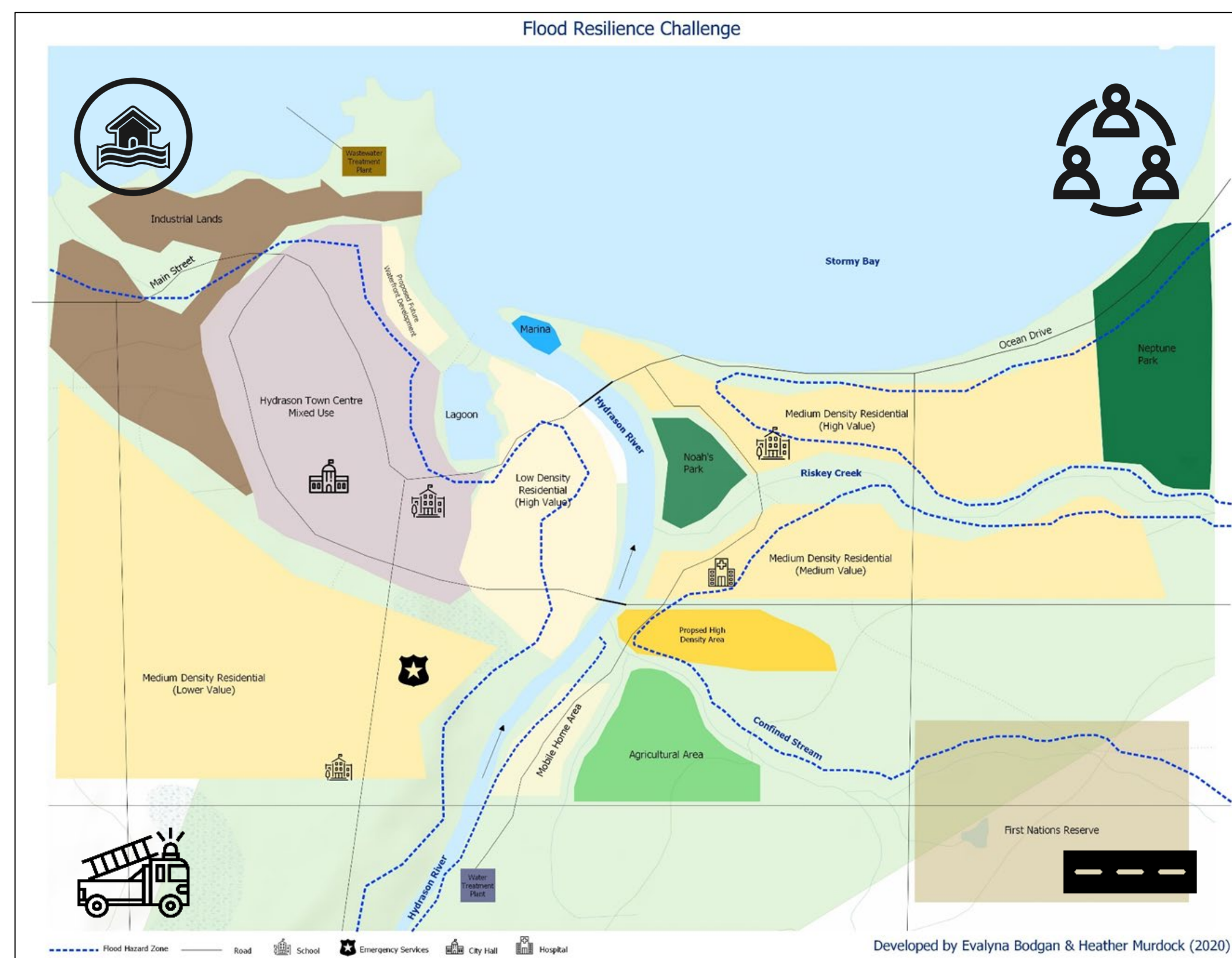


Research Problem

- Flood risk management is challenging because it:
 - Involves stakeholders with diverse and competing interests
 - Touches on core values of property rights, public safety, and economic security.
- There is a need to move beyond expert-driven, and technical approaches towards authentic inclusion of affected citizens, and to provide safe spaces for the public to explore ideas and values.
- Serious games have been shown to be effective in many ways but there is limited research on rigorously testing the efficacy of serious role-playing games against their intended learning objectives.

Purpose of the FRC Game

- To build the capacity of stakeholders to improve flood resilience and enhance flood risk governance, including (collective) decision-making.
- The Flood Resilience game achieves this purpose, as an educational and engagement tool, by:
 - Increasing flood literacy
 - Fostering social learning*
 - Creating a safe space for exploring both risk management and communication strategies.



***Social learning** occurs when individuals are able to look beyond their individual perspectives and shift towards shared interests and collective well-being, working towards mutually acceptable solutions. Social learning is an iterative process and involves active experimentation.

Serious games are games that are not just for entertainment but also have an educational purpose and address real-world problems.

Learning Outcomes for Participants

1. Explain the various components of the risk equation such as risk, hazard, exposure, and vulnerability.
2. Describe diverse flood risk management measures.
3. Evaluate the benefits and challenges of each flood risk management measure.
4. Recognize the benefits and challenges of collaborative decision-making in flood risk management.

Testing the FRC game



This FRC Game

- Additional content to enhance flood literacy.
- Tailored to the Canadian context (incl. regulations).
- Game play includes trade-offs and the lens of efficiency, legitimacy, and resilience in decision making.
- Financial component with payments (e.g. from homeowners to insurance).
- Socio-political dynamics (e.g. voting).

Methodology

- Pilot test with 2 games (A & B): Oct. 2019 & Jan. 2020
- Players: Faculty, staff, students at UWaterloo & UYork instructor (n=22)
- Evaluation methods:
 - Pre-game survey
 - Debrief with players
 - Post-game survey

Results and Impact

Q: How confident are you in your understanding of the risk equation?

Not at all = 1 Slightly = 2 Moderately = 3 Very = 4 Extremely = 5

	Pre-survey	Post-survey	Change
Game A	3.50	4.08	0.58 → 0.78**
Game B	2.95	3.65	0.70

Q: How confident are you in your understanding of flood risk management measures?

Not at all = 1 Slightly = 2 Moderately = 3 Very = 4 Extremely = 5

	Pre-survey	Post-survey	Change
Game A	3.33	3.75	0.42 → 0.45**
Game B	2.70	3.50	0.80

**These improvements are small because most participants already had some knowledge about these concepts.

Knowledge Mobilization

1. Students took part in the test pilots of the FRC game and suggested that it should be incorporated into the engineering curriculum at the University of Waterloo which is in progress
2. Adaptation 2020 conference, Vancouver, B.C.
3. Finalized game will be made available widely

Conclusion & Next Steps

- Designing serious games:
 - Using evidence-based information for design and evaluation
 - Balance between simplicity and complexity
 - Time-consuming
- Serious gaming:
 - Tool that can add value to climate change adaptation engagement
 - Facilitates social learning and can provide a safe space to test out ideas
- Need to test game with decision-makers and with the public (post-pandemic) or develop an online version.

Thank you to our generous funders:



"Making the right decisions as an engineer might be easy but not as a politician."

"...better understanding of governance dynamics and dilemmas"

"...found it interesting to watch the cooperation emerge"

"It helped me understand who benefits most from different mitigation infrastructures, and what [the] responsibilities [are] of each level of government"