

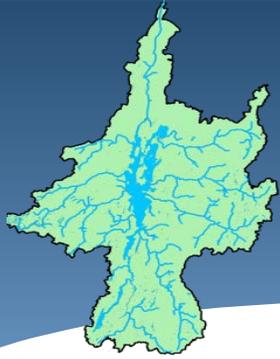
Floodplain Management Considerations

December 16, 2020

10 am (English) - Ted R Yuzyk

2 pm (French) - Andre Champoux

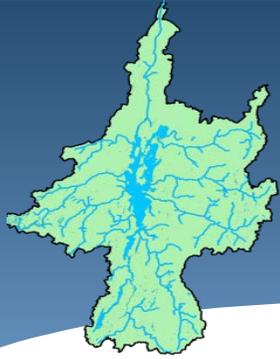




Outline

- Lake Champlain-Richelieu River Study Context
- What is floodplain management?
- Why moving everyone out of the floodplain has it challenges.
- Study's strategy for improving future floodplain management.
- We are a study with limited authority.
- The past: How has the floodplain been managed in the basin over the last 40 years?
- The future: Floodplain management changes that are coming.
- Alternatives the Study will be exploring.





Study Flood Mitigation Strategy

- Study focusing on four key mitigation themes, of which floodplain management is one.
- Work is more advanced on other themes.
- Workshop of experts and floodplain managers was organized to determine how the Study should address Theme 4.

**Goal 1: Reduce High Water Levels and Thereby Flooding Impacts
(Moderate Structural Solutions)**

Theme 1:
reduce
water
levels

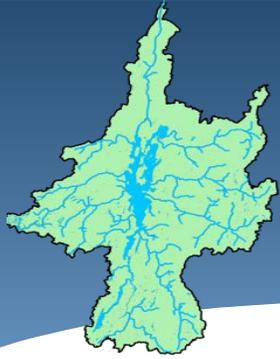
Theme 2:
upstream
storage

Theme 4:
floodplain
management

Theme 3:
flood
response

**Goal 2: Reduce Vulnerability to High Water and Build Flood Resiliency
(Non-Structural Solutions)**

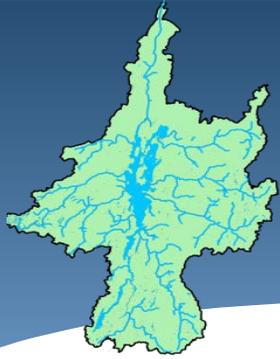




Flood Mitigation Decision-making

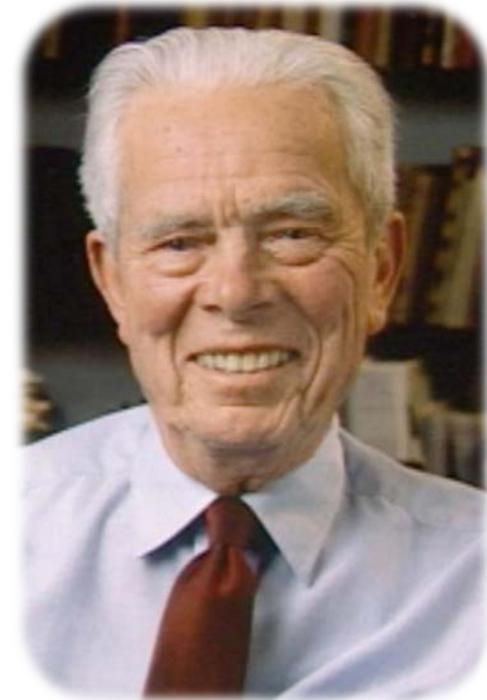
- 2011 flood triggered the five-year binational study that was initiated in 2016. The focus being on identifying mitigation solutions to address flooding.
- Next steps:
 - The study is responsible for providing its recommendations to the International Joint Commission (IJC).
 - The IJC will take this information and then advise the two governments.
 - If the governments agree to (any) recommendations, then they will work with the appropriate jurisdictions to implement.

