



HOW DISASTER FEELS:

The cascading effects of time and experience on perceptions of risk, response and recovery to flooding in Whitewater Region Township

ABSTRACT

From late April to early June of 2019 residents in Whitewater Region Township experienced high-water levels on the Ottawa River. During that time many people lost their homes and approximately 100 more could only access their properties by boat. Residents began the long road to recovery in late May of 2019, and as of March 2020 some residents were still recovering. With financial support from the Institute for Catastrophic Loss Reduction's Quick Response Program, we carried out an investigation on how residents experienced the 2019 flood, including how they prepared for, responded to, and recovered from the catastrophic event, as well as the role disastrous flooding two years prior, in 2017, played in shaping the 2019 experience. By privileging the perspectives of those who experienced the flood disaster first-hand, this investigation produced valuable insight, which serve as an important first step for building knowledge and local capacity to reduce hazard risks and disaster losses in the community as well as for others who face similar flood threat.

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Table of Contents

Executive Summary	iii
Foreword (first author’s narrative).....	v
Introduction & Conceptual Framework	1
Purpose and Guiding Questions	1
2019 Flood in Whitewater Region Township	1
Conceptual and Theoretical Framing for this Study.....	4
Background.....	5
The community.....	5
Kichi Sibi - The Ottawa River.....	7
Bylaws	9
Disaster Aid.....	9
Data, research methods and procedures	9
Preliminary Findings - Shared/Different Timelines of Personal Experience – 2019	12
Awareness.....	12
Perceptions of Safety	14
2017 and the role of past experience	14
Type, Extent and Duration of high water	16
Preparation and Response Efforts	18
Losses and Impacts.....	19
Physical Losses and Impacts	19
Emotional Impacts	20
Factors Exacerbating Threats and Impacts.....	22
Perceived Causes and Contributing factors to High Water	24
Positive Experiences with Relief and Disaster Aid.....	26
Recovery.....	27
Emotional Recovery	30
Challenges	31
Discussion	33
Conclusion.....	34
References	35
Acknowledgment	35
Author Information	35
Appendix A – Local Perspectives on Challenges by Phase of the Disaster Cycle	36
Appendix B – What could help at the Township level?	40
Appendix C – General Considerations.....	41
Appendix D – Questions raised by findings.....	42

Executive Summary

From late April to early June of 2019 residents in Whitewater Region Township experienced high-water levels on the Ottawa River. During that time many people lost their homes and approximately 100 more could only access their properties by boat. Residents began the long road to recovery in late May of 2019, and as of March 2020 some residents were still recovering. With financial support from the Institute for Catastrophic Loss Reduction's Quick Response Program, Spinney and Doberstein carried out an investigation on how residents experienced the 2019 flood, including how they prepared for, responded to, and recovered from the catastrophic event, as well as the role disastrous flooding two years prior, in 2017, played in shaping the 2019 experience.

The research team carried out an ethnographic research study to answer the following questions, with respect to the 2019 flood:

1. How did residents become aware of flood potential?
2. What did residents expect might happen?
3. At what point did residents come to feel personally at risk?
4. What measures did residents take to keep themselves and their properties safe from flood threat?
5. What were residents' experiences recovering from the flood?

Given the community's experience with flooding in 2017, the team also sought to understand the influence that recurrent flooding might be having on local experiences of risk. Therefore, we also sought to answer:

6. Are these successive disasters changing ideas of what 'normal' impacts might be during springtime?
7. If and how is experience with successive flood disasters shaping local capacities and motivations for preparation, or meaningful response, recovery and reconstruction?

In total, 26 people participated in this study by engaging in one-on-one interviews with a member of the research team between January and March, 2020. Participants included 22 residents (R₁-R₂₃) and 4 representatives from government (O₁-O₄; also, residents in the Township). The resident portion of the sample included 12 males and 10 females, whereas all four organizational representatives were male. Residents ranged from 30 years old to more than 60 years old. Furthermore, of the residents who participated, only one had been in the area for less than one year; the other 21 residents had been in the Township for at least seven years and either: grew up in the area and never left; grew up in the area and returned to retire; resided elsewhere before retiring to the area; or grew up elsewhere and chose to spend their adult years raising a family in the area.

The sample of residents includes the perspectives of people who lost their homes (R_{3&4}, R₅, R_{10&11}, R₁₆, R_{19&20}, R_{21&22} and R₂₃), people whose homes were impacted by water but not lost (R₁, R₇, R₁₃ and R_{17&18}), people who protected their homes against high water but were not impacted (R₂, R₈, R₁₄ and R₁₅), and people who spoke about helping during the flood (R₆ and

R9). Of the seven participant properties lost, six flooded during the first peak (on or around April 28th) while one property flooded on May 8th.

The report highlights local experiences during the 2019 flood in Whitewater Region Township, an event where water levels reached unimaginable heights and stayed high for a number of weeks. The perspectives shared show the variability of experiences and recoveries during the 2019 event, as well as the role that 2017 played in shaping participants' perceptions for the kind of flooding that was possible. In the report the ranges of experiences are highlighted under the following themes: awareness; type, extent and duration of high water; preparation and response efforts; losses and impacts; factors exacerbating threats and impacts; perceived causes and contributing factors to high water; positive experiences with relief and disaster aid; and finally, recovery.

Participants' perspectives were used to outline the challenges many experienced (these are outlined according to different stages in the Flood Disaster Cycle; Appendix A). Participants' perspectives were also drawn on to inform recommendations and community-informed strategies (see Appendices B and C), which is an attempt to show how this research can contribute in practical ways to enhance local disaster and emergency management practices when it comes to flood disasters.

Altogether, the results presented here provide critical insight and have important implications for building knowledge and local capacity to reduce hazard risks and disaster losses, and ultimately, for enhancing local disaster and emergency management practices in Whitewater Region Township and beyond.

Foreword (first author's narrative)

In the spring of 2019, I watched mainstream media highlight the devastating impacts of river flooding along the upper Ottawa River in Whitewater Region Township, Ontario, located approximately 140 kms west of Ottawa. As an outsider to the community, I relied on these media reports, as well as publicly available Township memoranda uploaded to their Facebook page, to learn more about the nature of the flood emergency and the efforts that were being made to aid residents in disaster response.

Images from media sources illustrated homes overtaken by water¹; communities cut-off by impassable roads²; and line after line, and row after row of cots set up in the Westmeath Recreation Centre to house Canada's military³, to name but a few. The combination of substantial snowpack, warmer temperatures contributing to a faster snow melt, and heavy rain were often the attributed causes in news reports⁴. As I paid attention to flooding in the Township, media briefings consistently mentioned the various local, regional and provincial political leaders attending to the flood, which increased the confusion I had with respect to understanding government involvement at each level and knowing each representative's role in managing the flood disaster. Yet what was crystal clear in these briefings was the plight of Township residents, many of whom were experiencing great peril and suffering tremendous losses. Through the lens of mainstream media and official Township communication, I saw a grim reality unfolding for residents in the spring of 2019; a reality only made worse by knowing the Township experienced disastrous flooding just two years prior, during the spring of 2017⁵.

As an anthropologist whose research is situated at the interface of people and their physical environment, and whose work privileges the perspectives of those who experience disaster first-hand in order to build knowledge and local capacity to reduce hazard risks and disaster losses, it immediately became important to me to amplify the voices of flood-affected residents in Whitewater Region. This is to say that while the media and Township provided valuable information and helpful perspective, it only told part of the story. The anthropological approach, or spending time in the Township and talking with disaster-affected residents about their experiences with the 2019 flood was needed to create a nuanced and much more comprehensive understanding of the event.

¹ <https://www.capebretonpost.com/news/canada/uncharted-territory-flooding-on-upper-ottawa-river-exceeds-historic-high-310633/>

² <https://www.cbc.ca/news/canada/ottawa/whitewater-region-flood-island-1.5126481>

³ <https://ottawa.ctvnews.ca/video?clipId=1683396>

⁴ One example: <https://www.ctvnews.ca/canada/flooding-turns-ontario-neighbourhood-into-island-accessible-only-by-boat-1.4418663>

⁵ <https://www.cbc.ca/news/canada/ottawa/flooding-whitewater-region-township-ontario-forced-out-of-homes-1.5133118>

Introduction & Conceptual Framework

Purpose and Guiding Questions

With financial support from the Institute for Catastrophic Loss Reduction's Quick Response Program, I initiated a study in collaboration with Dr. Brent Doberstein, a specialist in the area of flood disaster risk reduction, to investigate how residents experienced the 2019 flood, particularly how they prepared for, responded to, and recovered from the catastrophic event in Whitewater Region Township. More specifically, Dr. Doberstein and I set out to answer the following questions, with respect to the 2019 flood:

1. How did residents become aware of flood potential?
2. What did residents expect might happen?
3. At what point did residents come to feel personally at risk?
4. What measures did residents take to keep themselves and their properties safe from flood threat?
5. What were residents' experiences recovering from the flood?

In addition, given the community's experience with flooding in 2017, we also sought to understand the influence that recurrent flooding might be having on local experiences of risk. Therefore, we also sought to answer:

6. Are these successive disasters changing ideas of what 'normal' impacts might be during springtime?
7. If and how is experience with successive flood disasters shaping local capacities and motivations for preparation, or meaningful response, recovery and reconstruction?

Results from this investigation produced valuable insight, which serve as an important first step for generating community-informed strategies (see Appendices B and C) and actions to help residents and others who face similar flood threat prepare, respond and recover from future flood disasters.

2019 Flood in Whitewater Region Township

“And it never slowed it down. And I thought, okay, something's [wrong]. So I phoned my son at seven. And I said, you got to, something's wrong. You got to come out. So he came out. He was here by eight. And he turned around and he checked the pump – just made sure everything all the intakes were clean. And it was about 8:30. He said, “Dad, you've given it a good fight, but you've lost it.” And I said, “oh no, we can fight. We can fight a little longer.” It was already starting to come into the sunroom of the front of the house. He said, “Dad, let's go.” And that's when you lose. I give it a good fight but you ain't going to beat Mother Nature.” -*R19 talking about the rising water and losing the fight to save their home in April 2019*

From late April to early June of 2019 many residents in Whitewater Region Township⁶ (located in Renfrew County) experienced high-water levels on the Ottawa River. During that time many residents lost their homes and approximately 100 more could only access their properties by boat. Residents began the long road to recovery in late May of 2019, and at the time of interviewing, some participants recovery was still in progress.

According to a municipal representative interviewed (O4), long before spring flooding occurred in 2019, Whitewater Region Township representatives attended the first of the season's "freshet meetings." This is where emergency management coordinators from around the area meet to discuss seasonal spring flood potential along the Ottawa River. In mid-April, the province issued a flood warning, which took this group of coordinators by surprise since it didn't appear to them that the water levels along the Ottawa River were going to come up. The situation, however, quickly escalated, and what is typically a coordination of local stakeholders every few weeks each spring season became, as the severity of the situation increased, weekly meetings then nearly daily telephone calls with the Ottawa River Regulation Planning Board, Environment and Climate Change Canada, provincial emergency management representatives and the military. On these calls, O4 remarked that the coordinators tried to get a sense for when the water was expected to come up and go down, and then use this information to forecast what was going to happen in their respective areas.

To provide useful context for the forthcoming descriptions of residents' experience during the flood, an event timeline including key dates is provided here:

2019 Flood Timeline in Whitewater Region Township

- April 18, 2019 – Whitewater Region Township releases a Flood Preparedness Statement ahead of the Easter long weekend notifying residents of flood likelihood in low lying areas and offering recommendations for taking precautions. Some roads in the Township become impassable on this day.
- April 25, 2019 – Flood Emergency declared in the Township
- April 26, 2019 – Voluntary evacuations begin, emergency lodging becomes available care of the Red Cross, sandbags available for pick up at Westmeath Public Works yard
- April 27, 2019 – Water levels approaching or at first peak. Whitewater Region Township releases a flood update notifying residents that staff from Ministry of Natural Resources and Forestry are on location to assist with sandbagging. Residents with restricted road access are being asked to prepare to evacuate if needed. Sandbags also being dropped off at locations experiencing localized flooding.
- April 28, 2019 – Whitewater Region Township releases a flood update notifying residents that Canadian Armed Forces have arrived and are on the ground leading wellness checks, more than 100,000 sandbags have been filled (compared to 34,000 in 2017). Ministry staff, along with volunteer firefighters and paramedic personnel, continue to contribute to flood protection, health, wellness and safety efforts

⁶ For the purposes of this study, Whitewater Region Township refers to the areas/neighbourhoods of Westmeath, Lacroix Bay and La Passe. The authors recognize that Whitewater Region Township is broader in geographic scope. The decision to refer to the study area as "Whitewater Region Township" was made to avoid compromising the identities of study participants.

