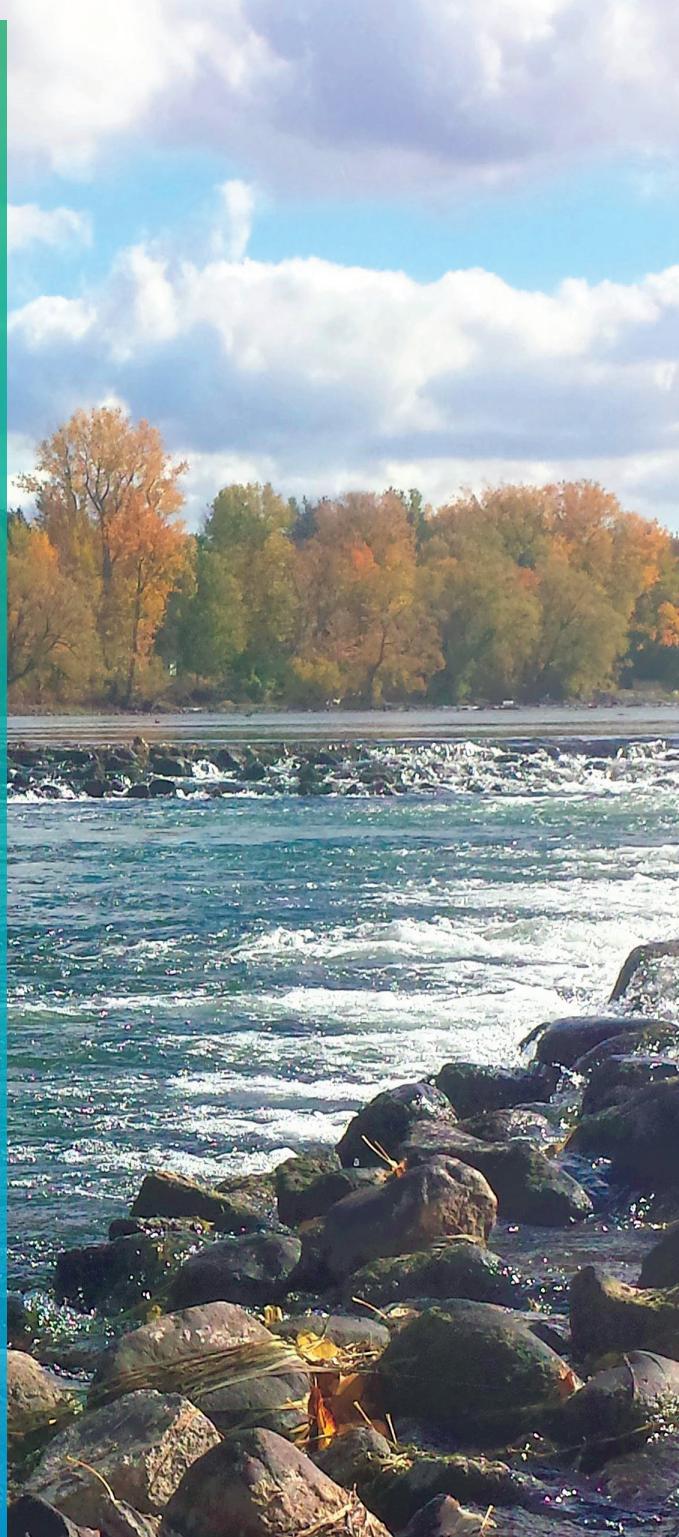




*International*  
**Lake Champlain**  
**- Richelieu River**  
**Study**

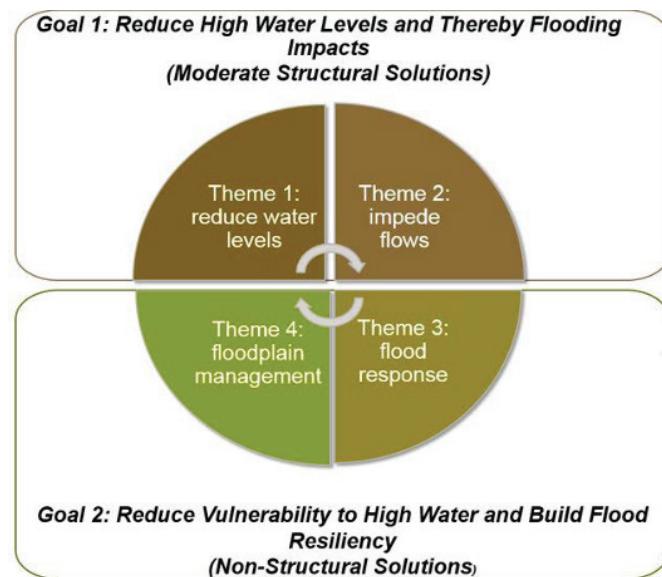
# POTENTIAL STRUCTURAL SOLUTIONS TO MITIGATE FLOODING IN THE LAKE CHAMPLAIN-RICHELIEU RIVER BASIN

Flood Management and  
Mitigation Measures  
Technical Working Group  
and Hydrology, Hydraulics  
and Mapping Technical  
Working Group



# SUMMARY OF POTENTIAL STRUCTURAL SOLUTIONS REPORT

The International Lake Champlain-Richelieu River Study Board is pleased to release its report *Potential Structural Solutions to Mitigate Flooding in the Lake Champlain-Richelieu River Basin*. This report is one of several undertaken by the Study focusing on a range of structural and non-structural solutions to flooding in the basin. The Study's efforts to develop solutions are centred around four themes: reducing high-water levels in extreme flood scenarios; impeding flows; improving flood response (flood forecasting and emergency preparedness) and enhancing floodplain management.