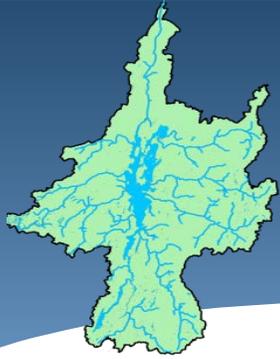




What is Floodplain Management?

- "Floods are 'acts of God,' but flood losses are largely acts of man" Gilbert White, 1942.
- White is considered the father of floodplain management and his ideas led to the flood insurance and floodplain management policies fifty years ago in the U.S.
- Floodplain management is the coordinated long-term effort to establish floodplain uses that satisfactorily accommodate the risk of flooding.

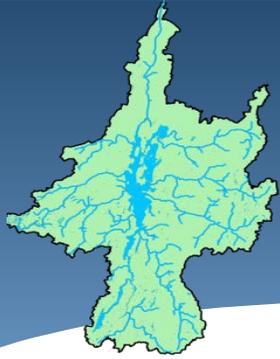




Floodplain Management Alternatives

POLICY TOOL	OBJECTIVE
flood risk mapping	raise public awareness of flood risk; support informed decision-making
public education and engagement	raise awareness of flood risk; share responsibility for flood risk management; motivate property-level protection
real estate disclosure	make flood risk transparent; protect property buyers
insurance	engage private recovery resources; reduce burden on public treasury; signal flood risk to property-owners
protection levy (i.e.,tax)	raise revenue for flood risk management; communicate regular reminder of flood risk
retrofit incentives	encourage property-owners to retrofit
property buyouts	reduce exposure to flood hazards and restore natural flood protection
land use regulation	prevent new flood risk; control use of existing properties to minimize exposure and vulnerability
enhanced emergency management	mitigate flood risk and prepare for effective response and recovery
watershed management agencies	empower special purpose body at watershed scale to regulate flood prone lands and manage flood risk



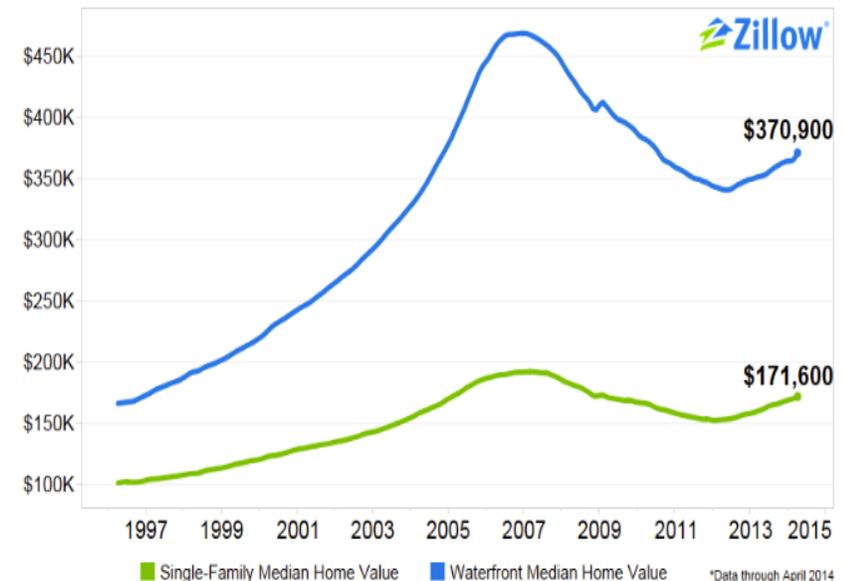


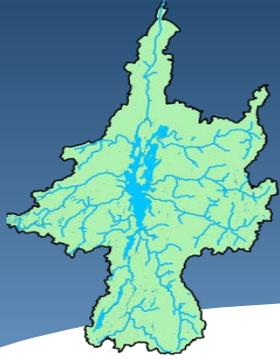
Why Moving Everyone out of the Floodplain is Challenging