- April 29, 2019 – People from 50 properties evacuate. Ontario Government activates Disaster Recovery Assistance to support flood impacted residents in Renfrew County
- April 30, 2019 – Renfrew County opens a crisis support line for residents impacted by the flood
- May 3, 2019 – Neighbouring Laurentian Valley Township opens a drop-in flood assistance centre for residents impacted by flooding
- May 7, 2019 - Whitewater Region Township releases a flood update notifying residents that water levels will remain high. They ask property owners to remain vigilant and maintain flood mitigation measures, including reinforcing sandbag walls.
- May 9, 2019 – Whitewater Region Township releases a flood update notifying residents that water levels are expected to peak again
- May 12, 2019 – Water levels approaching or at second peak
- May 13, 2019 – Renfrew County hosts a public town hall in Renfrew
- May 14, 2019 – Red Cross hosts first Open House
- May 15, 2019 – Ottawa River in Whitewater Region stabilizes
- May 23, 2019 – Red Cross hosts a second Open House
- May 24, 2019 – Water levels begin to recede⁷
- June 9, 2019 – Township hosts a recovery information session
- June 23, 2019 – Whitewater Region Township hosts a public meeting where Minister of Natural Resources and Forestry, the Honourable John Yakabuski, is in attendance, along with representatives from: the Ottawa River Regulation Secretariat, Ontario Power Generation, and Ministry of Municipal Affairs and Housing

In response to flooding across the province in 2019, the Province of Ontario appointed a special advisor to carry out an investigation, provide expert advice to Minister Yakabuski, and make recommendations to the government regarding opportunities to improve Ontario’s existing flood policy framework. The independent review of the 2019 flood events across the province was released in October 2019⁸ and made 160 recommendations. The review is based upon information gleaned mostly from provincial department meetings, agency meetings, municipal and conservation authority roundtables, and guided tours of locally impacted areas, such as in Ottawa, Pembroke and North Bay, and those communities surrounding areas⁹. According to the special advisor’s analysis of the information available for all of the systems that experienced flooding in 2019, including those in Whitewater Region Township, nothing points to human error or negligent operation of water control structures as the cause. This finding has since been contested by many Whitewater Region Township residents.

Following a brief explanation of our conceptual framework, we offer a background to the community and then describe the methods employed. The perspectives shared in the following pages purposely emphasizes local experiences of flooding in Whitewater Region, and as such, the preliminary results make up the bulk of this report. We include a list of challenges participants reported to experience during the 2019 flood before concluding with a brief

⁷ Although at least one participant commented that at their location, flood waters began to recede on May 15th.

⁸ <https://files.ontario.ca/mnrf-english-ontario-special-advisor-on-flooding-report-2019-11-25.pdf>

⁹ It was reported by one participant in this study that a group of Westmeath residents presented a local perspective to the special advisor during one of the regional meetings. The extent that the details were included in the special advisor’s final report is uncertain.

summary. The results presented here, grounded in local wisdom and knowledge, include meaningful pathways for residents and the Township to consider so as to reduce future hazard risks and flood disaster losses in their area (Appendices A, B and C). In this way, our ultimate goal is to contribute by offering practical ways to enhance local disaster and emergency management practices when it comes to flooding in Whitewater Region Township and beyond.

Conceptual and Theoretical Framing for this Study

This study places primary emphasis on highlighting the heterogeneity of lived experience, cultural orientations, knowledge, values, norms and beliefs of and held by residents in Whitewater Region and exploring how these elements shaped local understandings of flood potential and risk, as well as flood preparation, response and recovery efforts in 2019. At the same time, the study is grounded, theoretically, in a political ecology perspective, which is an outlook that highlights the interwoven character of the discursive, material, and social dimensions of the human-environment relationship (Escobar 1999). That is to say that the research effort carried out here, though emphasizing local voices, aims to produce an integrated understanding of the event, one that situates local realities of experience and recovery within a broader social structure. Practically speaking then, while the analysis that follows focuses on local realities of flood experience, from these perspectives the reader will see that individual actions taken, safety decisions made, and challenges and triumphs experienced were embedded within regional and national policy or rules, and within established social community practices.

For this study we adapt Cutter et al.’s (2008) Disaster and Resilience of Place (DROP) model and Norris et al.’s (2008) Stress Resistance and Resilience over Time model, to help conceptualize flood experience and recovery. Under this conceptual framework, flood experience and recovery are presented as a relationship between threats and hazards, adaptive capacities, and vulnerability and resilience, experienced at the individual level yet situated within the social and built environment.

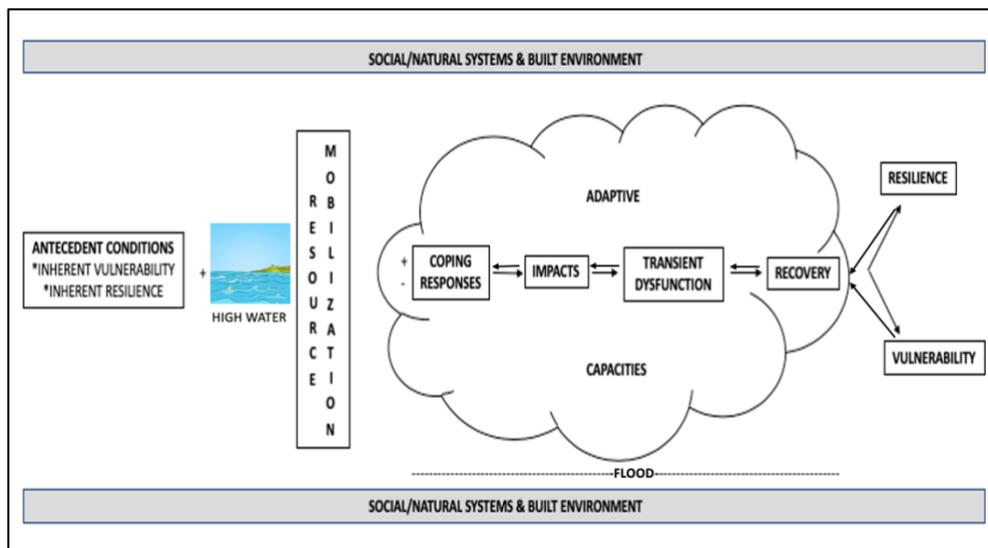


Figure 1. Spinney conceptual framework for flood disaster experience and recovery. Adapted from Cutter et al. (2008) and Norris et al. (2008).

The model begins with antecedent conditions that interact with the potential threat or actual hazard event, in this case: high water. The interaction creates a disaster situation upon which time individuals mobilize resources available to them. As the diagram illustrates, the resources an individual has available to them influences their coping responses, which includes preparation and response activities. Coping responses then influence the impacts individuals experience, which then leads to varying degrees of transient dysfunction, a term we intend to mean here as an outcome of impact, characterized by a temporary shift from what feels or has come to be felt as ‘normal’ for individuals. In our adapted conception, recovery influences, and is influenced by, the extent and type of physical and emotional impact. The ability for individuals to manage between potential threat and/or actual hazard and their recovery is reflective of their overall adaptive capacity, which is defined here as a function of knowledge, attitudes and practices, following from Wilhelmi’s and Hayden’s work (2010) on adaptive capacity to extreme heat at the household level. As the illustration, suggests, the unfolding of individual recovery, including the decisions individuals make regarding mitigation, is one of many factors influencing resilience and future vulnerability to high water threats and hazards.

Background

The community

Whitewater Region is a township on the upper Ottawa River in Renfrew County, located within the Ottawa Valley in eastern Ontario, Canada. The Township is made up of the former municipalities of Beachburg, Cobden, Ross and Westmeath, which were amalgamated into the current township nearly 20 years ago, on January 1, 2001. Most recent census data puts the population of Whitewater Region Township at 7009 with over 50% between the ages of 15-64, approximately 21% aged 65 and over, and where nearly equal proportions of the total population are reported as being male and female¹⁰.

According to one municipal representative (O₁), Whitewater Region Township is a small, lower-tiered municipality, which presents considerable resource challenges when it comes to managing flooding. There are limited financial means available for responding to floods, for example, and ensuring adequate resources to prepare beforehand is an even bigger challenge, according to this individual. Moreover, the Township is working with old floodplain maps and data, as O₁ reported, and there are limited funds available to update this critical information, which serves as an example of the constraints this lower-tiered municipality must delicately balance as they help their residents prepare for seasonal high waters along the Ottawa River.

Each municipality or township in Renfrew County is legislated to have a designated Emergency Management Coordinator (EMC)¹¹ who has to be a full-time employee of the municipality. In some of these rural or lower tier townships, the individual taking on the role of EMC may be the treasurer or the city clerk, for example. In Whitewater Region’s case, the EMC during spring flooding in 2019 was the Township’s Fire Chief who had previous experience managing floods

¹⁰ <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=3547056&Geo2=PR&Code2=35&SearchText=Whitewater%20Region&SearchType=Begins&SearchPR=01&B1=All&GeoLevel=PR&GeoCode=3547056&TABID=1&type=0>

¹¹ Organizational Representative 4 offered this explanation of Emergency Management in Whitewater Region Township

in the Ottawa area during the 2017 event. This dual-role situation that occurs in smaller townships, where individuals are both municipal employees and EMCs, is different from larger urban centres, such as Ottawa, where the EMC position is a full time job, and where these individuals likely have three or four other people on staff to assist when emergencies happen.

The EMC in any jurisdiction, whether urban or rural, is responsible for creating an emergency management plan and is also responsible for implementing the plan during a flood or an emergency event. As part of their yearly duties and obligations, the EMC in Whitewater Region reviews the emergency management plan and make adjustments as necessary. For example, on an annual basis hazard identification analysis is completed. Likewise, on an annual basis the Emergency Management Group meets for training exercises. Otherwise, aside from these formal obligations and the freshet calls that occur as spring approaches, typically only a couple hours are spent every week on emergency management, according to O4. When an emergency happens, however, operations shift to full-time emergency response, from sunlight to sundown, seven days a week.

As a lower tier municipality, in the event of an emergency Whitewater Region Township relies on four different levels of government to assist with providing or coordinating resources that aren't always locally available. For instance, the Township relies on the municipality for its volunteer firefighters and Public Works staff, on the county for its paramedic service, on the province for its flood forecasting, and on the nation for other response and relief efforts, such as by organizations like the Red Cross and the Canadian Armed Forces. For something as simple as sandbagging in Whitewater Region Township, Public Works brings in the sand and sandbags. The volunteer firefighters then help coordinate the public to fill the sandbags. The Ministry of Natural Resources and Forestry also helps to fill the sandbags and distribute the sandbags, and then the military is out on residents' properties helping them build their walls¹². There are times when the chain of resources and people operate smoothly and effectively. At the same time, during a flood emergency in the Township, the local EMC does not have complete control of each of those resources, which means that coordination and planning can become challenging, causing continual adjustments and readjustments of people and resources throughout the duration of the emergency.

Residents who participated in this study described the allure of the rural location. Living in the Township offered, according to most, a scenic, peaceful, quiet and isolated place to live. Residents appreciated these aspects of Township living, and in fact is what motivated many to move here. As much as residents enjoyed the privacy afforded to them by the tall forests and long winding trails off the main roads, almost all commented on the strong sense of community and the way residents and neighbours support each other, without question or hesitation. In the springtime there's an excitement in the air about the upcoming summer. And once summer arrives, residents enjoy beautiful sunrises or sunsets overlooking the water.

It is fair to say that many residents in Whitewater Region have a significant relationship with the land and their property. Conversations with participants highlighted their connection to the Ottawa River and the activities they enjoy doing on the water, such as fishing, kayaking,

¹² According to one project participant, Military assistance with building sandbag walls did not occur until well into the flood, and even then, only at a handful of properties.

canoeing, or boating. Other outdoor activities residents mentioned they enjoyed included watching the sunrise with coffee, working in the gardens planting flowers and vegetables, walking with dogs on the trails, bike-riding, or watching the birds. Typical spring days were said to be spent transferring seedlings spawned indoors to the outdoor gardens or watching changes on the river, such as the ice break up and flow downstream. These descriptions suggest that the river and land are not simply dormant or background features in residents' lives. Instead, residents have deep social connections to these elements of nature. The river and land are a part of who they are; these features of the natural environment are part of their everyday lived experiences.

Discussions with participants also highlighted their experience with previous high Ottawa River levels and flooding. This group of residents have come to expect peaks in the Ottawa River from year to year. First, a peak is expected during spring runoff from local thaw/melt, followed by a another peak once the northern waters are 'let down', which is a local way for describing snow melt and runoff from upstream reaching the area¹³. Participants described being used to water coming up and wetting the grass or gardens during the spring season, or water coming halfway up the yard. Others at lower elevations noted that it's not uncommon to have overland flooding every year, water over the yard or driveway, and sometimes even about a foot of water under a raised home for a week or two. One participant at low elevation commented that they expect a minor amount of clean up and fixing from high water every spring, whether that's tidying debris that has washed in or refitting retaining walls to prevent erosion of the shoreline.

