

GOVERNMENT-SPONSORED HOME BUYOUT PROGRAMS AND POST-FLOOD DECISIONS TO RETREAT

Case Studies in Constance Bay, Ontario and Pointe Gatineau, Quebec



By: Brent Doberstein, Shaierree Cottar, Brittney Wong,
Michelle Anagnostou, and Shawna Hamilton



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ICLR Quick Response Program Final Report

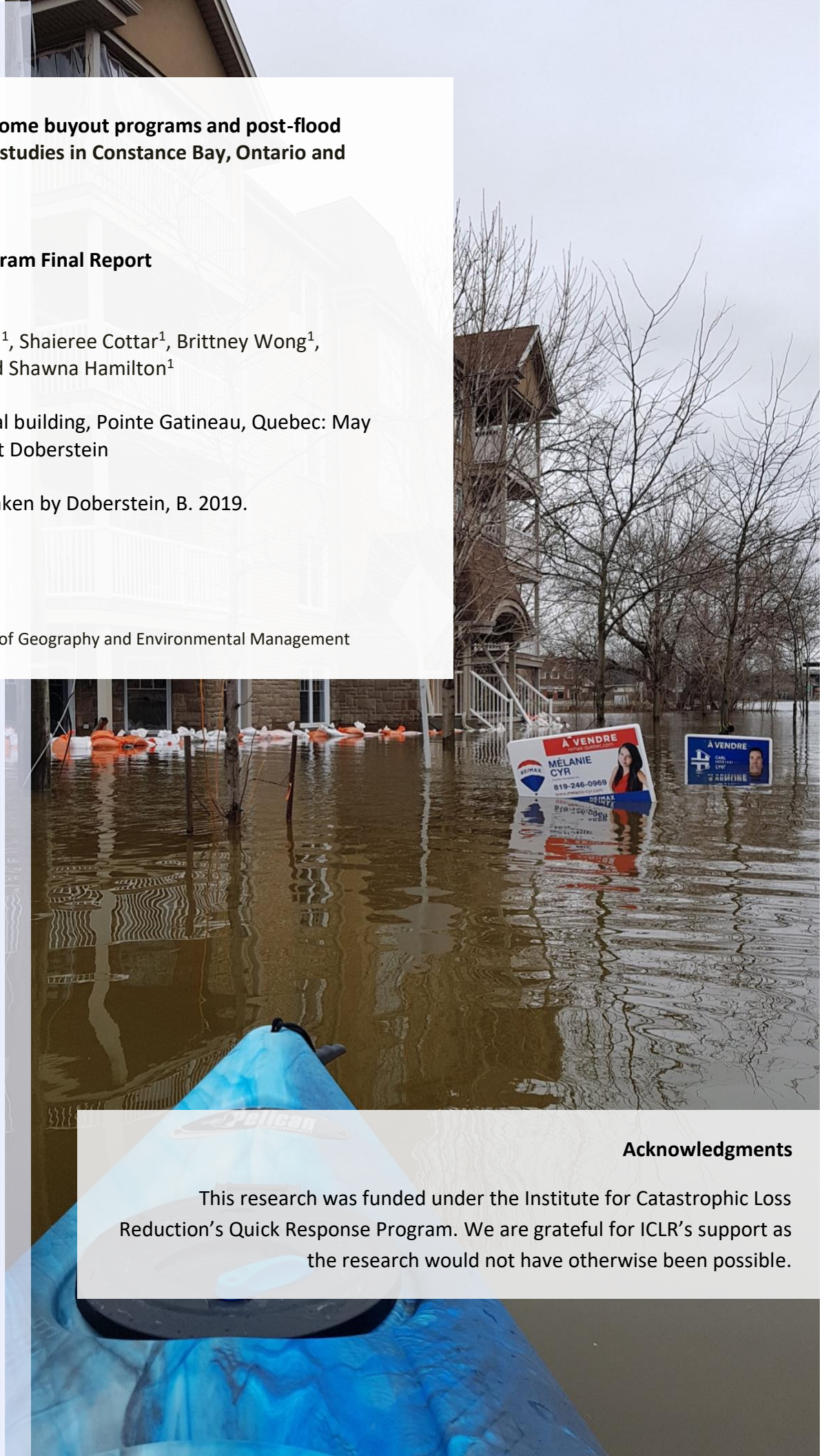
Authors: Brent Doberstein¹, Shaierree Cottar¹, Brittney Wong¹, Michelle Anagnostou¹, and Shawna Hamilton¹

Cover: Flooded commercial building, Pointe Gatineau, Quebec: May 2019. Photograph by Brent Doberstein

Photographs: all photos taken by Doberstein, B. 2019.

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¹ University of Waterloo, Dept. of Geography and Environmental Management



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ABSTRACT

Managed retreat is gaining considerable attention as a component of flood risk reduction, climate change adaptation, and community resilience-building in Canada and other countries. However, supportive government policies and programs, on-the-ground assistance for homeowners, and connections to wider community planning processes are needed for such retreat to be ‘managed’. In the absence of such policies and supports, homeowners who have been affected by flood disasters may choose to ‘self-retreat’ by

rebuilding and then selling their homes to unaware buyers. This research examines the very different experiences with post-flood recovery in two communities, Constance Bay, Ontario, and Pointe Gatineau, Quebec, located on the Ottawa River that flooded in 2017 and 2019. The study concludes that provincial government flood recovery policies and programs are crucial determiners of whether flood-affected homeowners will choose to retreat from flood risks, or ‘rebuild risk’.