- "Flooding is the most common and widespread disaster we face nationally, and **the one that is the easiest to alleviate by effective planning**," Richard Yuretich, a director of NSF's Dynamics of Coupled Natural and Human Systems program.
- Flooding is a very difficult problem to eliminate in reality because people want to inhabit the floodplain.
- Waterfront homes are worth significantly more, an indication of the value of living in the floodplain when it's not flooding, which is most of the time.
- Relocation offers are often not compelling for residents.



How have waterfront home values fared over time?

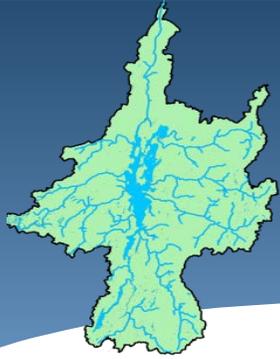




Study Strategy for Better Floodplain Management

- Show how much has and can be done:
 - Document the success of floodplain management since the 1970s.
 - Identify and characterize residual risks.
 - Consider how new QC and U.S. policies can further reduce these residual risks.
- Collaborate on the recommendations coming from the Floodplain Risk Management workshop:
 - Develop white papers on those recommendations.
 - Show what we've learned about mapping risk.
 - Formulate an insurance driven management regime.
 - Show how the other three themes impact floodplain management (Theme 4).



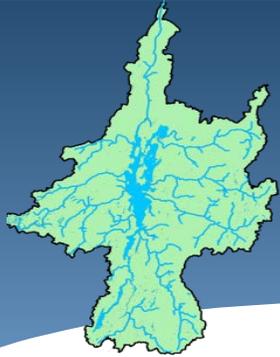


The Study's Contribution

- The Study is investing millions \$ in:
 - Collecting essential data.
 - Hydrologic and hydraulic modelling.
 - Integrated Social Economic and Environment System.
 - State-of-the-art flood forecasting and mapping.
 - Climate change research.
- Study provides credible scientific information and advice for making sound decisions.
- Study legacy will be the data, tools and knowledge it has compiled and in the way we frame the challenge and formulate alternatives.



Quebec and U.S. floodplain Management since 1976



- 1976 Romeo LeBlanc Canadian Minister of the Environment and Jean Cournoyer, Quebec's Minister of Natural Resources sign an agreement to reduce development in the floodplain, reducing pressure to build the six-gated proposed structure.

Vt. Environmentalists Welcome Reduced Flood Plain Development

By FREDERICK W. STETSON

Free Press Staff Writer

The province of Quebec and the Canadian federal government have signed an agreement designed to reduce development in flood plains such as the Richelieu River basin.

This step has been supported by Vermont environmentalists who favor such constraints in lieu of a flood control structure that has been proposed for the river, Lake Champlain's northern outlet.

Although the agreement will not prohibit development by municipalities or private interests, a spokesman said, it is a step forward in Canada's nationwide effort to reduce development in flood prone areas.

The Richelieu, swelled by record levels in Lake Champlain, has been the scene of extensive spring flooding in recent years, a development that has intensified pressure for a flood control dam.

The Canada-Quebec agreement was signed Monday by Romeo LeBlanc, Canada's

Minister of the Environment, said Harry Rosenberg, chief of the socio-economic division, Environment Canada.

Rosenberg, who is also co-chairman of a board studying the flood control proposals for the International Joint Commission, said the agreement provides \$5 million to identify and map flood risk areas, and prohibits federal or provincial spending in these areas.

Furthermore, he said, the agreement prohibits federal agencies, such as housing authorities, to give financial backing or federal guarantees for projects in flood prone areas. The areas are to be identified in a five-year mapping project.

He said local municipalities and private interests will not be prohibited from developing in flood plains, as zoning against such projects is a local matter, left to local communities. However, he said the new agreement will "encourage" zoning where possible.