In these commonly expected flood scenarios, participants described how the water would peak and then go down the next day, or within two or three days. In rare years, high water might last a few weeks on the grass in the springtime. One participant at lower elevation noted that every 1-3 years it's not uncommon for the lower sections of their property to be flooded for up to six weeks. Perceptions surrounding these typical flood occurrences were that this type of flooding was normal and not threatening at all. The high water may be bothersome, but it was manageable. "We could handle it," another participant stated.

Kichi Sibi - The Ottawa River

Derived from Anishinàbemowin and originally named Kichi Sibi by the Anishinabe, the Ottawa River, located mostly within the Canadian Shield, spans approximately 1,130 kilometres and forms the boundary between two provinces, Ontario and Quebec. With headwaters located at Lake Capimitchigama, Ontario, the river flows west before turning southeast at Lac Témiscaming, continuing in this direction through Mattawa, Petawawa and Pembroke, before turning northward at Westmeath (see Figure 2). At this point, the Ottawa River turns northward; the channel narrows and water flows through a number of bays and rapids before turning southward once again near Lac Coulonge. After La Passe, the Ottawa River continues south-southeast until it reaches the city of Ottawa and then finally culminating in Montreal, QC. At Montreal, the Ottawa River meets with the St. Lawrence River, a body of water connected to, and sandwiched between, Lake Ontario and the St. Lawrence Seaway.

¹³ One resident (R₇) commented that these peaks are less pronounced these days, and instead, at their location on the river it a more consistent fluctuation; up and down, up and down, but mostly up.

The Ottawa River¹⁴ has come to be a highly regulated waterway with 51 major dams and hydro-electric generating stations throughout its tributaries and mainstreams. To assist with coordination across these governing bodies, the Ottawa River Regulation Planning Board (ORRPB) was established in 1983 to ensure integrated management of the principal reservoirs in the watershed.

Along the stretch of the Ottawa River most relevant to this study, there are three dams which function as power generating stations, all owned by Ontario Power Generation (OPG). There are three river gauges, one at Mattawa, a second at Pembroke and a third at Lac Coloune, where residents can check Ottawa River levels and flows (see Figure 2). There are other dams and reservoirs along the Ottawa River, including two owned and operated by Hydro Quebec (Dozois and Rapide 7), one owned and operated by Ministère de l'Environnement et de la Lutte contre les changements climatiques of Quebec (Quinze), and one owned and operated by Public Services and Procurement Canada (Timiskamin)¹⁵. During interviews participants referred to Des Joachims dam¹⁶, the Chenaux dam, operations at Temagami (upstream of Otto Holden), Bryson and Sullivan dams (owned by Quebec), and the many uncontrolled dams affecting water flows along the Ottawa River in Whitewater Township Region, along with major tributaries of the Ottawa River such as Coulonge River. Although mentioned frequently in connection to the 2019 flooding, thorough investigation of the effect of these control measures and features, respectively, was beyond the scope of the study.



Figure 2. Dams and river gauges along the Ottawa River near Whitewater Region Township. Care of <http://ottawariver.ca/conditions/?display=river>

¹⁴ <https://www.ottawariverkeeper.ca/home/explore-the-river/dams/>

¹⁵ <http://ottawariver.ca/information/general-dam-information/>

¹⁶ Colloquially referred to as the Daswisha dam. The Des Joachims Generating Station is a 429-megawatt hydroelectric station with a 120-foot-high concrete dam spanning the river. The dam harnesses the power of the Ottawa River since 1950. (<https://www.opg.com/story/da-swisha-the-story-behind-the-name/>)

Bylaws

In Whitewater Region Township, residents are aware of certain bylaws when it comes to constructing and/or re-constructing their homes following a flood. If a home in the floodplain incurs damage due to flooding, the resident's repairs must comply with what's called a non-conforming bylaw. According to the Township's Economic Development Officer, this kind of a bylaw dictates what people can do on their lands, especially after a flood disaster. For example, after flooding, repairs must be in compliance with the non-conforming bylaw, which gives them two options: 1. rehabilitate the home to its original condition (e.g. repair the drywall and fix the dwelling to be as it was prior to flood impact), or; 2. raise the dwelling above a certain elevation as prescribed on floodplain maps without adding to the square-footage of their dwelling.

Disaster Aid

In Ontario, federal organizations such as the Red Cross offer aid to assist residents with their immediate needs after disaster strikes. However, in order to be eligible for Red Cross assistance after a flood, residents must prove that the damage incurred is to their primary dwelling; secondary or seasonal dwellings do not qualify for Red Cross disaster aid¹⁷. The Township's Economic Development Officer characterized residents with seasonal dwellings as people "who ha[ve] a permanent residence elsewhere", either in the community, elsewhere in Ontario or abroad.

Disaster Recovery Assistance Ontario (DRAO), a provincial-based recovery assistance program, also provides financial aid to individuals to cover emergency expenses, repairs, or replacement of essential property after a disaster, providing residents do not have insurance and/or providing their flood damage is deemed ineligible by insurance. DRAO is limited in that costs related to non-physical damage, such as for emotional recovery/working through mental health impacts following disaster, are not covered¹⁸.

Data, research methods and procedures

An ethnographic, qualitative research approach to data collection (Bernard 2002) was used to understand perceptions of individual and public stakeholder risk, the capacity for these groups to recover following catastrophic flooding, and the influence of the 2017 event on experiences with 2019 spring flooding in Whitewater Region Township. After receiving ethics approval in September 2019 through the University of Waterloo's Office of Research, three trips were made to the Township, beginning in 2020 and ending just before COVID-19 restrictions began.

Spinney and Doberstein visited jointly once in January of 2020. While in the Township, fliers were put up to solicit participation (Figure 3). In addition, Spinney arranged for a number of news articles to be published about the study in the local newspaper "The Whitewater News" between January and March 2020. In February of 2020, Spinney visited the Township for the first round of interviewing (February 7-10, 2020), and then she visited once again for a second

¹⁷ Red Cross. 2020. Get Disaster Relief and Recovery. <https://www.redcross.ca/how-we-help/emergencies-and-disasters-in-canada/get-help-disaster-relief-and-recovery>

¹⁸ Disaster Recovery Assistance Ontario. 2020. Guidelines to apply for Disaster Recovery Assistance for Ontarians (DRAO). Accessed online: <https://www.ontario.ca/document/guidelines-apply-disaster-recovery-assistance-ontarians-drao/2-general-applicant-information>

round of interviewing (Friday, March 13, 2020). In-person interviews took place either in peoples' homes or at a local Church Hall (Figure 4). For participants who were unable to meet in person, Spinney carried out video or telephone interviews (5). Interviews lasted anywhere from 60-120 minutes, depending on the number of people who participated in a single interview. For example, 16 interviews took place between Spinney and one participant whereas five interviews were conducted between Spinney and two participants, and the latter tended to take longer. All but one interview was audio-recorded.



Figure 3. Spinney posting fliers to solicit community participation in January 2020

The entire interview process generated approximately 1600 minutes of recorded talk that was transcribed using an AI transcriber (OtterAI), and then verified and corrected by a researcher or assistant afterward, since the transcription software did not capture or incorrectly captured many important details, such as: speakers, transition between speakers, and phrases and wording, to name a few. Following transcript verification, Spinney made initial interpretations of each interview and returned these interpretations to participants for their review and feedback¹⁹. Once participant feedback was received, Spinney carried out comprehensive analysis using a qualitative analysis software program called NVivo. NVivo is useful in the way that it provides an organised, structured and systematic approach to analysis and ensures analytic rigour.

To be included in this study, participants had to 'experience' flooding in 2019, whether through home damage, employment disruption, or flood response assistance, to name a few examples. In total, 26 people participated in this study, including 22 residents (R₁-R₂₃) and 4 representatives from government (O₁-O₄; also, residents in the Township). The resident portion of the sample included 12 males and 10 females, whereas all four organizational representatives were male. Residents ranged from 30 years old to more than 60 years old, with the majority being over approximately 50²⁰. Furthermore, of the residents who participated, only one had been in the area

¹⁹ One resident who initially agreed to participate was not pleased with the final transcript and requested to be removed from the study altogether. Participant totals and perspectives reflect this exclusion.

²⁰ Age was not something explicitly asked but many participated offered their ages

for less than one year; the other 21 residents had been in the Township for at least seven years and either: grew up in the area and never left; grew up in the area and returned to retire; resided elsewhere before retiring to the area; or grew up elsewhere and chose to spend their adult years raising a family in the area.

The sample of residents includes the perspectives of people who lost their homes (R_{3&4}, R₅, R_{10&11}, R₁₆, R_{19&20}, R_{21&22} and R₂₃), people whose homes were impacted by water but not lost (R₁, R₇, R₁₃ and R_{17&18}), people who protected their homes against high water but were not impacted (R₂, R₈, R₁₄ and R₁₅), and people who spoke about helping during the flood (R₆ and R₉). Of the seven participant properties lost, six flooded during the first peak (on or around April 28th) while one property flooded on May 8th. The COVID-19 pandemic constrained our ability to capture additional perspectives from four residents affected by flooding in 2019.

Of the participants who spoke about flood experiences at their homes, 16 homes would be considered primary dwellings, whereas four would be considered secondary, or what is officially considered ‘seasonal’. Of the participants who spoke about their experiences at home, the geographic locations of residences ranged from west of Westmeath Provincial Park (downstream of the Pembroke river gauge) all the way past the community of La Passe (downstream of the Lac Coloungue river gauge). This report refers to residential structures, for the most part, as ‘homes’, no matter the official status of the participant’s dwelling. Additionally, this report emphasizes the perspectives of residents. Information provided by organizational representatives added useful context for understanding local perspectives shared here. As the authors of this report, Spinney and Doberstein recognize their positionality as academic scholars and outsiders to the community. We therefore acknowledge our own role in interpreting the experiences shared with us. This study’s methodology included extra efforts to ensure as accurate an interpretation of residential perspectives as possible.



Figure 4. From top, moving clockwise: a local Church Hall served as the location for many interviews, a participant showing me a picture they took of flood damage at their home, another participant explaining water flow along the Ottawa River near Lacroix Bay

Preliminary Findings - Shared/Different Timelines of Personal Experience – 2019

In the Spring of 2019, with ice still on the Ottawa River, the River's water levels begin to rise in Whitewater Region Township. The following section highlights the range of local experiences participants had during the flood in 2019. To say that the residents experienced 'flooding' does not account for the range of experiences, which mostly centred on high water - high water on roads, a high-water table, or high water over the land. Ranges of experiences are highlighted under the following themes: awareness; type, extent and duration of high water; preparation and response efforts; losses and impacts; factors exacerbating threats and impacts; perceived causes and contributing factors to high water; positive experiences with relief and disaster aid; and finally, recovery.

Awareness

Participants recall noticing as early as the Fall of 2018 that conditions on the Ottawa River were amiss. Resident 5 recalled saying to their spouse that at that time "the river [wa]s freezing very high. If they don't lower it, we're going to be in trouble in the spring". This is coupled by Resident 15 who reported, "we knew the Fall before that there was going to be a problem because they raised the water levels to ridiculously high water {dangerous} levels in the fall. And the water stayed high all winter." At a Christmas celebration, Resident 8 recalls a local builder saying the river was too high. It was in January when fishermen noticed the ice huts were frozen in on account of water levels being raised at a nearby dam during the winter. These ice fishers needed to use chain saws to get the ice huts off. In the words of Resident 3, "the ice fishing guys knew right away with the ice huts. We knew right away that there was a problem". To this they added, that at that time, much like the rest of the ice fishers, "I didn't know what was wrong, I just knew something was wrong."

Around the first of April, Resident 20's son who lives on the other side of Daswisha Dam noticed the water in front of his house was down 6 feet. They were lowering it for the spring flood on his side of the dam, according to the son. He asked about the water levels closer to his parent, but Resident 20 responded to say, "they haven't prepped here", meaning the water was still high in their location on the Ottawa River.

It was around the middle of April when Resident 7 first became aware of the possibility of flooding. Information released online on or around April 20th, 2019 was the first indication for Residents 3 and 4. On April 25th Resident 8 learned that Highway 17 was closed in Mattawa and they found that surprising.

When participants became aware of the possibility of flooding, residents engaged in preparing and protecting their homes reported searching the Ottawa River Regulatory Planning Board's (ORRPB) website. As Resident 15 commented, "When the water is lapping at your doorstep, you start to watch those reports. [...]. They were actually quite accurate." Participants reported using ORRPB data to determine current water levels and forecasts regarding the peak, the rate of rise and the timing for the rise. Interestingly, at least one participant found the site more useful after the flooding of their home - they wanted to know when water was going to go down so they could begin cleaning up and recovering the property (R₁₆).