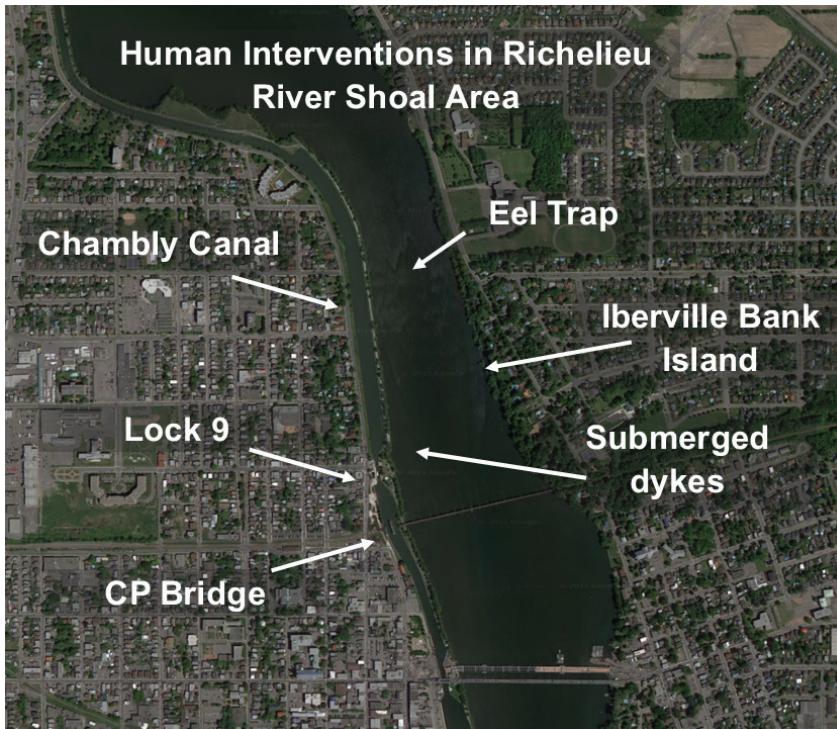


The Study Board was directed by the U.S. and Canadian Governments to investigate "moderate structural works" to address flooding. Study experts identified and evaluated a wide range of structural solutions to reduce extreme water levels

in the Lake Champlain-Richelieu River basin. The structural alternatives that were considered by the Study include potential solutions from the 1973 International Joint Commission reference study, ideas provided by stakeholders during the current study, and potential solutions identified from a literature scan.

Using various models, tools and indicators developed during the study, experts assessed potential alternatives in terms of their effectiveness to reduce extremely high water levels. The alternatives considered to be promising by the Study were as follows:

1. Excavation of man-made structures on the Saint-Jean-sur-Richelieu shoal (eel trap, submerged dikes)
2. Diversion of flood water through the Champlain Canal
3. A combination of Alternatives 1 and 2
4. Installing a fixed weir 11 km upstream of Saint-Jean-sur-Richelieu and dredging the channel at Saint-Jean-sur-Richelieu
5. Installing an inflatable weir or bladder 11 km upstream of Saint-Jean-sur-Richelieu and channel dredging at Saint-Jean-sur-Richelieu
6. Installing an inflatable weir or bladder at the Saint-Jean-sur-Richelieu shoal and channel dredging at Saint-Jean-sur-Richelieu



The information compiled on each alternative in spring 2020 and a set of analysis criteria were used to determine which alternatives warranted a more comprehensive analysis, considering resources and time available before the completion of the Study. The analysis criteria applied are that the alternatives were:

1. Within the scope and mandate of the Study
2. Implementable
3. Technically viable
4. Economically viable
5. Equitable and fair
6. Environmentally sound
7. Robust to the pressures of climate change.

The Study Board deliberated the implications of implementing each of the alternatives, including their utility, effectiveness in reducing floods, potential impact on drought levels, number of residential buildings that would be spared from flooding, and certain economic and environmental considerations.

The Study Board concluded that Alternatives 4, 5 and 6 (installing an inflatable or fixed weir) did not fall within the governments' scope of "moderate structural solutions",





*The Chambly Canal alongside the Richelieu River*

as they involved the damming of the river with significant effect on its flow and the surrounding environment. Thus, the Study Board determined that no further resources should be committed to assessing these options.

The Study Board identified the diversion of water through the Chambly Canal as the most promising structural solution as it has the potential to provide significant flood relief, negligible risk of exacerbating low water levels, and potentially limited environmental implications. However, this measure appears costly and additional information regarding flood relief and expected future water supplies scenarios is being obtained to complete the analysis.

Alternatives 1 and 3, involving the excavation of structures in the river, were less appealing to the Study Board, as they would result in permanent water level lowering. This could be problematic if climate change reduces overall water supplies in the basin, as some early climate work by Study scientists predicts. A separate Study report will be produced on this subject. Alternatives 1 and 3 are still in consideration pending the results of an

in-depth evaluation of the diversion of water through the Chambly Canal, Alternative 2.

The Study Board has directed its technical working groups to continue the analysis of the Chambly Canal diversion (Alternative 2), to explore implementation and operation cost estimates, economical viability, and to explore various potential operating plans and assess associated environmental, economic, and social impacts and benefits. The appropriate hydraulic simulations, evaluations, and a benefit/cost analysis are still being done by the Study Board and Study scientists are working closely with Parks Canada, as required, to further evaluate modifying the Chambly Canal as a potentially acceptable diversion scheme.

The Study Board will be releasing other reports on potential structural and non-structural flood mitigation measures in the Lake Champlain – Richelieu River basin over the coming months.

**The full report can be found on the LCRR website**