It remains to be seen what practical effect the agreement will have on Richelieu development. There are now ex-

cepting that "Once they've been identified there won't be any development work done in those areas subject to flood damage."

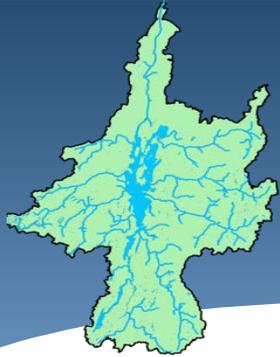
In another unrelated development, the commission's Champlain-Richelieu Board, established by the IJC to study the flood control proposals, has issued a statement, saying that the board has been advised "the dangers are very small that the construction of any dam would influence or be influenced by an earthquake."

However, Dr. Rolfe Stanley, a University of Vermont geologist, believes Vermont geological and environmental officials should review the situation because the sites suggested for a flood control structure have been surrounded by earth tremors.

Since 1974, there have been 36 earth tremors with magnitudes up to 4.2 on a scale similar to the Richter scale in southern Quebec, and northern New York, according to records from the Lamont-Doherty Geological Observatory of Columbia University.



Quebec and U.S. floodplain management since 1976



- 1976 Romeo LeBlanc Canadian Minister of the Environment and Jean Cournoyer, Quebec's Minister of Natural Resources sign an agreement to reduce development in the floodplain, reducing pressure to build the six-gated proposed structure.
- On the U.S. side, political leaders stated their preference for flood insurance and floodplain management policies over building new flood control structures.



Flood Control Thinking Has Changed Since '27

By NEIL DAVIS
Free Press Staff Writer

After the most destructive flooding in Vermont's recorded history — that of Nov. 3 and 4, 1927 — the state government considered but never executed a massive program of dam construction for both flood control and hydroelectric power generation.

The toll of lives in the 1927 disaster was 84 and the damage to property was estimated at \$35 million, which would be more than \$250 million at today's prices.

In comparison, this year's flooding of Aug. 10 was far less destructive, causing two deaths and an estimated \$5 million to \$7 million in property damage.

State officials say flood control projects completed before this year's disaster drastically reduced the damage in some areas, but because dams already have been built at the major trouble spots and because government thinking on the subject has changed, few big projects are on the drawing boards.

"What we're going to see," state Environmental Conservation Secretary Martin Johnson predicts, "is more recognition that we're just going to have to stay out of the floodplains."

"I don't see any major, mechanical,

'What we're going to see is more recognition that we're just going to have to stay out of the floodplains.'

—Martin Johnson

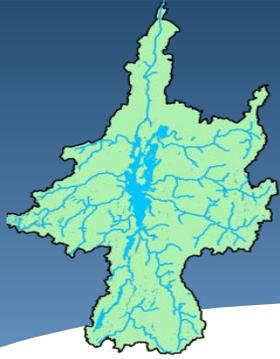
flood control was needed, but now there's a growing recognition it may not be desirable to build these structures and it certainly isn't economically feasible.

"The better approach," he says, "is to avoid the use of floodplains for building whenever possible and to flood-proof the facilities we already have in our floodplains as best we can."

In the decades just before the 1927 flood, the secretary says, it was believed generally that extensive tree planting would prevent floods. At the time, Congress passed a law requiring reforestation, he says.

When it was realized that the tree-planting program wasn't the answer, dam construction was thought to be the key to flood control, he says. An added incentive was the potential of using the same dams for hydroelectric projects.

Among the features which led to dam-



Flood Insurance Developments in the U.S.

- From its inception, the National Flood Insurance Program (NFIP) offered flood insurance coverage only to property owners in communities enrolled in its program.
- In the early years of the program, few communities enrolled in the NFIP.
- Reforms in 1973 were adopted to increase community enrollment.
 - Any property that had a “federally backed” loan and was in the Special Flood Hazard Area had to purchase an NFIP policy.
 - Owners of residential and commercial buildings that did not have an NFIP policy would receive limited post flood aid.