When participants use the ORRPB to see water level data, one commented to say that the information “should be reassuring, not alarming” (R₄). This is similar to another participant who reported that ORRPB should be giving confirmation of what they, the individual, is expecting to see. Resident 1 reported that the website was their only source of data and they, along with other participants, said that it wasn’t very easy to follow (R_{3&4}, R₅). Resident 1 noted how they looked constantly at the website, and Residents 17 and 18 checked several times a day, whereas Resident 4 noted looking everyday at 2pm because ORRPB would refresh their data at that time. For Resident 8, looking at the website became part of their routine:

“Every morning I’d get up and I’d check [the site] and then I’d say, oh my god, don’t tell me it’s going to come up another 12 inches or eight inches or six inches or whatever it was. And then in my pyjamas, I put my rubber boots and my big coat on [...] and I’d walk all the way down to where our canoe was to see how high the water had gone up. And you know, kind of check and then come back to the house and then I go to the stairs and see how many more stairs are underwater”.

When looking at the ORRPB’s website, residents must ensure they are interrogating the data properly. Since the online system divides the river into various sections, and because the two main gauges are located at Pembroke and Lac Couloungue, residents seeking water level information must be certain they are looking at the proper gauge and interpreting the gauge information accurately, such as understanding references to cubic feet and metres above sea level. Moreover, since not all residents live at the location of the gauge, they must also be sure to extrapolate gauge data properly when making interpretations. This is a matter of understanding the dynamics of the river channel, such as its width and depth from the gauge to their location. Resident 13 did this because they live downstream from the Lac Couloungue gauge. Resident 16 noted that they must extrapolate because they are located between two gauges, and they are located on a stretch of the river that is not the main channel, so their channel has a very different water level from that where the gauge is located. Residents 21 and 22 also carried out extrapolations. They live upstream from La Passe and have learned over time that “when they say it was going to decrease, we were kind of ahead of what they were predicting, [...] like if they were, if they were predicting a rise on Tuesday, we might have saw it on Monday”.

In addition to searching the ORRPB website, participants commented that they learned about flood risk and potential by seeing for themselves the quick rise of the river. Weather forecasts also gave information about forecasted rains (R₁, R_{3&4}), which provided a clue for what was possible. Resident 7 talked about the Ontario Power Generation website²¹ as a source of information that gave her notice of potential flooding. On this website, Resident 7 saw the water being released from the Daswisha dam that was set to flow through their stretch of the Ottawa River, so they had an idea water was coming their way.

Participants also noted other sources as providing information about flood possibility and risk in 2019, including word of mouth, and the Township Press Releases and other media, such as the

²¹ <https://www.opg.com/powering-ontario/our-generation/hydro/river-system-data/>

radio, social media and the Whitewater News community newspaper, especially when the latter announced the water was going to be as high as it was in 2017.

When flooding was underway, environmental markers, such as flags or spotters on trees, or wood stakes at different distances in the yard relative to the river offered clues regarding flooding and the rise of waters. When the Township began dropping off sand at the end of the roads, two participants considered this an indication of flood likelihood in the area. Some participants noted learning about flooding by neighbours who called or sent text messages, by driving to the home and seeing for themselves, and also by viewing cameras set up on the property.

Despite general awareness of the potential for spring flooding, and despite the shift from potential to likely and concerns being raised, there remained a perception of personal safety to many who participated in the study, even after flooding began, and even after impacts in the area were observed.

Perceptions of Safety

Although residents were familiar with flooding, there was an element of surprise in 2019, which the data show to be linked to perceptions of safety. For example, participants in this study, most notably those who grew up in the area, had not seen Ottawa River water levels that high. One long-time resident reported, “nobody ever dreamt it could get that high” (R15). This individual didn’t lay sandbags until almost the second peak because, given the location of their home with respect to the water, and because the water had never been that high, they didn’t think they had to. Similarly, other participants also commented during interviews that their homes were high up from the shore. Several residents pointed out their homes were five feet above the shore, behind a six-foot wall, or that between their home and the river was a large frontage and an 18-step staircase down to the shore. All of these were descriptions that conveyed that the distances between the river and the home, and the differences in elevation between the river and the home, which added to the perceptions of security and safety held by these participants.

2017 and the role of past experience

Two years prior, in 2017, the Township experienced another bout of disastrous flooding and all but one of the 22 participants experienced that event, whether observing it unfold in their community or experiencing it first-hand. When asked about experiences in 2017, some participants described that high water flooded their interior crawl spaces (R3&4, R19&20) or reached the door sill of their home (R10&11). Other participants commented about experiencing exterior damage to their property (R16, R23), a few said their Trail was flooded, which means they were isolated (R13, R21&22), and several noted experiencing no personal impacts to their property (R1, R2, R5, R7, R15, R17&18). Two major differences between the 2017 flood event and the 2019 event are that the water peaked at a lower level in 2017 and the water receded much earlier that year as well, on or about May 9th, 2017²².

When asked about the 2017 flood event, a pair of participants believed it to be a fluke. They evacuated in 2017, and with the impression that the 100-year flood only comes every 100 years,

²² Date provided by Resident 1

the two never thought they'd have to worry about it again (R_{19&20}). After seeing the community experience flooding in 2017, Resident 1 thought that another major event wouldn't happen again for some time. For example, in their words:

“when 2017 occurred and it was over we thought oh well that's that... that was a nasty one. We won't see that again for another ten years. And then two years later, not only was it back but it was back with a vengeance and even worse.”

In 2017, Resident 1 recalled feeling only slightly worried. For Resident 5, there was not even high water in the yard during 2017. For Residents 17 and 18, during the 2017 flood the river water peaked a considerable distance from their patio door. These are all notable differences in terms of individual experiences across the two events.

For the most part, the 2017 flood led to perceptions of safety or at least guided what participants thought they might need to prepare for in 2019. This could also be considered perception of risk based on known threat.

As an example, Resident 23 offered:

“We didn't panic about it too much [in 2019] because we'd seen that before and we thought it was more or less going to be the same kind of thing. You know, inconvenient, but not really much to worry about.

Likewise, Resident 17 also confirm 2017 contributed to their perceptions of what to expect in 2019. In their words:

“2017 [...], it hit that peak and then went back down fairly fast. [...] Wasn't near the house. So we knew what to expect [in 2019], so we thought that was the peak. [We thought] we're never going to get any worse than that.”

Relatedly, Residents 21 and 22 originally sandbagged in 2019 to the extent they did in 2017 because they thought the water wouldn't go any higher.

While experiences during 2017 contributed to participants' perceptions of what to expect, they also contributed to perceptions of what *not to* expect. For example, Resident 16 commented: “I think the experience in 2017 gave us a little bit of a taste of what could potentially happen. I don't think anyone expected [2019] to be as bad as they thought,” meaning water levels exceeding maximums that were reached in 2017. Furthermore, Resident 10 said: “No one expected this. No one expected. We all, we thought after 2017... we saw the worst”. In much the same way, Resident 23 offered: “2017 was our standard of worst-case scenario. So [we] always thought like, okay, we might get [flooding] but we'll never get it as bad as 2017, you know.”

These perspectives reveal that the 2017 flood experience created a conceptual ‘capping’ of sorts for study participants, framing for them what kind of flooding would and wouldn’t be possible during the spring of 2019.

Other participants’ perceptions of safety were grounded in something else altogether. One, for example, noted preparing and protecting their home by laying sandbags on the river side of their property, only to be caught by surprise in the early morning hours when flood waters meandered to the back of their property, and then entered their home. This participant went to sleep believing that they would be alright; they never thought flooding would happen overnight, not in a few hours, and they didn’t anticipate water coming in from the back at all. Moreover, this participant went to sleep feeling safe.

“And for us, it didn’t come at us from the front. It came at us from the back, because our neighbors are very low.” (R₅)

For other participants, they saw the water going down after the first peak and sighed with relief. After fighting the battle, “about four days later it went down, and [then] it went right back up. It went up the two-foot mark, like past two feet. It went down and we thought phew,” said Resident 11, which signifies how the drop in water levels after the first peak created a perception of safety for some residents.

Past individual flood risk reduction choices, in accordance with municipal bylaws, also gave some participants the perception that they were safe from flooding in 2019. For example, two participants built their homes above the floodplain, which means they ensured their dwelling was constructed 30 metres, or roughly 90 feet, back from the high-water mark or the 1 in 100-year flood limit, and sometimes more. Both of these participants had water in their home from a high-water table. One of these participants commented to say that they were given authorization by the municipality to build their home in that particular location, which added to their feelings of safety. As it turns out, according to new data that was released during the flood of 2019, this participant learned that their home is no longer technically above the 100-year flood level.

The perception of safety continued, until for the most part, the rise in water levels exceeded anything residents thought imaginable. For instance, when residents received distress calls from neighbours requesting their help, when residents could see the rise so quickly before their eyes, when water levels were forecast to go higher than 2017, when water “was coming up too fast to be just like 2017” (R₁₆), when the water level forecasted extended over the septic and closer to the house (R_{17&18}), possibilities and awareness shifted to concern, and then high alert. Before long, panic set in.

Type, Extent and Duration of high water

Spending time talking with residents revealed the varied experiences people in the Township had with flooding during 2019. From the perspectives shared, flooding was understood to be due to high water, but high water that impacted the physical environment in a number of different ways, which then led to a variety of high-water situations for residents to manage.

For example, some participants in this study experienced high water and were cut off from the community or stranded due to impassable roads and/or Trails. Peninsulas and the properties on them became islands, surrounded only by water. People canoed to work while others took the boat down their Trail to the main road to pick up sandbags. In other parts of the Township, residents walked along sandbag walls to the other side of the water where their vehicle was parked. In some cases, the homes of stranded residents weren't at risk for flooding, whereas in other cases, the homes of stranded residents were, and so this latter group of individuals was managing two different types of high-water situations. Participants who experienced being stranded during 2019 were cut off from the community anywhere between 8 days to six weeks.

Many participants who may or may not have also been stranded, experienced a high-water table on their property, which in some cases caused or contributed to overwhelmed sump pump operations, septic back up or well contamination, and also in some cases, seepage through the weeping tile, the footings or through the slab foundation of the home. One case of seepage was reported to have led to increased pressure on the cement foundation of the home, which then caused cracks in the basement walls, which then allowed river water to enter the structure from underneath the ground. Another participant spoke about the high-water table in terms of the squishiness of the grass on their property, while another participant recounted a story of water filling a hole, one they were digging in the yard to reconstruct a drain and add a backflow preventer. In the words of Resident 13:

“As I was digging the hole, it was filling in with water. It was coming in through the ground. It wasn't overland, the water, yeah, I am trying to pick a place to do this. So I did it, basically, I think I was like a foot to two feet away from the high water level. So yeah, so I'm digging this hole but then the water started coming in from the sides of the hole and filling it up.”

Participants managing high-water table seepage situations mentioned the need for constant attention in order to prevent water damage. And where the septic system and wells were compromised or of questionable safety, many lost access to running water; they were forced to stop using showers and toilets, they couldn't run the taps in the kitchen, nor could they do laundry, in some cases for as long as 8 weeks.

As well, some participants who may or may not have been stranded, and who also may or may not have been battling against a high-water table, experienced high water flowing overland and into their homes. In these cases, the river water entered homes from water levels exceeding the height of, or breaching, sandbag walls, or from water meandering over the land in unexpected ways. Consider the perspectives shared by Residents 3 and 4 about their experience:

- R3 - At 3:30 in the morning when the water finally- I was awake, watching the pumps and I just finished gassing up the pumps. And I came in and I looked at the river and it looked at me, I think.
- R4- You knew it was gonna go.
- R3- I saw the section and I said where it was going to breach. And I said, it's gonna breach right there. And-
- R4- [bang]

- R3- [bang] it breached. And then just threw the sandbags against the house.
- R4- It thrust.
- R3- But we didn't, nobody got hurt. Thank God we didn't have anybody in there at the time I was out. I was out there doing what I had to do.

About 15 minutes after Residents 3 and 4 hear the loud “bang” of the sandbags thrusting against their home, Resident 5 wakes to beeping. During our interview, Resident 5 describes:

- R5- Everything started beeping. We had-
- J- What does that mean?
- R5- Ah, like, any electronics we had down there [in the basement]. Because of the water.
- J- Oh.
- R5- The uh, like we had CO₂ sensors. So as soon, when the water hit them, they started “*beep beep beep beep*”. So, we, you know; that's what woke us up
- J- Okay so, and still at that point you're watching from the front.
- R5- It was dark.

Of the participants who were on their property in the days leading up to overland flooding and the loss of their homes, one couple had feared the day before their sandbag wall breached that the worst was possible, while another participant was surprised and thought they had a few more days to fight. Three other couples reported either starting to clean up or believing the worst was behind them when water began to rise a second time. A final couple had chosen to evacuate, thinking that they would wait out the higher waters and return to an only slightly damaged property once the river receded.