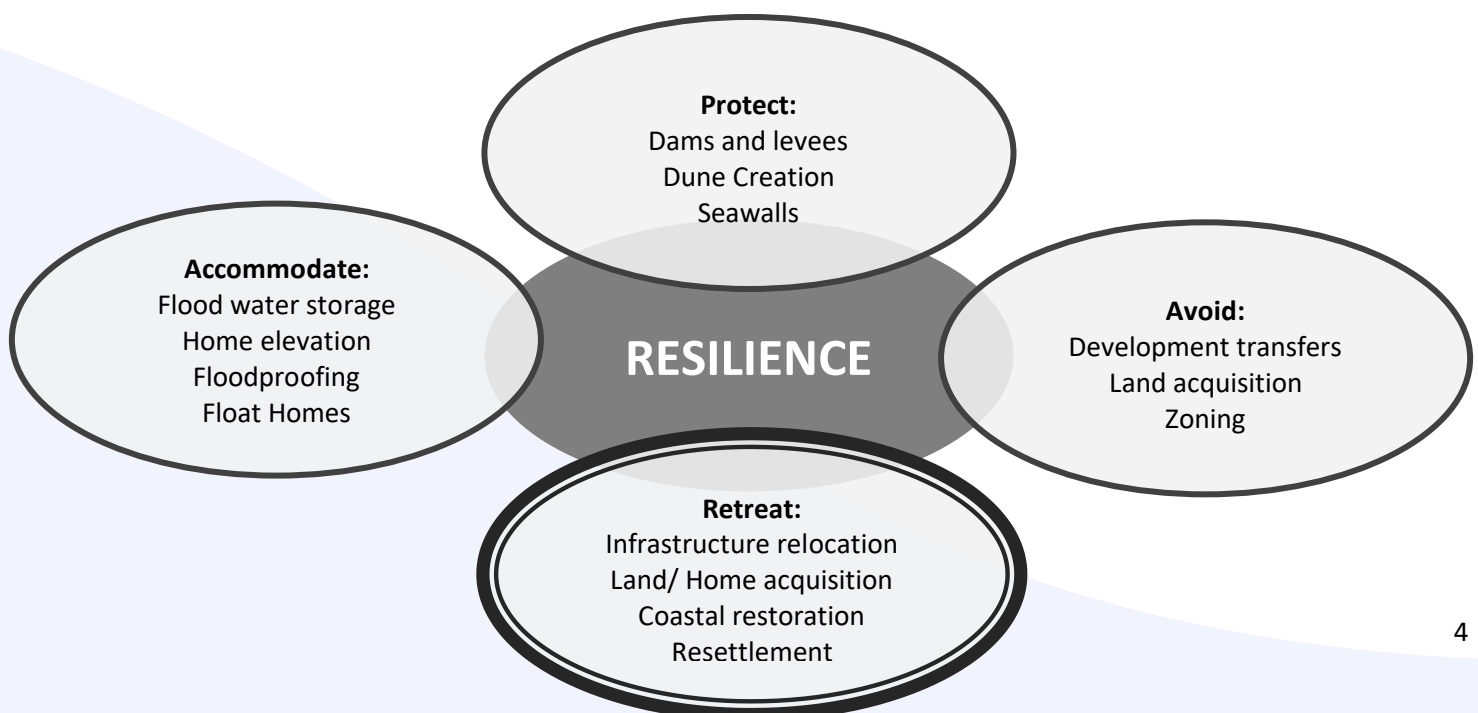
Keywords: managed retreat, flood recovery, disaster risk reduction, climate change adaptation, resilience



1.0 Introduction

‘Managed retreat’ (i.e. the acquisition, demolition, removal or withdrawal of homes, buildings and infrastructure away from flood risks) is gaining considerable attention as a component of flood risk reduction, climate change adaptation, and community resilience-building (Doberstein, Tadgell and Rutledge, 2020). In a flooding context, the overarching objective of managed retreat is to reduce the exposure of people and assets to flooding by retreating from these threats in a planned fashion (Doberstein, Fitzgibbons and Mitchell, 2019). In the long term, retreat from hazards is seen as a promising means by which to build resilience under changing climate conditions (Nicholls, 2011; Alexander et al., 2012; Harman et al., 2015; Hino, Field and Mach, 2017). Developing a better understanding of how Canadian communities are employing managed retreat as a form of climate adaptation is vital to the success of disaster and climate change resilience-building. Retreat is one of four main risk reduction and resilience-building options depicted in the “PARA” (Protect, Avoid, Retreat, Accommodate) framework below (Figure 1).

Figure 1: The PARA framework of resilience-building through exposure reduction (re-created from Doberstein, Fitzgibbons and Mitchell, 2019)



The acquisition of homes in flood-prone areas can reduce or eliminate the risk of future damage to properties, while simultaneously allowing for ecological restoration of former floodplains (Siders, Hino and Mach, 2019). However, the practice of managed retreat has historically been met with opposition due to often significant social, financial and political impacts that arise from moving individuals and communities to new locations (Binder and Greer, 2016; Hino, Field and Mach, 2017). Thus, acknowledging that relocation is inherently disruptive for community social networks is important to consider when broaching the idea of permanent retreat. Homeowners often hold a 'place attachment' to the communities they live in, which is rooted in either place identity (i.e. self-perception of identity as it relates to the surrounding physical environment) or place dependence (i.e. residents' perception of the degree to which the community meets their needs) (Jamali and Nejat, 2016).