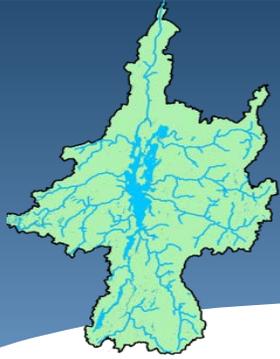




Flood Insurance Developments in Canada

- Residential overland flood insurance only available in Canada since 2015.
- Only a 35% uptake of the insurance in Quebec.
- Quebec's General Financial Assistance Program for Individuals specifically excludes "damages caused to property by an insurable risk."
- Federal government recently announced a Task Force to address the issue of flood insurance and relocation on a national basis.

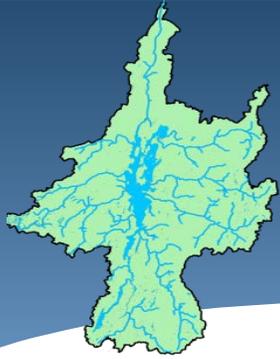




Floodplain Management Has Already Helped

- The 1976 IJC study showed damages starting at 29.6m (97 ft) feet elevation, more than 0.9m (3 ft) below the currently targeted **minor** flood level (30.7m or 100.8 ft) .
- At the minor flood level damages were estimated to be \$2M at that time or \$10M in current dollars.
- Based on the current stage-damage curve there are negligible damages at that flood level.
- The 2011 flood damages were estimated to be \$86 M.

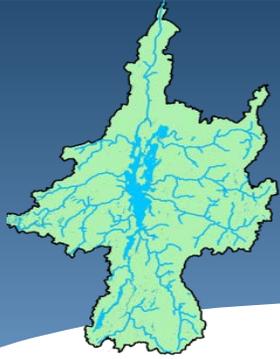




Quebec's Floodplain Management Evolution

- Protection Policy for Lakeshores, Riverbanks, Littoral Zones and Floodplains in December 1987. Updated in subsequent years (1991 to 2017).
- July 2019: Final Order respecting the declaration of a special planning zone to promote better management of flood zones.

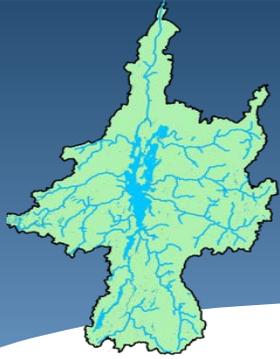




U.S. Floodplain Management Evolution

- Federal Emergency Management Agency's (FEMA) Risk Rating 2.0 will go into effect nationwide October 2021.
- Still many unknowns, but
- Risk Rating 2.0 will be:
 - based on characteristics of each building
 - will comply with existing statutory caps on premium increases.



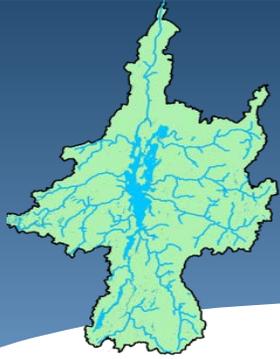


What Did Experts Tell Us at the Study's February 6-7, 2020 Workshop?

Identified four priority areas.

1. There should be better flood risk maps:
 - Good flood risk maps are user-friendly, searchable by address or postal code, clearly distinguish the extents of the flood zone, and offer risk reduction information about topics such as evacuation procedures, property-level protection measures and expected damages.
2. Flood risk should be better communicated and understood:
 - Engagement with citizens is an important tool for increasing awareness of flood risk and sharing responsibility for flood risk management
 - Need to examine a variety of methods to better communicate with the public.