Preparation and Response Efforts

During the 2019 flood, participants fought arduously to save their homes. People made the best decisions they could with the information they had available. These fights lasted anywhere from seven to 10 days. Individual efforts made by participants during the fight included:

- Monitoring water levels and monitoring conditions on property;
- Purchasing and preparing supplies, such as hip waders, canoes, generators, pumps, ensuring cars were parked on the other side of impassable roads, and ensuring canoes were tied up for easy access;
- Sealing off the septic with plastic and sandbags over top;
- Sandbagging, anywhere from 40 sandbags to 7000 sandbags were reported to have been used at the individual properties of study participants;
- Wet vacuuming and mopping;
- Activating or installing additional sump-pumps. Installing means jackhammering through concrete or digging new holes in crawl spaces;
- Working in shifts of varying lengths of time– sleep, vacuum, mop; round-the-clock for days. Vacuum cleaners operating on 20-minute rotations in some cases. Gassing sump pumps consistently but unplugging them frequently so they wouldn't burn out;

- Walking through ice-cold water to adjust pumps, adding sandbags, or repairing breaches to sandbag walls;
- Moving household belongings from the outside up higher on the property; from the inside- from lower to higher. When on the highest level of the home, participants used firewood, logs, boards, 2x4s, plastic pails- anything- to lift furniture, appliances and other items off the floor; and
- Digging 6'x 6' hole in the yard to collect excess water

“So my husband got the back hoe, I said, I had a, it was like a lap pool. It was six feet deep and six feet wide. And he just kept having to start it up and digging holes to pump the water in and the water came up to the edge of it and just sat in there like this far below the top of it. And then he had to go out and he must have extended three four times [to stay] ahead of the water.” R₇

During the 2019 flood, individuals and neighbours helped each other in the fight, too. Some of these neighbourly efforts included:

- Cooking;
- Securing the front door of a neighbour's house so the river wouldn't come up and push it in;
- Packaging up and move others' household items;
- Sandbagging;
- Removing garbage; and
- Offering a place of respite, such as somewhere for flood-affected residents to shower and rest, if need be; a place for people to gather and support each other; a place where flood affected residents could escape temporarily- Social experience during a time of isolation

“I think there was, you know, the strength in numbers. There'd be 15 people at the end of our driveway filling sandbags all day long. [...] I ran between the two houses all day trying to help, and then a house on the other side of the third house was in danger, and so I went there.” R₁₅

Losses and Impacts

Physical Losses and Impacts

Participants in this study experienced a range of losses and physical and emotional impacts. In some cases, people lost their homes or their basements, or contents in their home or belongings from their property. Participants talked about items that were damaged, others that were unrecoverable, and still others that were gone altogether as a result of floating down the river. At least 10 participants, eight of whom experienced extensive flooding to their homes and/or evacuated, commented that they lost a year of their lives in this experience. Added to the reports of structural and physical losses, or losses of time and years of life, were comments made about impacts to the physical environment due to the high waters, such as the changes in the soil, their concern for the wellbeing of trees, the health of their gardens and the integrity of sand embankments.

Emotional Impacts

Individual exposure to the sights, smells and sounds, and participants' involvement in preparation and response activities brought about a range of feelings. For example, participants expressed disbelief in watching the river rise to the height it did or the lines they saw trending upward on ORRPB water level forecasts. Watching others' belongings as they were carried downstream by the current created a fear of the river for one participant (R₈), as was made noticeable when they said, "The way it raged like it was really really fast and high and a lot of debris, like we saw fridges floating by our home, a deck with a barbecue on it". The sight of mold growing like 'fur' on belongings and creating musty smells, noticeable from as far as the driveway, were shocking to the senses for two participants.

Sounds also had a significant impact on those affected by flooding in the way that they brought about feelings of anxiety, worry and fear. For example, in the homes relying on sump-pumps to keep water out, Resident 2 mentioned they transitioned from:

"at first you know, the sump pump was turning on maybe, I don't know, every half hour or so. And then it would be like every 20 minutes and then as we're watching the water rise, it was just surreal, really. [...] And then it came to the time when the sump pump was always on, it was not ever stopping,"

In most cases, the constant activation of sump pumps was coupled by humming of multiple wet vacuums. Together, these sounds reinforced the stressfulness of the situation; the noises, difficult enough to tolerate during waking hours, were even more difficult to endure at sleep time. To the beeping of the electronics Resident 5 mentioned earlier, add: the splash of Resident 21's brand new pump slipping off and falling in the water, the sound of the bubbling water coming up from the gap at the base of Resident 19's sandbag wall, the thrusting of the sandbags against the house in Resident 3 and 4's case once their sandbag wall breached, and then the "*glub, glub, glub*" sound of water coming up through their crawlspace as the fight to protect their home came to an end. These are only a handful of sounds that live on in the memories of flood-affected residents.

Uncertainty, or that feeling of not knowing what was going to happen, brought on considerable stress as well for participants in this study. For example, some didn't feel they had a good understanding of what the peak was going to be or how high on the property the water was going to go because they couldn't understand the gauge information. In other cases, people were uncertain their individual efforts would be sufficient, or did not know when the waters would finally recede or what the status would be of their house and/or belongings once the levels returned to normal. Others were concerned about possible power outages and the possibility that presented for sump pump failure. Because the high water lasted for so long, uncertainties felt with respect to personal flood experiences created a significant amount of sleeplessness and emotional fatigue.

Relatedly, extreme physical and mental exhaustion was also referred to during interviews, particularly by participants who endured multiple types of high-water situations and a prolonged battle to save their home. For participants, there was a general sense that they couldn't rest and that the situation was never ending – essentially these were circumstances requiring chronic

vigilance, which was tiring and in at least two cases resulted in medical health consequences. “You were tired, worn out and sore,” as Resident 21 commented.

Conversations with those who worked around the clock to protect their homes also conveyed senses of panic when they saw water coming in, helplessness when they felt on the brink of losing the fight, despair and sadness when they had lost the fight, and shame for having lost the fight. As one participant who lost their home commented:

“I think you go numb. It’s kind of like, I know this happened. I’m not going to wake up and find it was a horrid dream. This really did happen. You’ve lived it. And your body just goes numb.”

At least a few participants highlighted life going on around them and how that was emotionally difficult. For example, ‘normal’ elsewhere seemed to amplify the feelings of loss at home for Resident 4. They had this to say of arriving by boat to an area not impacted by flooding:

“And it was so surreal because we got off the boat. Now we look at it. We were actually...he was taking his boat overland over trees, because it was so high and docking at another neighbors where people had left their trucks or vehicles over there. And I got out of the boat and stood on land and just watched cars going by and thought they have no idea what we're living. Their world hasn't changed, but ours sure has. So very, very surreal and humbling, right?”

Similarly, for Resident 18, leaving the community while they were deeply immersed in the flood experience was not an escape, and seemed to make more noticeable just how depressing their situation was:

“but then to go to Pembroke, people in Pembroke, life was just going on, like normal. You know, they had some flooding down there too. But I mean, you get into the downtown Pembroke. Nobody knew about the flooding. Nobody knew what you're going through. And you came back, and thought that life was so good there and you come back and you think oh, my God, I shouldn't have gone out, because look I have to deal with this again. You know, I shouldn't have gone out. I should have stayed here and tried not to think that life is normal out there. Because it was so depressing when you came back.”

As palpable as some of the negative emotions were during interviews nearly a year after the flood, it is worth stating that flood experiences did bring about some positive emotions for participants, too. For example, participants noted being relieved when seepage began to slow or high overland waters receded; gratified when they were able to save someone else’s home; and thankful for their connection with, and support from, the community. This kind of positivity and optimism was a noticeable theme that emerged during analysis of interview data.

Participants discussed the impact flood preparation and response had on their daily routine and the changes to their day-to-day everyday norms. In a few cases, residents described disruptions to their work, which resulted from their need to prioritize flood protection efforts over their employment. One participant whose home was not damaged by the flood commented how challenging it was to concentrate and meet the deliverables associated with their consulting job during the height of the flood. For one participant who lost their home, while it may have been difficult to focus, they had a need to re-establish routine as quickly as possible; to continue working and to keep the family schedule intact. For others who lost their homes, when a return to pre-flood routine was impossible, there was a need to stay busy, which was achieved by helping others around them or by focusing their efforts as much as possible on clean-up and recovery efforts. For example, Resident 16, whose home flooded, turned the loss into a project. In this case, the participant reframed the experience into something more positive and a new beginning of sorts.

Factors Exacerbating Threats and Impacts

‘Compounding challenges’, broadly defined, undoubtedly worsened the experiences of flood threat and impacts. Differing kinds of compounding experiences identified included, but were not limited to: participants who were cut off/stranded and working to protect their homes; participants were cut off/stranded and flooded; participants were cut off/stranded and lost their home in the flood *and then lost contents*; and participants whose home flooded, which caused them to evacuate only for that second location to flood and force a second displacement.

The lengthy duration of high water worsened people’s fears regarding what would be left of their foundation once the water receded, as well as impacted others’ ability for successful remediation and recovery. For example, a couple who lost their home and were stranded due to impassable roads were not able to take up insurance policy options available to them, such as the delivery of a container, to salvage what was left of their belongings and minimize further damage. In this case, the participant described, “the road was closed, nothing could come” for weeks. And so, by the time the road opened on May 30th, many of the contents enclosed in the house had been trapped in the heat and were thus damaged beyond repair.

Limited mobile and internet service were also reported as exacerbating the experience of flood threat and impacts, both for individual residents as well as more generally in terms of emergency response. Overall, cellular service in the region was referred to as random and unreliable by participants in this study. One commented that they don’t have cell service in their home at all; text messages might be receivable out on driveways, but that isn’t guaranteed. Cell phone connections are often forced to operate via WiFi, and if WiFi is poor due to the inability of having access to land-line internet, the ability to communicate becomes even more complicated. One participant explained that their internet equipment is in a location near the river to maximize connectivity, but this makes their access to services vulnerable in times of flooding.

When it comes to emergency response, Resident 15 had this to say of the experiences of first responders with the Ministry of Natural Resources and Forestry, and also the military:

“They said [to me], in most northern parts of northern Ontario, we get cell phone service. Why don't you? [...] And then the military came in and they

had no way of communicating. And they were staying at the arena in Westmeath. At the rink in Westmeath. And they had very limited internet. And they were all just shocked. [...] The military weren't even able to communicate with their radios. So I don't know if it's the way our...because the land is fairly flat here, there are no high real high points and you've got the river as a lowest point. I don't know, if maybe any, the signals don't get through or what but they were well, the guys from the Minister of Natural Resources were just shocked. They said, we've never seen this anywhere we've ever been. They [said, we] fight forest fires in BC, we've never had a communication problem.”

In some cases, during the 2019 flood when emergency responders were unable to communicate with residents due to poor cell phone service, residents were asked to complete wellness checks, a request for which this participant willingly and happily obliged:

“Like we're fortunate because you go down the road here a little ways and you can't get cell service. [...]. You know, and those people I mean, it's a big thing that communication. [...]. That's one thing that hasn't got corrected out here that, you know. [...] people were calling here- “Can you check on so and so? And you'd check up, and “you, can you make sure they got water? Can you make sure they got you know, food? We haven't heard from them a couple of days.”

Other hazards, such as high winds and motorized vessels on the water, created waves and a wake, respectively, which exacerbated people's worries and threatened additional, and in some cases, worsening flood impacts. At their place, Resident 16 said that the standing water wouldn't have been too bad, but it was the waves that wrecked everything. In their words:

“The waves had come through the cottage, and all of the stuff we had put up was underwater, and the waves came through the cottage so strongly that it actually blew the whole back door frame or side door frame right out of the wall. [...]. So I mean the pressure of the waves is...the water's pretty powerful right.”

Other participants who eventually lost their home in the flood noted how a group of emergency responders travelling at high speeds and without caution in a boat on the water created an unnecessary wake and nearly compromised their entire flood protection effort.

Comments made by public in the media also added to the stress of the 2019 experience for some residents. These included comments questioning the decision to live or build on the river such as, “what do you expect, you're on the river?”. Other comments that assumed a perceived wealthy economic status of people in Whitewater Region simply because they had homes on the Ottawa River were particularly damaging to residents and caused extra frustration in an already extremely frustrating time. When describing the comments made by public about building decisions on the River, Resident 13 had this to say:

“the [public] really got it wrong because to me, especially when you have, your local municipality told you what the flood level was, and they're wrong, it's hard to blame me for building here. You know they gave me the wrong information. [...] People are speaking up saying it's your fault. No, it's not my fault.”

Similarly, Resident 17 was sure to mention:

“we did our homework. [...]. We're not in a floodplain. We're not you know, you'd look at the drawings- we weren't on the floodplain. I'd show you the map. [...]. We asked neighbours and every house, [...] what's the water situation [...]. We did all that due diligence, you know, before we bought down here.”