After a natural disaster strikes, homeowners are often emotionally overwhelmed by damages and the ensuing recovery process. This emotional shock can compromise the property owners' readiness to deliberate, plan and evaluate the merits of buyout offers, and to make sound choices about relocation (de Vries and Fraser, 2012). While ideally, managed retreat should be carried out before a disaster strikes, most applications of managed retreat take place after a disaster has occurred. Well-planned government post-disaster recovery programs can help to significantly alleviate the emotional distress for affected homeowners.

Despite the abundance of existing research on climate change adaptation and disaster recovery, there is still a lack of consensus on how and when to facilitate managed retreat for at-risk communities. Research examining the different social, environmental and political determinants that influence homeowner decision-making can help to reduce gaps in knowledge on managed retreat as a possible disaster risk reduction and climate change adaptation strategy for Canada. It is imperative to compare the strengths and shortcomings of managed retreat programs across jurisdictions in order to create more effective evidence-informed policy.

In 2017, spring flooding on the Ottawa River affected multiple communities near the Ottawa National Capital Region, yet the experience with managed retreat was inconsistent across the affected communities. Due to significantly different flood response policies in the two provinces which border the Ottawa River (Ontario and Quebec) managed retreat was only incorporated in the Quebec communities. Homes in several Quebec communities were demolished after owners accepted hastily mandated Quebec Government buyout/relocation compensation. This approach was particularly evident in the community of Pointe Gatineau, where at least 30 homes were torn down after the 2017 floods (CBC, 2019b) (see Figure 2). By contrast, the community of Constance Bay in Ontario, just 40 kilometres away from Pointe Gatineau, also saw extreme flooding in 2017. Despite 380 homes being damaged, no owners were offered a buyout (i.e. there was no buyout program in Ontario at that time) or moved their homes to a safer location (see Figure 3 and 4). The 2019 Ottawa River flood, which closely mirrored and slightly surpassed the 2017 flood levels, once again impacted both Pointe Gatineau and Constance Bay, so it was timely to examine the various factors which fed into homeowner decisions to choose retreat over reconstruction. As the flooding

unfolded in 2019, the Quebec Government announced a revised and extended home buyout program (up to \$200,000/home plus \$50,000 for land) while the Ontario government again declined to offer a buyout program. These provincial flood recovery policy differences provided the unique opportunity to probe the impact of variable provincial policies on homeowner decisions to retreat from flood risks (or not).

2.0 Research Questions and Methods

Our research was framed within the theory of “policy windows/windows of opportunity” which typically open up following major disasters (see for example Birkmann et al., 2010; Huitema et al., 2011; Kousky, 2014; Braamskamp and Penning-Rowsell, 2018). This theory suggests that, in a post-disaster environment, it is possible to change, sometimes radically, the rules and policies that were in force before disaster struck (e.g. disallowing homes or neighbourhoods in floodplains through buyouts and zoning changes), and in doing so, reducing the potential for future similar disasters to occur. Policy windows typically do not remain open forever, and thus, there is a critical time component to the policy changes (e.g. creating a buyout program, purchasing damaged homes, rezoning land) that can be implemented post-disaster. Once a policy window closes it is extremely difficult to implement significant policy change, and often the political will for change evaporates (Birkmann et al., 2010). This research sought to probe the influence of post-disaster policy changes introduced during the “window of opportunity” which opened up after the 2017 and 2019 floods.

Through a comparative study of the communities of Pointe Gatineau, Quebec, and Constance Bay, Ontario, the research aimed to understand the current riverine flooding disaster-recovery and risk reduction policies in two provinces, and to examine the extent to which these policies reduced homeowner flood disaster risks or alternatively, led to homeowners ‘rebuilding risk’. Our working hypothesis for the research was that provincial government buyout policies and programs facilitating retreat would be a key factor in homeowners deciding to either retreat or rebuild. Normally, insurance and disaster relief payouts for flood damage are conditional on rebuilding in place, so these payments were hypothesized to work against the possibility of retreat.

2.1 Research Questions



1. To what extent and in what way did government-sponsored managed retreat (buyout) policies affect 2017/2019 flood victims’ decisions to retreat from flood risk?
2. What are the most important factors post-flood that convince homeowners to choose managed retreat over reconstruction?
3. How can managed retreat as a climate change adaptation and disaster risk reduction option be improved for use in Canada?

2.2 Research Methods

This research was structured as a comparative case study, with Pointe Gatineau, Quebec and Constance Bay, Ontario serving as the two cases. Data were derived from a combination of semi-structured interviews (n=20), secondary sources, and site visits. Semi-structured interviews were conducted to provide insights into why different post-flood policies were created in Ontario and Quebec (despite sharing a common river and flood risks), the evolution of the Ontario and Quebec policy strategies that followed the 2017/2019 floods, and the impact of the different provincial policies on homeowner decisions to retreat or rebuild.