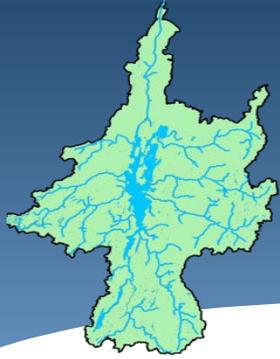


Results of the Workshop Evaluation (cont'd)

3. Management of floodplain occupancy should adapt and evolve:
 - Need to explore a wide range of measures such as: relocation, flood retrofit incentives, etc. as appropriate.

4. Developments in Canadian and U.S. flood insurance should be recognized:
 - Insurance is a useful tool to reduce vulnerability, because it engages private resources to support recovery and because premium rates provide a market signal to property-owners about their level of risk.

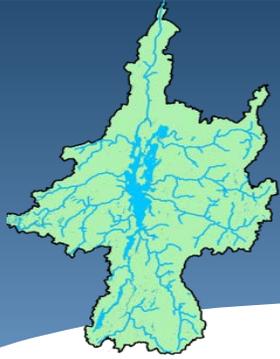




Study Preparing White Papers on the Four Topics

- White Paper context:
 - think piece compiling ideas from various experts and other sources.
 - incorporating knowledge/information established by the Study.
 - cognizant of current political directions.
 - short and concise.
 - to provide recommendations for Study Board consideration in the final report

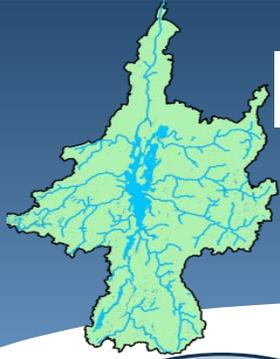




Development of White Papers

- *Ouranos* has been contracted to lead on the development of two of the papers:
 - There should be better flood risk maps
 - Management of floodplain occupancy should adapt and evolve
- *Study* has contracted a leading expert to lead on the other two papers:
 - Flood risk should be better communicated and understood *Dr. Daniel Henstra*
 - Developments in Canadian and U.S. flood insurance should be recognized *Dr. Len Shabman*

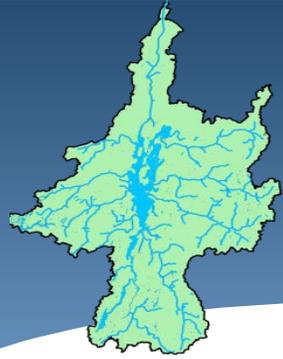




Integration of the Floodplain Management Alternatives

- New flood insurance ideas and geomatic flood risk estimates
 - Carefully developed building by building flood risk maps can be used
- 1. Risk Maps** To communicate risks building by building
- To identify building groups that will flood frequently and are most suited for relocation or elevation
 - Perhaps residents could stay in such buildings until the next flood, then be relocated.
- 2. Communication**
- To identify buildings that will rarely flood, but suffer large damages if they do, and are best suited for high deductible insurance policies
 - To shape emergency response plans (perhaps to identify neighborhoods that flood rarely but with great damage, for protection with Aquadams)
- 3. Floodplain Management**
- 4. New insurance ideas**

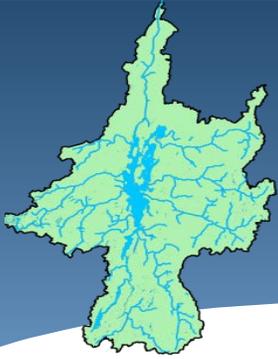




Next Steps

- White Papers to be completed by March 2021
- Study Board will be consulting on the findings with the public in the Fall, 2021
- Study Board's final report to the IJC due March 2022





Key Messages

- In that last four decades floodplain management has helped to reduce flooding impacts in the LCRR basin.
- Older buildings and buildings outside the delineated floodplain may still be vulnerable, and addressing that risk is extremely challenging and complex and involves many considerations.
- The final Study report will provide recommendations on how flood risk in the basin can be better addressed.
- Action on the IJC recommendations requires governments' support and the implementation will be the responsibility of the appropriate jurisdictions.