Perceived Causes and Contributing factors to High Water

Of the participants who were interviewed for this study, some reported that the 2019 flood could have been the result of a perfect storm of nature, or essentially a sequence of natural events that came together. For these participants, the events in nature they deemed likely contributors to high water were an early frost/freeze and very high snowfall over the winter of 2019, the latter of which resulted in a heavy snow load. In addition, participants mentioned a late thaw as a contributing factor, and then some participants added that the ice thawed quickly once it started. One participant reported that uncontrolled rivers (where there are no dams) were at their highest ever, and this likely contributed to high flood waters on their parts of the Ottawa River in 2019 (R1).

However, the majority of participants who mentioned natural causes for the flood also believed that mismanagement of the OPG-owned and operated dams played a significant role in the 2019 flood. Overwhelmingly, participants in this study referenced human error and a 'screw up with the dams' as a major contributor, if not sole cause, for flooding. Resident 5 pointed to the fast rate the river rose in late April as evidence of mismanagement by saying, “It happened too fast. I could see the water rising that day.” Rather than a quick rise, Resident 8 points to a quick drop in water levels as support for their belief that somebody made an error. In their words, “I can't believe it lasted 31 days and [...] on the 31st day *snaps fingers* all the water receded.”

Some participants perceived one particular management error made by dam operators, in addition to those made before and during the 2019 flood, which was their decision to keep the water high in the Fall. In their opinion, water should be let out in the Fall (released through the dam downstream) so that there is more room for the river channel, essentially, to hold water when the local melt first happens in the springtime. That water was kept high in the Fall was seen to be a contributing factor to flooding in the spring of 2019. For example, Resident 11 reported:

“I think there was some error somewhere with the dam, opening the dams. There had to be. I mean, we've been on the river a long time and every time you go in the Fall and you see the water high, you go, uh oh, this isn't good.

They should be letting some water out, but they don't. And then you get the flood.”

Still, one other participant alluded to errors made in the springtime more generally, and how decisions are made to empty the Temagami dam, but Daswisha can't handle the intake and so the water is let through, but eventually it's stopped at Whitewater so as to not affect larger city centres downstream (R7).

Two participants disagreed with the notion that OPG dam operations were responsible. According to Resident 13, the government and hydro did everything they could do. To this individual, the snow load, the quick thaw and the rains were the main causes for high waters. Another participant agreed- Ontario was not to blame in this particular case, they said (R7); rather Quebec Hydro and the decisions made by this group that were to blame, since they, too, own and operate dams on the Ottawa River that influence river water levels in Whitewater Region.

Two participants believed dam-related decision-making played a role, yet also suggested that that better management would not necessarily have meant no flooding at all; only that flooding wouldn't have been as bad (R8, R16). As stated earlier, examining the veracity of resident perceptions and claims about dam mismanagement was beyond the scope of this research.

Alongside perceptions of mismanagement of the dams, automation of dam control was perceived as a major contributing cause for the 2019 flood. According to the perspective shared by many participants, up until 2015 there were people monitoring the Ottawa River, all the way from Temiskaming to Ottawa. In 2015, however, changes to monitoring began, which included, according to participants, a reliance on satellite data, computers, and Environment Canada forecasts. Dam-related decisions became automated and according to algorithms, for the most part, and if there were humans involved, participants reported that they are not located at the dams in question. Resident 16 saw the flood in 2019 a tragic consequence of automation. In their mind, it was going to be a bad year because of the snowpack and fast melt. However, dam operators and remote management made a bad situation worse.

Most of all, regardless of the cause of flooding, participants in this study described wanting assurances that someone is looking out for them and their best interests. Environmental observations as well as the behaviour observed of political leadership caused at least two to question just how much the community is being looked after. For example, Resident 7 pointed out how provincial premiers sell hydro to the United States, which causes them to question their Township's significance in the grand scheme. “We're just little peons up the river” (referring to major urban centres downstream, presumably Ottawa and Montreal).

Furthermore, two participants talked about ‘dry rivers’ further upstream, which triggered them to think of the overflowing Ottawa River closer to their home in Whitewater Region. Resident 8 mentioned a dry Deux Rivieres whereas Resident 15 said:

“we all know [it wasn't an act of nature] because the dams above us had no water. They weren't holding back any water. They were completely

flooding us. [...] up at Ralston Dam and Daswisha Dam there was no water. You could walk across the river.”

As examples, a dry river at Deux Rivieres at certain times of the year but high water in Whitewater Region, or low water in the reservoirs upstream and flooded homes in Whitewater created a conceptual disconnect for these participants, which then contributed to mistrust and speculation that homes in Whitewater are being sacrificed, at the expense of other communities, such as Ottawa or Montreal, much like Resident 7 reported above.

Positive Experiences with Relief and Disaster Aid

Experiences with disaster aid, including formal monetary assistance from Red Cross, Disaster Recovery Assistance Ontario, and Insurance, for those who qualified or chose to pursue these options, ultimately helped to diminish the negative impacts brought on by flood disaster. Formal non-monetary types of assistance, such as that from organizations like the Ministry of Natural Resources and Forestry, the Canadian military and coast guard, local firefighters, and paramedics who delivered water and medications, did wellness checks, and laid sandbags and supplied pumps, all helped flood-affected residents cope better with their circumstances. Likewise, efforts made by the Samaritan’s Purse and groups of Mennonites (including a local group as well as Mennonite Disaster Services), offering either freshly baked goods and other food items and/or much needed labour for clean-up and restoration operations once high waters receded, were appreciated. These forms of aid came at critical times during the disaster experience and were especially helpful as participants found their levels of exhaustion increasing and their resources stretching thin.

Aid, in the forms of time, energy, resources, or mental and physical support offered by families, friends, and neighbours to those in need during the 2019 flood was immediate, according to participants. It was noted that people in town are kind and responsive and that the sense of community is vibrant in Westmeath. Caring for people, caring for each other, and being attentive to the needs of others shone through as part of the woven fabric in this tightly knit community. Altogether, Whitewater Region was referred to as a place that offered neighbourly goodwill. It was characterized as a place where people work together for the betterment of the community. During the 2019 flood these virtues became even more noticeable.

The community at large was often heralded as the hero by participants in this study. Their efforts were supported by the Township who opened the Westmeath Hall as a Flood Relief Centre early on. Westmeath District Recreation Association (WDRA) then spearheaded volunteer efforts at the Hall, such as coordinating meal preparation for affected residents, first responders, and for anyone helping with sandbagging, to name a few. Often referred to as “the ladies”, local women volunteering at Westmeath Hall did more than just prepare and plate the food or clean up after everybody left. In addition to “g[etting] things working at the community centre,” according to Resident 2, the ladies also offered emotional-safekeeping and comfort during an extremely tough time. Resident 5, for example, who evacuated during the flood had this to say of the support provided by the ladies:

“...the ladies at the hall that, the day we [evacuated], we didn't have any food. So, you know, everybody goes to the halls. So, we are usually the

helpers. So to ask to be the ones needing help was very difficult for us. But they were, you know, we sat down and there was this huge meal. Everybody was crying because we were all in the same boat. And women just, they hugged us, or they made us laugh, or they fed us, or they nurtured us. You know, it was really amazing.”

And community members stepped up to the plate during the flood as well, whether that was by sandbagging or by helping to supply significant amounts of food- day after day, for a number of weeks. A local business, the Whitewater Brewing Company operated an informal, one-month long free lunch program for any resident experiencing flooding, for example. Even people outside of the community were helping, such as the soup kitchen in Pembroke who provided food, and people in Petawawa who sent meals, and even people in other provinces who provided monetary donations to help the farm animals impacted by the flood. As Resident 15 commented:

“I was never as proud of our community as I was this time around. [...]. I was really, truly amazed to see how well the [communit]y pulled together, but not just our community, all the surrounding communities. People that had no water flooding anywhere were here helping. And that was, that was heartwarming.”

Recovery

Varying flood experiences during the 2019 flood resulted in markedly different recoveries for individuals, both structurally and emotionally. Recovery became longer, and sometimes exponentially so, if a participant evacuated and lost their home. As of March 2020, when interviewing for this study was in its final stages, of the eight participants who evacuated because their home flooded, three continued to be displaced and five had returned to their property. Of these five, one couple had moved into an entirely new home whereas three others were able to repair and rebuild their original home. Three participants whose ‘secondary’ or seasonal dwellings flooded in 2019 were both in the process of rebuilding their homes at the time of interviewing. For these three who had other means of accommodation, the structures had been lifted but there was still a significant amount of work to be done to repair the interior and exterior. The other participants who experienced flooding but did not leave their homes were in varying stages of structural recovery; some had completed their fixups, whereas others had work to finish in their basements. Interior recovery was prioritized over exterior, and in many cases at the time of interviewing outdoor decks still needed to be rebuilt and properties still required landscaping.

Participants revealed three main points in time when structural and emotional recovery efforts could begin, and these all related to high water. First, it was possible for some to initiate recovery once they could gain control of the seepage or when the seepage stopped altogether, which corresponds to receding water on the property. A second point in time when flood recovery efforts could begin was when roads became passable again, which was approximately the last week of May into the first week of June 2019. A third point in time when recovery could be initiated was when there was no longer dampness in basements or flood waters in homes, which was approximately July. It is important to note that these points in time are neither discrete nor concrete; they are approximations and intend to serve as guideposts to signify that when the

recovery process was initiated (and how that process unfolded) was different for everyone, depending on their unique circumstances. The emphasis on points in time is made to highlight that while some people were recovering others were still experiencing impacts. The emphasis on variability is also meant to signify that while some residents were just beginning to recover, others' abilities to recover were expanding.

To make this clearer, take for example the very different experiences of Resident 1, Residents 21 and 22 and Residents 19 and 20 to flooding in 2019. Resident 1 experienced seepage and was able to begin cleaning up quickly after seepage got under control in the middle of May. Residents 21 and 22, whose home and road flooded, were boating onto their property to begin recovery later in May and were finally able to access their home by vehicle in the first week of June, which enabled them to finally bring garbage and appliances to the Township Garbage. In and around those two same weeks, Resident 1 was able to leave their home for the first time after 26 days of isolation and also had organized a schedule for contractors to come in and complete all repair work. Meanwhile, during May and June, Residents 19 and 20 who evacuated due to their home flooding, were living with family and waiting for flood waters to recede from their home.

Well into July, Residents 19 and 20 were still waiting for their house to dry out. In the words of Resident 19:

“Actually, the house was dripping. It- when did I tear it down? Was it July? July when they were taking buckets of- out of the walls and the wood-water was literally flowing out of the house. Out of the wood structures, the insulation, everything. I mean it was disgusting.”

By July, Resident 1 had returned, more or less, to their typical daily routine which included occasional shopping, taking lunch in town, or going to a movie. Meanwhile, in July Residents 21 and 22 were living back in the upstairs of their home in as it dried out, making the best of their situation by using the garage as their kitchen for cooking.

The shape of structural recovery is influenced by access to, and experiences with, insurance. In this study, there were a handful of participants who made claims, but not all with damage did so. Resident 1, for example, had water enter through cracks in their foundation, yet the damage didn't qualify under their policy; if water had come through the window, they would have been eligible. Interestingly, Resident 13 found that they didn't have insurance coverage for flooding because their home was reported by insurance to be in a designated flood zone, which was perplexing to them since the municipality didn't consider their home to be in a flood zone. Therefore, Resident 13's damages were not covered and since damage was confined to the basement and not to an 'essential space', this participant neither qualified for Disaster Recovery Assistance through the province.

Of the participants with damage who made an insurance claim, points made regarding challenging encounters they had with adjustors and remediation specialists revealed how seemingly innocuous encounters can play a significant role in the shape one's recovery process takes. This was noticeable in Resident 3 and 4's case when they said:

- R4 - and then going through and looking at what they're valuing it for, and then realizing - no, what we had was worth a lot more than what you've actually given us. And so again, all my life, I think you have to be your own best advocate. And that's what we've had to do. And sometimes I just say, Okay, I can't deal with our adjustor. [R3], you need to call because we'll-
- J- Butt heads?
- R4- Yeah, I know she's using her strategies on you know, when they say “[R4](insurance representative saying R4’s name),” okay, I guess she thinks I'm being difficult. And then I'll say her name, because I think she is being very difficult. And she's not listening to what she needs to hear from us, right? Because we're the clients. So anyway, that's a whole other journey [that takes]
- R3- [that’s a tough one]
- R4- And that's where anger will come out [from us].

Likewise, Resident 19 shared their experience watching people sort through and discard of their unrecoverable belongings:

“And I lost it one day. I just went and sat in my truck and cried. And when I come back out, I guess I'm- she looking at me and she says you okay? And that's just it just becomes too, too over overpower[ing]. Now, so you get, you've lost your house, which is stressful. Then you have your contents literally watching them, take them out, put them in a dumpster and smash them with a hammer.”