Interviewees were selected based on purposive and snowball sampling methods which identified individuals with specific knowledge of one or both of the cases, and/or general expertise in the areas of managed retreat, home-buyouts, disaster recovery, climate change adaptation, or flood management. Disaster-affected homeowners were omitted from interviewee sampling due to ethical concerns about potentially triggering or accentuating post-disaster trauma, and to instead understand post-disaster homeowner decision-making via interviewees who were familiar with the cases. Interviewees were affiliated with municipal/provincial/federal government agencies, academia, research institutes, insurance, real estate, disaster relief agencies and community organizations. The majority of the interviews were conducted virtually (n=15), with the exception of five which were conducted in-person. The interviews followed a semi-structured format that lasted between 45 and 90 minutes. All interviews were audio recorded to facilitate accurate collection of data, and then transcribed using a combination of online transcription software (Otter.ai and Rev.com) and manual 'cleaning'. Themes that were explored in the interviews included: awareness and details about home-buyouts/flood damage compensation programs that lead to either rebuilding or retreat in the case study sites, factors that influence homeowners when considering retreat/non-retreat options, and opinions about programs needed under future climate change. Once the interviews were transcribed and converted into a MS Word file, manual analysis of the interviews began with the researcher coding for common themes that arose such as 'program design', 'benefits', 'barriers', 'factors influencing homeowner post-flood decisions', 'flood event narrative' etc. For the purposes of simplicity, key informants are referred to as 'interviewees' throughout the report.

3.0 Case Study Background

In April 2017, heavy rainfall and rapid snowmelt in the Ottawa River watershed led to the most severe flooding event that many local riverside communities had experienced in decades. This was followed up just two years later by even worse flooding, leading many homeowners to question the logic of rebuilding in the flooded communities. However, the differing policies in place in both Ontario and Quebec led to dramatically different post-disaster recovery approaches. The research used primary and secondary data sources to compare the impact of recovery programs in two communities which experienced successive floods - one which was able to tap into with a provincial government-sponsored home buyout program (i.e. Pointe Gatineau, Quebec) and one which did not have a provincial buyout option (i.e. Constance Bay, Ontario).

3.1 Pointe Gatineau, Quebec

Pointe Gatineau, located at the confluence of the Gatineau and Ottawa rivers, has had a history of flooding spanning more than 200 years. Portions of the Pointe Gatineau community are established in what is now considered to be a 1:20 year floodplain (CBC, 2017). Although the construction of upstream locks (in 1911) and hydropower dams (in 1920 and 1964) have reduced the frequency of flooding, significant flood events were experienced in 1926, 1947, 1951, 1974 and 1976 (The French-Canadian Genealogist, nd). After an approximately 40-year quiet period, two record floods occurred in April 2017 and May 2019, inundating the community and triggering managed retreat via two successive waves of home buyouts. Approximately 1,800 homes were affected by flooding in the wider Gatineau municipality during the Spring 2017 floods, with the Pointe Gatineau neighbourhood being hit particularly hard. Flooding in Spring 2019 exceeded the water levels of the 2017 floods.

Following the 2017 flood, Quebec provincial legislation banned home reconstruction in the 1:20 floodplain, and within weeks, the Quebec government facilitated managed retreat through a special 2017 flood-related program which piggybacked on its standard “Financial Assistance for Disaster Victims” program. In mid-April 2019, just as record-levels of spring flooding again began to inundate Pointe Gatineau, the Province announced a new disaster relief program expressly facilitating managed retreat by setting “hard caps on the amount of compensation available to homeowners in flood zones, with the goal of encouraging them to move elsewhere” (CBC, 2019c). The program compensates homeowners dealing with flooded properties outside of the 1:20 year floodplain with up to a maximum of \$100,000, after which the government offers to buy the home at a maximum cost of \$200,000, and an additional amount of up to \$50,000 for the land, granted as a buyout or ‘departure allowance’ (Government of Quebec, 2019). Homeowners who choose to rebuild rather than be bought out have a lifetime maximum recovery allowance of \$100,000. After the limit is reached, the Quebec government will not offer any further disaster assistance (Ottawa Citizen, 2019).