These encounters exemplify how challenging encounters during structural recovery have additional emotional impacts, such as anger, despair and stress. These challenges are considered here an amplification and compounding of disaster impacts, where negative experiences add one on top of the other. Similar to Residents 3, 4 and 19, there were participants in the study who were unable to obtain Red Cross aid on account their flooded home was officially considered a seasonal dwelling. The comments they made also show how flood impact, and the recovery process, can be worsened by disaster relief policy constraints. In the words of Resident 10:

“And then for assistance, any assistance well, we didn't get any assistance from any flood, especially the 2019. It was disappointing. Red Cross gave us a pail with rags and cleaning stuff. [They] almost gave us five or \$600 to clean but after a few phone calls and a meeting, we were left with the pail because it's a seasonal dwelling. And permanent residents receive two sums for that funding the five and \$600 because they had extra funds, but they didn't give any to us. They gave it to the other people, that already got the money. So, at that meeting, I said to Red Cross, I said, I said you mean to tell me. You can't help me with anything? I said you give money away in other countries and everything else and I've been there for 34 years. You

can give me anything but a pail? So I said to them, I was very upset with them and I left. We cleaned our cottage and we both received eye infections and sore throats. And we went to emergency and had medication as outpatients. We did not receive any financial support for damages or cleanup. We were on our own.”

For this participant, who splits their time evenly between two homes and who has done so for the last 34 years, and who has contributed to the Township through taxes for over three decades, the inability to obtain anything more than a pail from Red Cross has left them feeling like a ‘second class citizen’ (R₁₀’s words) and as though they don’t count, and this has amplified the impacts of flooding and worsened their trauma.

Emotional Recovery

Recovering from a flood is a complex process that has structural, social and emotional dimensions. It is more than simply putting four walls and a roof back together. While repairing the housing structure may be a central component of recovery, recovery from flooding is also about re-establishing everyday practices, and perhaps more importantly, re-establishing what the walls and the roof of the housing structure represented or have come to represent in one’s life. For many, like Resident 5, losing their home was certainly a physical loss, but it was emotional, too. It took away their sense of security and their sense of safety. And for Resident 5, despite being back in their home for some time, the emotional feelings of security and safety have not yet been re-built. As an example, in the days leading up to our interview there was freezing rain in the community and Resident 5 had this to say about that experience, almost 10 months after the flood:

“So I’m not over it. You know, the other day there was freezing rain, and we woke up and I was frozen, I couldn’t move. We woke up thinking it was water in the basement. That’s what it sounded like. So my husband just, you know, turned on the lights in the basement, came back up and he said, there’s nothing, it’s dry. [...]. It changed our lives. It takes away your sense of security.[...] that you feel in your home, that you’ve built in your home. It takes that away.”

Even the participants who believed they got off easy are still triggered from time to time. For example, one participant at the time of our interview, recalled driving down a once flooded road at Christmastime in 2019, and thinking how unbelievably high the water was eight months prior. Another participant mentioned seeing the hip waders tucked away in their storage and how they hoped they would never have to use them again to stay dry while walking down the road. This is not to say anything of these participants’ mental state other than to highlight that the experience has resulted in lasting memories that still trigger emotional reactions like disbelief and shock.

When looking closely at the process of emotional recovery from the 2019 flood and the steps it included, repairing one’s relationship with the river and the natural environment was one of three major themes that emerged from interviews. This was shown by Resident 4 when they said:

“The river just was unforgiving. So it's going to take us, me in particular, time to get reacquainted with that river because it wasn't our friend last year. I like to swim and I didn't go once- one the river wasn't very nice and clean, it was pretty yucky. But, you know, I think we need to rekindle that relationship. Hopefully this year again, right. I don't know.”

The importance of re-establishing a connection with the environment was also noticeable for Resident 5 who talked about “re-friending” the river after the flood. Likewise, Resident 8 was afraid of the river afterward, and so they too had to rekindle a relationship. Resident 16, on the other hand, talked about the shift in nature when they said:

“And I mean the flood changed the river a lot, too. [...] the wildlife changed. [...]. [...] And the other thing, too, was because of the volume of water that came down the river, a lot of things moved. [...]. [...] even to go out boating, where there was always a sandbar [and you knew] where you had to [go to] avoid it, now it's over here. It's, the whole thing has shifted.”

For these participants, emotional recovery from the flood included a re-learning process, such as taking steps to restore their feelings of comfort in, on or with the river, and also learning the new contours of the waterscape.

The process of structural recovery itself emerged from interviews with a handful of participants as a second major theme contributing to participants' emotional recovery. For one participant, it seemed almost a cathartic experience for them to witness the tearing down of their house. For another participant, the day their new house was delivered brought feelings of great joy. For a third participant, once the framing started and they could see things moving forward, it generated a sense that progress was being made.

Lastly, post-flood risk reduction and flood mitigation efforts seemed to provide participants with a sense of comfort and safety, which lent to their emotional recovery from 2019 flooding. The Township raised some roads after the flood, and this helped, but individuals also mitigated against future flood risk by: moving their home to higher ground further away from the river (R_{3&4}, R_{19&20}), leaving the lower level unfinished (R₅), lifting homes higher above ground (R_{10&11}, R₁₆), upgrading sump pumps and adding more fill to yard to enhance the rock wall (R₂), raising private roads and installing backflow preventers (R₁₃), reinforcing a retaining wall (R₁₆), and finally, building a retaining wall, ensuring proper drainage and installing a backflow valve (R_{17&18}).

Challenges

In addition to the challenges highlighted in the previous pages (see also Appendix A), such as those having to do with limited communication, ineligibility for some to receive disaster relief, and encounters with insurance representatives, other perceived challenges were identified by participants during interviews with respect to their flood experience in 2019.

First, there were participants who explained that information and data related to rising water levels weren't in terms residents could easily understand, which made knowing their risk difficult to comprehend and also contributed to feelings of uncertainty when it came to their confidence surrounding preparation efforts.

Second, some participants were disheartened by the limited attempts made to learn about and acknowledge the local flood experience in Westmeath during and after the 2019 flood. At least two residents were unhappy that, as of the date of interviewing, post-flood investigations had not looked more closely into mitigation possibilities on the river, such as a flood diversion control structure (a floodway) or dredging, so that the possibility of future catastrophic flooding in their community was being addressed in a meaningful way.

Third, at least a few participants reported that at public meetings their concerns were often diminished, and nobody was listening to their experiences. In particular, participants reported it to be challenging to deal with representatives at public meetings, who seemed to lack sensitivity. For example, Resident 4 said:

“I remember the presentation we went to in Westmeath. And one young lad with all his fabulous charts said, Yeah, well, at one point, I can't remember what it was. But he said, Well, if we had done this, you might have got two and a half hours more before the first peak. And what difference was that going to make? And so, my filter was off and I said, ‘Well, it may have made a difference for us, because two and a half hours would have given us two and a half hours more to shore up that one wall, right that breached’. I thought, you have no concept of what this is like really.”

In addition, the timing of public meetings created significant challenges for participants of this study to attend since some were still fighting to protect their homes and/or they were isolated on account of impassable roads, and therefore logistically unable to attend.

Fourth, though the procedures for sandbag distribution improved after the 2017 flood, participants reported that retrieving and transporting sandbags back to their home was challenging. This was because (in most cases) a limited number of bags could be transported at once (50, for example, at a residence that used 1000s), each trip (in some cases) could take approximately two hours, and vehicles incurred damage (one participant reported blowing out their brakes) due to the multiple trips that were needed.

Fifth, there was a shared perception surrounding irregular and inconsistent communication between Ontario and Quebec with respect to the dams and that was a challenge for participants as they contended with rising and high flood waters. Moreover, general coordination and communication between all the bodies that govern waters impacting Whitewater Region Township residents was perceived as lacking. Participants also reported a lack of transparency regarding dam-related decision-making and the challenge that little advanced warning regarding dam-related decisions caused in local flood preparation efforts in 2019.

Relatedly, one participant noted the irregular communication with residents during the flood as challenging. In their perspective, news media could have done a better job letting residents know what was going on in Whitewater Region. This participant found it especially challenging that Whitewater Region council was not actively corresponding with residents via email to share details, and that there was a reliance on Facebook for emergency communications in the Township.

Lastly, general management of the emergency was a challenge experienced in different ways by both residents and leaders of flood response. From the residents' perspective, frustrations were expressed surrounding the decisions made by the emergency's incident command. For example, once the state of emergency was declared in April of 2019, the military arrived and only took orders from the Incident Commander, which was perceived by some as a hindrance to effective disaster response. From the perspective of leadership, managing the flood effectively was challenging because there were four levels of government to coordinate. In addition to understanding the role of different tiers of government, it was necessary for leaders in this emergency response to manage expectations of these four different levels and all of their representatives on the ground, as well as ensure adequate emergency response was given to residents.

Discussion

Returning to the conceptual framework for flood disaster introduced earlier, the local perspectives outlined above illustrate, to an extent, the socially and structurally situated nature of individual experiences with high water in Whitewater Region Township during the spring of 2019, and the ways individuals navigated their unique situations by mobilizing resources they had available to them. The antecedent conditions, combined with high water levels, necessitated the activation of differing coping mechanisms, resulted in differing impacts and degrees of transient dysfunction, which in turn, lead to and influenced differing types of recovery for many people, including participants of this study.

Antecedent conditions in the flooding sense typically trigger notions of an already saturated ground where additional water- whether rainfall or snowmelt- has no alternative but to accumulate in rivers and over the land. Certainly, this antecedent hydrological condition was present in Whitewater Region during the spring of 2019, however, data presented here also reveal inherent physical and social vulnerabilities that contributed to disaster experiences. For example, approximately 170 homes in the Township are located within the designated floodplain, which makes these structures and the people occupying them physically vulnerable to flood threats. Furthermore, the Township's abilities to prepare for and mitigate these catastrophic events, for instance with new data and updated floodplain mapping, is limited due to significant resource constraints, and this contributes to the social vulnerability of those living in the community.

Helping to offset these vulnerabilities, however, is the inherent resilience of the Township and its residents, a capacity demonstrated by a strong sense of community and extensive network of social support that exists in the area. While on the surface, neighbourly offerings of assistance or *the ladies* volunteering at the Township's Relief Centre during the flood of 2019 appear as par for the course in times of disaster, deeper analysis also reveals that the ability for these features

of flood response to have come together so seamlessly during the event is largely due to the community connections and social support structures that were already well-established prior to the event. In this way, the inherent resilience of the community increased the ability to cope with the flood and helped many to manage the impacts and transient dysfunction that were brought on as the catastrophe unfolded. Moreover, the positivity exhibited by participants about their community- its people and leaders- as they reflected on their disaster experiences during interviews highlights the ongoing cultivation of resilience; specifically, how expressions of optimism and gratitude in these social encounters function to generate continuing capacity in Whitewater Region Township.

Interestingly, data suggest that experience in 2017 contributed to both residents' inherent vulnerability and resilience during 2019 flooding. On the one hand, 2017 flooding conceptually limited what many participants thought was possible, and in this way shaped perceptions of risk that did not accurately reflect the level of threat before them. On the other hand, however, experience with 2017 motivated preparation efforts in 2019 in so much as when residents were notified that water levels would reach 2017 levels, people began to take action. Ultimately, however, once projections exceeded 2017 levels, participants were unable to rely on their past experience to gain a better understanding of how high waters would impact them.

Conclusion

The preceding pages focused on highlighting local experiences during the 2019 flood in Whitewater Region Township, an event where water levels reached unimaginable heights and stayed high for a number of weeks. The perspectives shared in this report show the variability of experiences and recoveries during the 2019 event, as well as the role that 2017 played in shaping participants' perceptions for the kind of flooding that was possible. While participants spoke positively about the assistance that was provided to them from the community, they also described challenges that exacerbated their experiences with, and recoveries from, the flood, which has had the unfortunate consequence of considerable mistrust by residents towards regulatory bodies (see Appendix A). Participants' perspectives were used to inform recommendations and community-informed strategies (see Appendices B and C), which is an attempt to show how this research can contribute in practical ways to enhance local disaster and emergency management practices when it comes to flood disasters. Altogether, the results presented here provide critical insight and have important implications for building knowledge and local capacity to reduce hazard risks and disaster losses, and ultimately, for enhancing local disaster and emergency management practices in Whitewater Region Township and beyond.

Limitations of current study include a relatively small sample size. Though the participants provided a deep accounting of flood experience in 2019, the small sample size prevents these data and findings from being generalizable. Future research could include an exploration of dam-related operations along the Ottawa River with the possibility of enhancing the transparency regarding decision-making; a closer examination of multi-tiered emergency response in rural Townships with a possibility for informing policy; or a longitudinal study of flood experience in Whitewater Region Township to understand if and how acute, escalating and chronic flood threats contributes to trauma and influences long-term recovery.