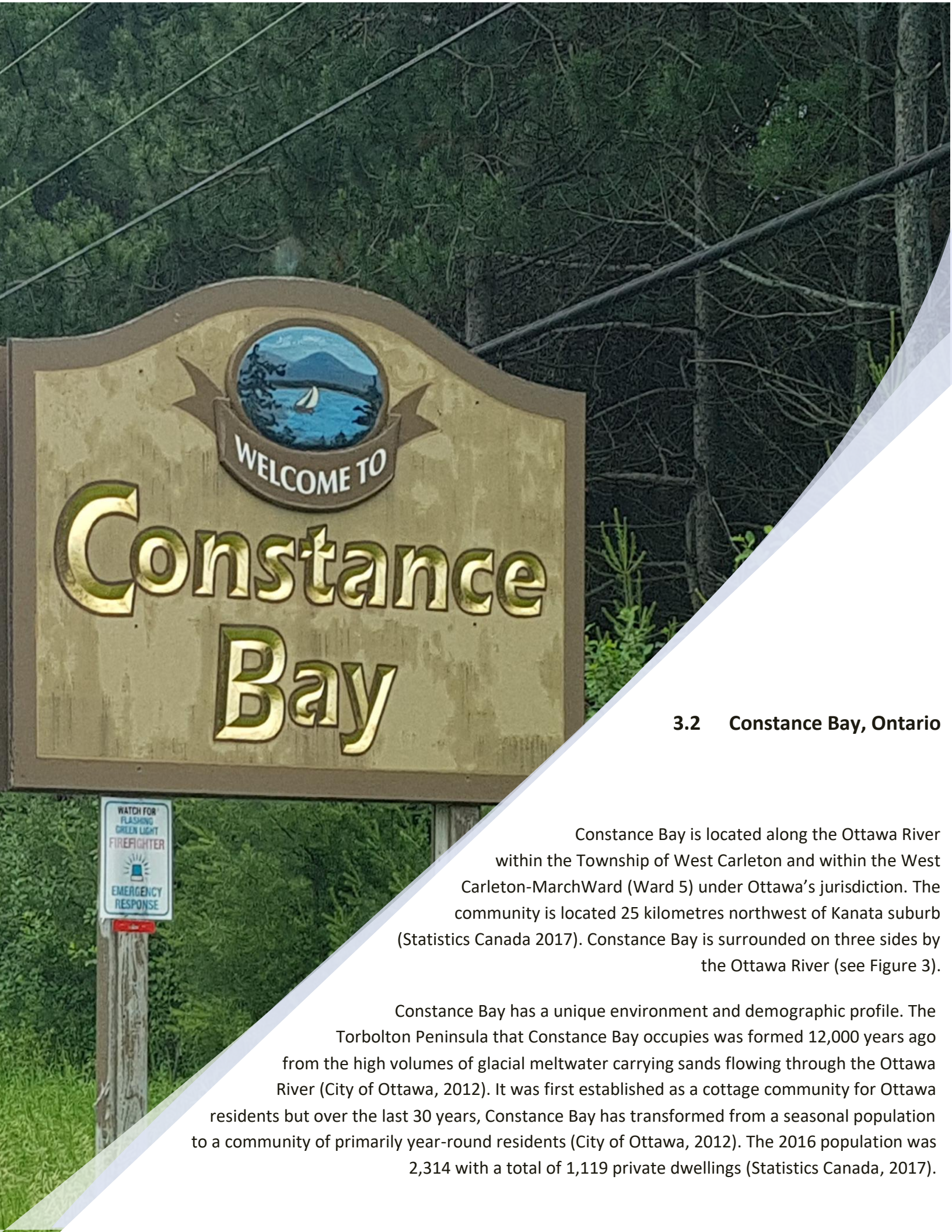


The managed retreat/buyout program in Pointe Gatineau has elements of both ‘forced retreat’ (i.e. for damaged homes located in the 1:20 year floodplain) and ‘optional retreat’ (i.e. for damaged homes located outside the 1:20 year floodplain). As detailed by Boudreault and Bourdeau-Brien (2020), “the (2019 Quebec Government) decree sets a ceiling on cumulative compensation for recurrent flooding, whereas the previous assistance program treated each flood independently and allowed owners to be compensated after each flood”. Considering that the 2017 and 2019 floods were successive events, the lifetime accrued amount of financial assistance received for a home cannot exceed 50% of the replacement cost or the upper threshold of \$100,000 (Government of Quebec, 2019). The explanation for this change was that the government was unable to repeatedly offer compensation to disaster victims because this was unfair to other taxpayers, and the new program incentivized homeowners to move from these flood-prone communities (Government of Quebec, 2019).

As of November 2019, over 185 house and condominium owners in Pointe Gatineau or the wider Gatineau municipality had accepted buyouts, and empty lots currently dot low-lying areas of the community in what is often called a “swiss-cheese pattern” of retreat (Figure 2). Some flooded residents were forced to move (forced/involuntary retreat) if their homes were located in the 1:20 year floodplain, while others who were outside the 1:20 year floodplain faced the difficult choice to either rebuild in a risky location (knowing that future flood damages would only be covered to the \$100,000 cumulative maximum) or accept a buyout. As with many disaster-related retreat programs, a post-disaster environment is a chaotic time in which to plan retreat and, in Pointe Gatineau, this has led to significant gaps in program implementation, unmet community needs, and elements of what might be called ‘unmanaged retreat’.

Figure 2: Community of Pointe Gatineau, Quebec, showing properties in red that have been bought out and demolished or are still ‘to be demolished’



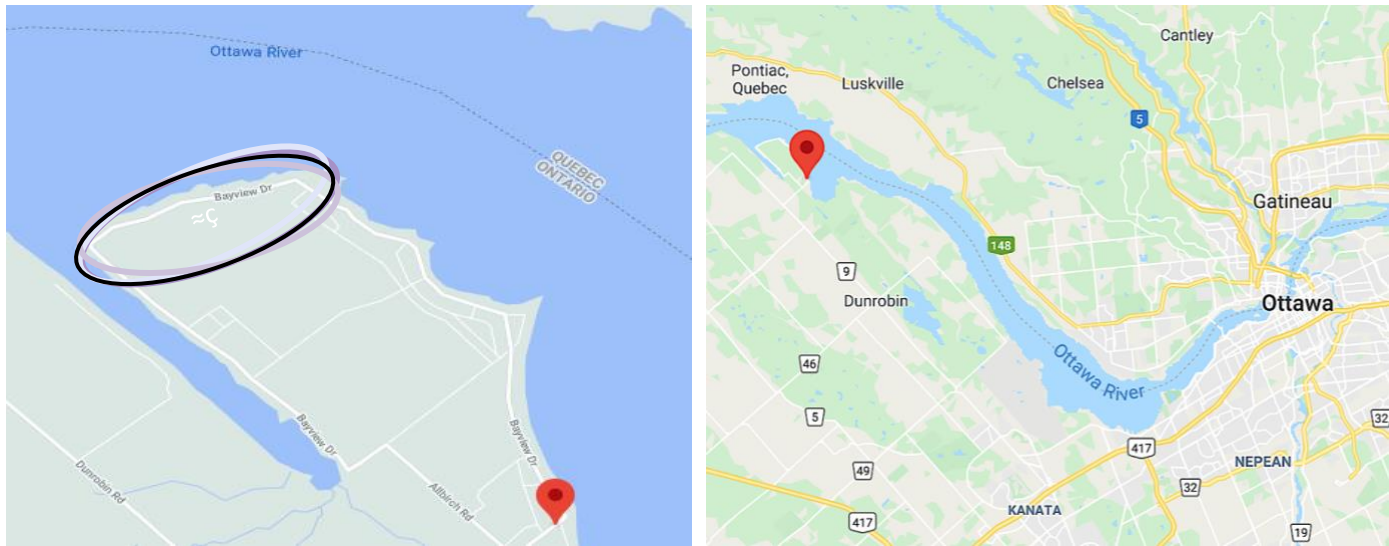


3.2 Constance Bay, Ontario

Constance Bay is located along the Ottawa River within the Township of West Carleton and within the West Carleton-March Ward (Ward 5) under Ottawa's jurisdiction. The community is located 25 kilometres northwest of Kanata suburb (Statistics Canada 2017). Constance Bay is surrounded on three sides by the Ottawa River (see Figure 3).

Constance Bay has a unique environment and demographic profile. The Torbolton Peninsula that Constance Bay occupies was formed 12,000 years ago from the high volumes of glacial meltwater carrying sands flowing through the Ottawa River (City of Ottawa, 2012). It was first established as a cottage community for Ottawa residents but over the last 30 years, Constance Bay has transformed from a seasonal population to a community of primarily year-round residents (City of Ottawa, 2012). The 2016 population was 2,314 with a total of 1,119 private dwellings (Statistics Canada, 2017).

Figure 3 – Constance Bay, Ontario, with areas flooded in 2017 and 2019 highlighted and showing proximity to Ottawa/Gatineau



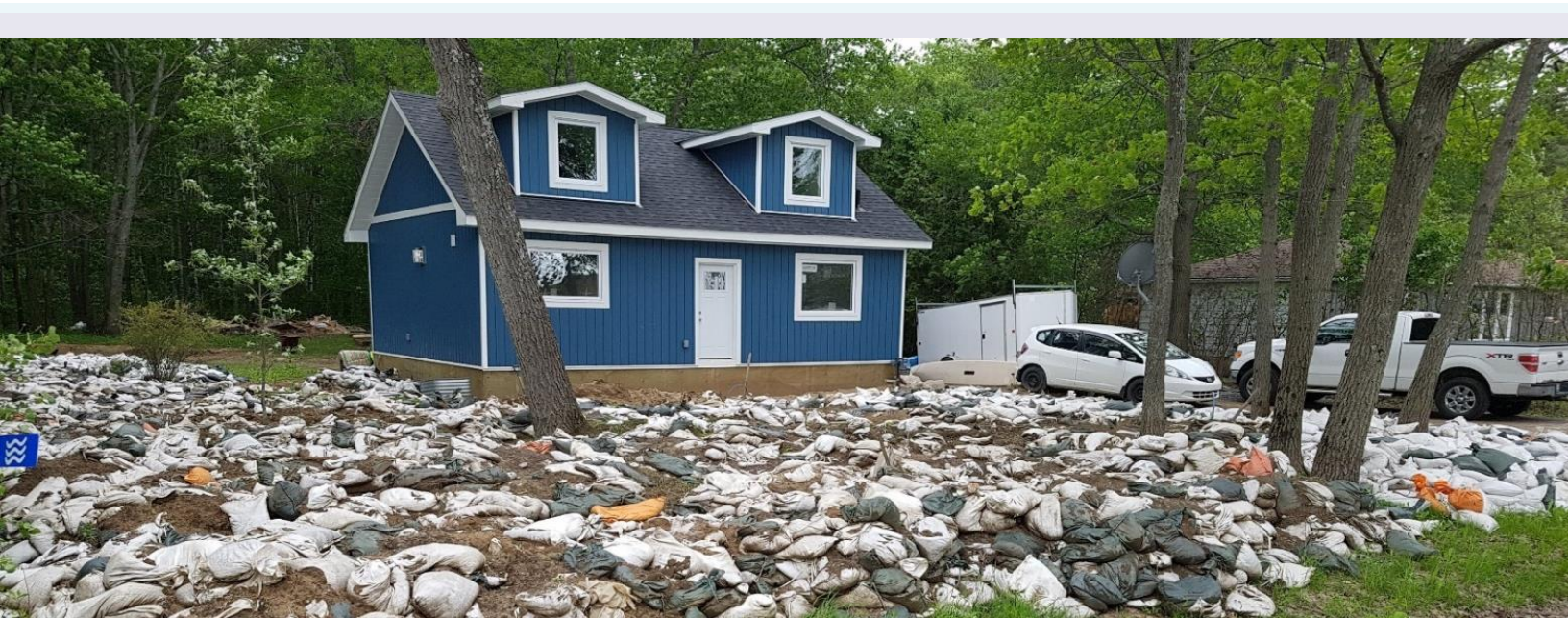
More than half of the population of Constance Bay is between the ages of 15 to 64 years (1,640), and of that, the highest number is between 55 to 59 years old with a count of 280 (Statistics Canada, 2017). The number of private dwellings occupied by long term residents is 86% (Statistics Canada, 2017). Housing in Constance Bay is highly sought after and vacant land in the region is being developed and converted to permanent dwellings. The City of Ottawa Official Plan prioritizes shifting growth in rural areas to villages, and Constance Bay is listed as one of the designated growth villages (City of Ottawa, 2012). The community's decisions relating to the recent flood events are likely highly influenced by the amenity value placed on the local environment and natural resources.