References

- Bernard, R.H. (2002). *Research methods in anthropology: qualitative and quantitative approaches 3rd ed.* Walnut Creek, California: Altamira Press.
- Cutter, S.L, Barnes, L., Berry, M., Burton C., Evans, E., Tate E. & Webb, J. (2008). “A place-based model for understanding community resilience to natural disasters.” *Global Environmental Change*. Vol. 18: 598-606.
- Escobar, A. (1999). “After nature: Steps to an anti-essentialist political ecology. *Current Anthropology* Vol. 40(1): 1-30.
- Norris, F., Stevens, S., Pfefferbaum, B., Wyche, K. & Pfefferbaum, R. (2008). “Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness.” *American Journal of Community Psychology*. Vol. 41(1–2): 1573–2770.
- Wilhelmi, O. & Hayden, M. (2010). “Connecting people and place: a new framework for reducing urban vulnerability to extreme heat. *Environmental Research Letters*. Vol. 5(1). 7 pp.

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Appendix A – Local Perspectives on Challenges by Phase of the Disaster Cycle

Challenges regarding Flood Preparedness – Communication –

1. Insufficient information and/or instruction provided by Township Counsel:

“Notice of what roads were closed; For those whose roads are closed, information about what would happen with mail delivery, garbage and recycling pickup, etc.; Instructions for what to do with garbage and recycling – such as a central drop off location on a specific day of the week; When the military was arriving; When the military were pulling out; An email link to the Ottawa River Regulation Planning Board and brief instructions regarding when they post, etc; An email link for where to apply for disaster recovery assistance; Information regarding food relief centers and hours of operation; What to do in the event a well is compromised, etc.” (R₂; Feb 11, 2020)

2. An over-reliance by Township to communicate over social media (Facebook), a digital, member-based platform.

J - ...the fact remains that not everyone has, like chooses to use these social media platforms, not everyone has access to-

R₂ - Yep, and we shouldn't have to

J - And so what would be-

R₂ - I shouldn't need to have access to Facebook

J- Yeah, what would be the best way to reach you? What way would you want to be reached?

R₂ - Well, I don't think you guys have next door in Ottawa, do we? In Ontario, do we? Next Door is an app. And you know what, frankly, I think it would be easy for the council to email us

J - Okay

R₂- They can collect that information, they have our addresses, they, you know, I think that's what they should be doing

Challenges regarding Flood Preparedness – Planning –

1. Changes to river monitoring has meant there are no longer “eyes on the water”, which made it difficult for homeowners to adequately prepare

“ Like there used to be people working every dam that looked after them. And then it went to just a few places, like not the entire province and [...] you know there's no visual there's nobody walking out and saying oh my gosh, that rock's under water. We have to; let's hold back some water. It's all just done by computer now and I mean there's no human element I guess. [...] ...the dams above us had no water. They weren't holding back any water. They were completely flooding us.” (R₁₅; February 25, 2020)

2. Home buyers not made aware at the time of purchase of flood plain data and the location of the dwelling with respect to the flood plain or flood fringe line.

Example 1

“And so after all of this happened, I thought, why weren't we aware of how the water could come in behind here? Right? We weren't- when we purchased and now I'm thinking, I've gotten information that shows the flood map and that this is the flood. I think they call it the flood fringe line. *But I didn't know that when we bought. And that really made me feel like geez*” (R8; February 9, 2020)

Example 2

R₁₆ - I think that as part of a property assessment or a property on file with a township or a province, there something about historical flood damage on or a lake-

J - On the river or the lake. Okay.

R₁₆ - Yeah. So like at least there would be a chance to know when you buy something that that potential for a real flood was there. So I didn't know that the water had been that high before. And it was in 1960 and in 1970 and you know, this is this is nothing new.

3. Inaccurate flood zone information from the municipality made preparedness and planning difficult for homeowners

“It's like, look I did everything you [the municipality] asked me to do. I built above the 100 year level. I did the survey. I paid for that work. I did all that stuff right. And you [the municipality] were wrong.”
(R₁₂; February 23, 2020)

4. Conflicting flood zone information between the municipality and insurance made preparedness and planning difficult for homeowners

R₁₃ - ...so one time I checked with my insurance and they said to me that I was in a flood zone and I had no insurance for it.

J - Could you repeat that? You said that they said you're in a flood zone?

R₁₃ - Yeah. So although the municipality didn't consider it to be a flood zone, the insurance did. So I had no flood insurance. As far as the provincial program, they won't do basements because all they cover is your primary living areas. So I had nobody really to turn to. It's all on myself.

Challenges regarding Flood Response and Recovery –

1. Lack of organized central command

“And this one fella came and he said, you know,[...] You know, they had the arena. They had maps that but there was nobody saying, okay, today we're going to send a team out to this Road because they're in they're in

danger. And tomorrow we're going to... there was none of that it was just trying to help. They were going in every direction.” (R₁₅ speaking about a conversation they had with another resident; February 25, 2020)

2. Conduct of insurance representatives was rushed and unprofessional/insensitive, and at times lacked understanding of local environment

Example 1

R₅ - And, and like felt a bit violated by the guys that... Because I wanted to go downstairs once they pumped the water out just-
J - Why?
R₅ - To, to help with the inventory.
J - Oh, okay.
R₅ - Right. Because I said like, all our good clothes are down there. And they said no. So what they did; they took all the clothes, they put them in garbage bags, they emptied the basement, threw everything in the garage and closed the garage. So then I called the company I said, “don't close the garage.” You are going to have mold right to the ceiling in the garage now. Everything is soaking wet. So they came back and opened it, because they had locked it. I didn't have the key for it. They had changed it. So I said “you have to open it.”

Example 2

R₅ - And I said - that's all we need. That's all we're asking for is that little, you know? So, but the first time the adjuster came, he said “has- look, you know in this area..”, he said, “..has the city shut off the water to your house?” I said look around you. We're in a forest of pine trees. There is no city. We have a well. Now the water is contaminated, I'm sure. Okay, what about your sewage; the septic? He, that's not the word he used but I forget what I said-
J - Sewer?
R₅ - Yeah, I said we have our own septic system. There's no city, but he couldn't get out of the frame of mind. But I said look around you like, you know, we're in the boonies, we're in the middle of nowhere. But no he didn't get it, didn't get. He also didn't get how difficult it was.

3. Government policy regarding access to disaster relief/aid for seasonal and/or secondary dwelling. This contributed to feelings of “not counting” and being treated like second class citizens

Example 1

“So, at that meeting, I said to Red Cross, I said, I said you mean to tell me. You can't help me with anything? I said you give money away in other countries and everything else and I've been there for 34 years. You can give me anything but a pail? So I said to them, I was very upset with them

and I left. We cleaned our cottage and we both received eye infections and sore throats. And we went to emergency and had medication as outpatients. We did not receive any financial support for damages or cleanup. We were on our own.” (R₁₀; February 9, 2020)

Example 2

So anyway, he says okay, he says so this is [address of seasonal dwelling]? Yes, that's it there. That's our cottage. He goes okay, and where do you live? At XXXX Drive. Can I see your driver's license? I said, sure. I show my license was [same as XXXX above] Drive, [...]. I'm sorry, he said. That's where you live [referring to the address on the Driver's License]. We can't give you anything. [...] And yet, other people got the Red Cross funding twice. Not just once, but twice. They said, I don't know why I got it again.” (R₁₀; February 9, 2020)

Example 3

- R₂ - But because it's not a primary residence. We wouldn't have been eligible for any assistance from the government if something that happened
- J - Okay.
- R₂ - And which really doesn't strike me as fair because I'm Canadian. My family is there and I'm very much, I'm there because I'm connected.
- J - Yeah.
- R₂ - And yeah, so I think the government policy sucks, especially since we can't buy flood insurance, you know, if they won't let us insure for for the damage and they won't compensate us if anything happens, but we still pay the same taxes as everybody else.

Example 4

“...my only asset was the cottage. [...]. Because it's not my primary residence, I didn't qualify for disaster relief. Because it's on a river floodplain, I don't have insurance to cover over water flooding.” (R₁₆; March 4, 2020)

Challenges regarding Flood Mitigation – Risk Control and Prevention –

1. Lack of attention post-flood to measures that could lead to future flood prevention

“My disappointment with the report was that it didn't give any indication of what could be done from a technical point of view in the future, in the way of any sort of major project to prevent flooding of this nature. For example, could another reservoir be dug somewhere? Could some present reservoirs- and we're talking mainly lake Tamiskamang- could they be dredged? Would that make any difference? We didn't get any science in that report, that we didn't get a suggestion of science that could be employed to possibly prevent it if there was any science, Jennifer, and if there is anything could be done maybe there cannot be, but there was nothing that nothing that that was discussed.” (R₁; January 26, 2020)

Appendix B – What could help at the Township level?

In addition to the list of individual and community preparation and response strategies that were employed prior to and during the flood in 2019 (see page 18 of this report), the following is a list of ideas for the Township to consider for enhancing disaster preparation, response and recovery, as informed by interviews with study participants.

Prior to/As spring flood season approaches, the Township could:

- a. Participate in ongoing emergency planning and training exercises prior to events and throughout the year so that stakeholders expected to manage flood emergencies have already established operational rhythms in place at the time disaster strikes.
- b. Encourage residents to have life jackets and hip waders handy, give reminders to secure kayaks and floating docks, and request that residents compile their most important documents in an easily accessible location.
- c. Make connections in correspondence between water levels and vertical height AND potential impacts.

During flooding, the Township could:

- a. To help with a need for more manpower, establish a protocol to allow people in from neighbouring communities to come in and assist with flood preparation, response, clean-up and recovery.
- b. Have someone with engineering knowledge (hydrologist) to act as a communication liaison. This person could be appointed by a neighbouring conservation authority possibly or the Ministry of Natural Resources and Forestry to be onsite and/or accessible in the Emergency Operations Centre or Relief Centre. This individual could:
 - i. Be part of flood preparation and response as a resource for local incident command.
 - ii. Be present for residents to ask questions of.
 - iii. Repackage flood data, graphs, information in meaningful ways so that residents and members of the community understand more easily the implications of high-water levels.
 - iv. Go to different residences and help with the extrapolation process if people are between gauges (for example, help residents prepare for the high-water level on their property by using lasers), since the differences in property elevation with respect to the river is different for everyone.
- c. Communicate on platforms in addition to Facebook, such as email or by pre-recorded telephone messages
- d. Have sandbags brought closer to homes and have sand dropped off at more locations across the Township

Post flooding, the Township could:

- a. Include sandbag removal as part of the recovery plan, regardless of location within the Township
- b. Establish a garden-hosting community group whereby volunteers in the community would be organized to help salvage the gardens of individuals impacted by flooding, temporarily hold or plant for one season, and help to replant once these flood-affected residents are back in their home

Appendix C – General Considerations

The following is a list of ideas for different stakeholders to consider for enhancing disaster preparation, response and recovery, as informed by interviews with participants of this study.

Township:

1. Clearly communicate what the Township disaster emergency plan is, particularly when it comes to electricity connections during a flood.
2. Examine and address cellular service limitations.
3. Determine the possibility of implementing a process that would enhance the transparency regarding dam-related decision-making.
4. Communicate with residents any efforts that are being made to investigate long-term mitigation options.

ORRPB (Ottawa River Regulation Planning Board)

5. Translate difficult to discern gauge data on website into meaningful parcels of information for public uptake. This includes, if possible, presenting online how much the water is going to rise vertically, rather than presenting the data in cubic feet or metres above sea level so more people can interpret the information.

Red Cross

6. Examine the possibility of removing the proof of primary residency clause to ensure immediate aid and assistance is provided to all Canadians experiencing disaster.

Insurance Companies

7. Ensure training of representatives includes how to interact ethically and sensitively with flood-affected policy holders, and that only experienced representatives are deployed to complex, catastrophic disasters.

Government (general)

8. Ensure that there is federal government representation at public town hall meetings during follow flood disasters.
9. Ensure that provincial representatives who arrive in flood-affected areas have an awareness of the community, the individuals and what they experienced.
10. Offer whatever resources might be available to enhance and upgrade the facilities at the local disaster relief centre, especially in lower tier municipalities.

Appendix D – Questions raised by findings

1. How can organizations and agencies begin to rethink disaster “loss” and its relationship to/with financial aid and assistance?
2. Relatedly, how can we help to rethink what “assistance” stands for?
3. How can we best uncover/highlight attributes such as attachment to place when it comes the experience of flood disaster?
4. We have entrenched ways of thinking, talking about and acting in times leading up to and during disaster. How do people perceive their own vulnerability to disaster? These perceptions influence preparation and response actions, both at an individual and organizational level.
5. Relatedly, how can we contribute to disaster literacy across groups? How do we make connections between how residents perceive their own vulnerability and what others consider more objective physical vulnerability to such things as flood hazard/risk?