Constance Bay experienced Ottawa River flooding in both 2017 and 2019 (see Figure 4). The average water level for April in Arnprior, just upstream from Constance Bay, was 74.35 metres above sea level, yet in 2017 hit a record of 75.95 metres (CBC, 2019d). This was surpassed two years later during the 2019 flood when water levels were 30 centimetres higher (Whan, 2019). Constance Bay flood damages totalled \$2.8 million in 2017 and \$5.9 million in 2019, yet this was not enough to warrant federal disaster relief funding, which required at least \$46 million in damage (Kupfer, 2019). Therefore, the community was not eligible for federal assistance and instead had to rely on funding at the provincial and municipal levels.

Interviewees reported that Constance Bay homeowners who experienced flood damage were assisted financially through a combination of household insurance, the Disaster Recovery Assistance for Ontarians (DRAO) program, and some limited funding or in-kind assistance from organizations such as the Red Cross, Salvation Army, and the Canadian military. Eligible residents could receive a maximum DRAO payment of \$250,000, less any compensation paid out by homeowners insurance, with applications being paid at 90% of the eligible amount after the \$500 deductible was applied (Government of Ontario, 2019). A condition attached to the DRAO payment was that homeowners must rebuild on their property, but *the payment*

could not be used for retreat purposes (Government of Ontario, 2019, emphasis added). Interviewees who helped individuals with their DRAO applications noted that the application is lengthy and tedious, and can be rejected if portions are filled out improperly. Interviewees further highlighted that homeowners must attach quotes for their needed home repairs, and any funds granted must be used to rebuild or repair the house to the pre-flood condition, rather than to upgrade to a higher standard (e.g. elevating homes, adding flood-proofing components). Neither the DRAO program nor homeowner's insurance provides funding for home buyouts for properties located in floodplains, and so flooded Constance Bay homeowners were forced to rebuild in place in order to qualify for financial assistance. As a condition of funding, these programs quite literally force flooded homeowners to rebuild their flood risk.

Figure 4: One month post-flood in 2019, Constance Bay, Ontario



4.0 Results

Our findings indicate that provincial Government post-disaster recovery policies and funding programs in place in both Quebec and Ontario strongly influenced whether flooded homeowners attempted to retreat or rebuild following the 2017 and 2019 floods. Of the more than 1800 homes flooded in Gatineau in 2017 and 2019, 185 (about 10%) chose to - or were forced to - accept managed retreat/buyouts, while the remainder rebuilt, with varying mixtures of insurance funding, disaster assistance funding, loans, or personal savings. By contrast, in Constance Bay, despite 380 homes being damaged during the 2017 floods and even more during the 2019 floods, we found no evidence of even one case of government-facilitated managed retreat or home buyouts. We did however note several properties for sale late in 2019 and 2020 that were located in areas known to have flooded, and several of these properties were listed as “recently renovated” suggesting that homeowners may have rebuilt following the 2017 or 2019 floods, and were then trying to ‘self-retreat’ through a private sale. This has been noted in the literature on managed retreat

where, in the absence of formal buyout programs, homeowners self-retreat from flood-prone zones because they are unwilling or unable to shoulder the future costs of additional repair/rebuild cycles (Freudenberg et al., 2016), or deal with the psychological trauma associated with future flooding. The worrying outcome of self-retreat is of course that homeowners then end up passing along their flood risks to new owners. Ontario homeowners selling previously flooded properties are required to disclose the home's flood exposure via a Seller Property Information Statement which includes a specific question: "Is the property subject to flooding?" (Henstra and Thistlethwaite, 2018). Nonetheless, interviewees confirmed that a number of Constance Bay residents were successful in selling their homes and self-retreating from flood-prone parts of the community due to fears about future floods and frustration with the lack of governmental support for flood risk reduction. Without government support for risk reduction approaches such as retreat, "unmanaged, unstrategic, ad hoc retreat misses opportunities to contribute to societal goals" (Siders, Hino and Mach, 2019).

We also found that there was a lack of consistent assistance and support for homeowners going through managed retreat via the Quebec provincial home buyout program. Despite suggestions in the academic literature that homeowners accepting buyouts should be offered assistance in making sound choices about where to relocate (Siders, 2019), we found only limited evidence of such assistance in the Pointe Gatineau case, and heard repeatedly that the buyout process was fraught with delay and bureaucracy. Other than limited municipal assistance in waiving fees, speeding up issuance of demolition permits, and occasional help in navigating bureaucracy, interviewees said there was minimal support or assistance for homeowners throughout the planned retreat process. Interviewees suggested there was no assistance for homeowners in identifying homes in 'safer' locations, or helping homeowners to decide whether to relocate individually or as a group/neighbourhood. The initial wave of 2017 buyout applications were completed several months after the spring floods, yet interviewees said some residents still had not had their applications processed by the following winter 2018, with some reporting delays that lasted until the second flood in 2019. Interviewees explained that the lengthy program delays stemmed from the combination of a convoluted/bureaucratic application process, lack of guidance or on-the-ground support for applicants and, in some cases, long turnaround times once applications were submitted. Delays were also introduced simply due to the sheer scale of the two disasters, as it took months for public safety department inspectors to examine flooded properties and issue the damage assessment paperwork needed to initiate buyouts.

Interviewees explained that managed retreat can contribute to long-term community risk reduction and livability planning strategies, rather than simply reducing individual homeowner risk. Although the retreat process for 185 Pointe Gatineau properties initially produced the "swiss cheese" landscape commonly mentioned by managed retreat researchers (Bukvic, Smith and Zhang, 2015; Yarina, Mazereeuw and Ovalles, 2019), interviewees confirmed that the 2017/2019 managed retreat process unfolding in Pointe Gatineau is connected to a long-term vision for the "post-retreat lands". The city council has secured \$1.4 million for ecological restoration and redevelopment projects on vacant lots, with additional funds being paid out of the city councilor's discretionary budgets (CBC, 2019a). The city council has also planned future



grant applications to obtain funds for the more costly elements of the plan. At the time of publication, the plan is still unfolding and includes: rezoning some parts of the community from residential to recreation/greenspace; ecological restoration of the former residential land; creating recreational areas, walking trails, and facilities, and; creating an area which will commemorate both the flood history of the community and the sacrifices made by residents who agreed to be bought out. The resulting greenspaces will also serve as areas for future floodwaters to spill onto without damaging homes or valuable infrastructure. Interviewees believed that the municipal planning process for the retreat lands will engage the community in a transparent decision-making process, and the resulting post-retreat landscape will help Pointe Gatineau maintain resiliency in the face of future climate change.

We found that there is a high level of interest among Constance Bay residents in high-risk areas for the Ontario Government to modify its DRAO program to allow for both floodproofing and managed retreat/home buyouts. Several interviewees told of multiple conversations with flood-affected residents wishing to floodproof their property, instead of simply rebuilding to the original standards, in order to reduce the overall long-term financial burden on governments and taxpayers and to mitigate future damage that might occur from flooding. One key informant also noted that there is communal interest in Constance Bay for the provincial government to modify its policies to allow for buyouts at pre-flood market value, especially for homeowners who are vulnerable and at heightened risk. Several interviewees mentioned that they, and many flood-affected residents, cannot understand why Ontario's disaster recovery policies force disaster-affected homeowners to rebuild in flood-prone areas.

5.0 Recommendations and Conclusion

Multiple interviewees offered recommendations on how to improve managed retreat/buyout programs, and flood risk reduction more broadly in Ontario and Quebec. Many of these recommendations align with those in the academic literature (e.g. Brokopp-Binder and Greer, 2016; Siders, 2019). Below is a summary of these recommendations:

- **Modify the Disaster Recovery Assistance for Ontarians (DRAO) program:** DRAO should be modified to allow post-flood risk reduction actions such as managed retreat and accommodation/floodproofing, rather than just compensating homeowners for the costs of rebuilding what was lost.
- **Provide better homeowner support for managed retreat/buyout programs:** flood-affected homeowners need significant support and guidance to navigate program requirements and the retreat process. This might include the provision of dedicated on-the-ground support staff who help homeowners with their retreat decisions, walk homeowners through every step of the buyout process, assist homeowners with their search for homes in safer locations, connect flood-affected homeowners with counselling programs and social workers, and help to navigate unexpected roadblocks in the application process.
- **Create better risk communication strategies for homeowners living in floodplains:** updated floodplain maps and alternative ways to communicate flood risks are needed. Many homeowners continue to misunderstand the most common risk communication tool, the “1:20 year/1:100 year” flood recurrence intervals or floodplain maps. Interviewees mentioned that some homeowners believe that they are ‘safe’ from flooding for many decades after a 1:100 year flood occurs, and so have misunderstood the correct meaning of the concept. Risk professionals should convey risk using appropriate terminology that the average homeowner can understand. For example, stressing annual flood risks rather than long-term averages may be more effective (e.g. communicating to homeowners that they have a 5% or 1% annual risk of flooding, rather than 1:20 year or 1:100 year).
- **Create stronger connections between proactive managed retreat and broader community risk reduction and livability strategies:** managed retreat is still most commonly employed in a post-disaster setting. There is a need to create stronger connections between proactive retreat and community risk reduction and livability (i.e. greenspace and recreation) strategies. Retreat in a post-disaster setting is almost always rushed, often poorly planned, and is likely to be disconnected to broader community plans and strategies.
- **Create national guidance on managed retreat best practices, and promote provincial harmonization of buyout programs:** the research profiled here exposed significant differences in the disaster recovery programs of two Canadian provinces sharing a common border. National-level leadership is needed in order to reduce provincial differences in managed retreat/buyout practices.

Our research demonstrates that Government-sponsored home buyout/retreat programs are of interest to homeowners living in flood-prone areas, and to municipal officials trying to reduce risk exposure in communities. Floods are increasingly a costly burden on Canadian communities, and risk reduction and climate change adaptation strategies should include consideration of managed retreat as part of a suite of options (see Figure 1). Conversely, if managed retreat/buyouts are not part of provincial government policy, individual homeowners will continue to self-retreat (i.e. sell their properties) and pass along flood risks to new homeowners.



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Photographs: all photos taken by Doberstein, B. 2019.

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