



VOICES OF FLOODING IN WINDSOR, ONTARIO:

RESULTS OF A SURVEY ON FLOOD EXPERIENCES AND PREPARING FOR THE FUTURE

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IN PARTNERSHIP WITH:



TABLE OF CONTENTS

Summary.....1

Introduction.....2

Flooding in the City of Windsor.....3

Impacts of Recent Flooding in the City of Windsor.....5

Preparations, Then and Now.....8

Information Sources and Needs.....10

Conclusions and Next Steps.....11

References.....13

SUMMARY

Residents of the City of Windsor have been through many flood events in recent years. The latest events, in 2016 and 2017, resulted in over \$225 million in insured damages. In 2016, Partners for Action (P4A) conducted a national survey of residents who had experienced flooding. Results from this survey indicate that almost half of the costs of recent floods have been paid out-of-pocket, potentially doubling these losses to well over \$400 million in the past 2 years. In 2018, P4A conducted a survey with the City of Windsor and the Canadian Red Cross to gain a better understanding of flood risk perception and preparation among Windsor residents. Understanding the risk of flooding in a community is the first step to being prepared for future flood events. Just over half of respondents to the Windsor survey believed they lived in an area that was at risk, which is significantly greater risk awareness than Canadians living in flood-prone areas (6%). The survey results also show that more than half of respondents had done something to prepare before the last flood, and many are currently protecting their homes and families following the latest flood. Experiencing a flood seems to raise risk awareness, and drive action to protect homes and possessions.

Windsorites who have been through a flood had honest, simple advice for their friends, family, and neighbours, like installing sump pumps and backwater valves. These types of actions are made more affordable for homeowners with support from the City through the Basement Flooding Protection Subsidy Program. Residents also recommended the disconnection of downspouts, which can be completed for free by Windsor staff under the Downspout Disconnection Program. Additional recommendations from the survey included keeping valuables out of the basement or raising items off the floor, and investing in floodproofing property, rather than finishing basement living spaces. Finally, flood survivors advised others to understand personal flood risk and insurance options.

Everyone has a role to play in managing flood risk. P4A recommends clarifying those roles and working together to make Windsor more flood resilient. There are many actions homeowners can take to protect their homes and reduce the financial burden of flooding. We recommend that these actions, including why they are needed, how they work, their cost, and their role in creating a more flood resistant home, are made very clear to Windsorites. We also recommend promoting subsidy programs offered by the City and communicating the success stories of Windsor residents who are taking preparedness actions. Finally, the City needs to develop a plan and work with local media, social media leaders, and community groups to effectively communicate with residents before, during, and after a flood. These actions will help Windsor residents get the information they need and when they need it most.

KEY FINDINGS:

1. Flood risk awareness in Windsor is almost nine times the national average - 51% of respondents believe they live in an area at risk for flooding, compared to only 6% of Canadians.
2. Many respondents tried to prepare for flooding in their home (by installing sump pumps and backwater valves, purchasing sewer backup insurance, or raising valuables off the floor) but still had some damage.
3. Respondents that had not made flood and evacuation plans, or shared these plans with their neighbours, felt these were **ineffective** or **unimportant**. Those that did not purchase flood insurance, install sump pumps, use water-resistant materials, or grade their property, felt these actions were too **expensive**, or too **difficult**. Many who did not take action to protect themselves from flooding felt it was **not their responsibility**, or they **did not know how**.
4. While just over half of respondents were acting to protect themselves from flooding, many did nothing, mostly because they felt they had done enough or were safe from flooding because it had never happened to them before.
5. Twenty-four percent of respondents do not have an emergency kit, mostly because they feel an it is **unnecessary** because they will never have to evacuate their homes or they have enough supplies on hand.
6. **People rely on different sources for information about floods and daily weather.** The Weather Network and local radio and television stations were key for information before a flood; local radio and television and social media for information during a flood; and the City of Windsor's website and local radio and television stations for information after a flood.
7. **Friends, family and neighbours** are the most important source of support before, during and after a flood, followed by **municipal representatives** before and after a flood, and **Emergency Services** during a flood event. **Community volunteers** and **non-profit organizations** are also valued during and after floods.
8. **As a result of the 2017 flood, many respondents have decided to prepare**, including purchasing a sump pump or backwater valve; raising expensive appliances off the floor; and disconnecting their downspouts.

INTRODUCTION

Flooding is one of the most common environmental hazards to affect people, their properties, and their livelihoods. Between 1918 and 2018, there were 302 major flood events in Canada, accounting for approximately 37% of all natural disasters to occur in the country during that time (Public Safety Canada, 2018).

Federal payments for flood assistance have skyrocketed over the last four decades, from \$300 million during the 1970s to \$3.7 billion during the 2010s, with floods now accounting for 76% of total disaster spending nationally (IBC, 2016). Impacts on federal budgets will only continue to grow, with estimates of flood losses expected to be approximately \$673 million annually over the next five years (PBO, 2016). On average, flooding in Canada costs over \$1.2 billion every year, with homeowners covering most of the losses themselves (Swiss Re, 2016).

The causes, size, location, and consequences of every flood is different. Urban flooding in particular is a growing concern as urban centres continue to develop with increasing populations, putting pressure on infrastructure and nature's ability to soak up water where it falls. Between 2003 and 2012, flooding in Canada cost more than \$20 billion in damages (Public Safety Canada, 2016). Two floods in particular, the 2013 flooding in southern Alberta and the 2013 flash flood in Ontario, cost approximately \$2.8 billion in insured losses (IBC, 2017) and affected or displaced hundreds of thousands of Canadians. In 2016 alone, insured losses for natural catastrophes, including flood, approached \$5 billion (IBC, 2017).

In 2018, Partners for Action partnered with the Canadian Red Cross and the City of Windsor to examine the perception that many Canadians fail

to prepare against flood risks. The partners sought to understand how to improve their risk messaging to encourage more residents to take protective actions before, during, and after flood events. Partners for Action developed a survey that examined several important themes, including:

- individual experiences with flooding in the City of Windsor;
- perceptions of household flood risk and likelihood of future flooding;
- current and future protective actions;
- preferred sources for information before, during, and after a flood event; and,
- awareness of or participation in City-led initiatives (e.g., Downspout Disconnection Program, Basement Flooding Protection Subsidy Program, Sewer Master Plan, and Climate Change Adaptation Plan).

The online survey was available from April 5 to May 15, 2018, and promoted through a variety of outlets, including the City of Windsor main website and Sewer Master Plan website, social media platforms, print and radio, and numerous public outreach events. A total of 420 respondents with postal codes located in the City of Windsor completed the survey, and their responses were analyzed for this report.

Respondents provided input for survey questions that were relevant to their particular situation. Results presented throughout this report are based on the percentage of the 420 respondents who answered each individual question. In terms of their representativeness of the study area as a whole, the percentages provided are generally accurate within +/- 5.7% at a 95% confidence level.

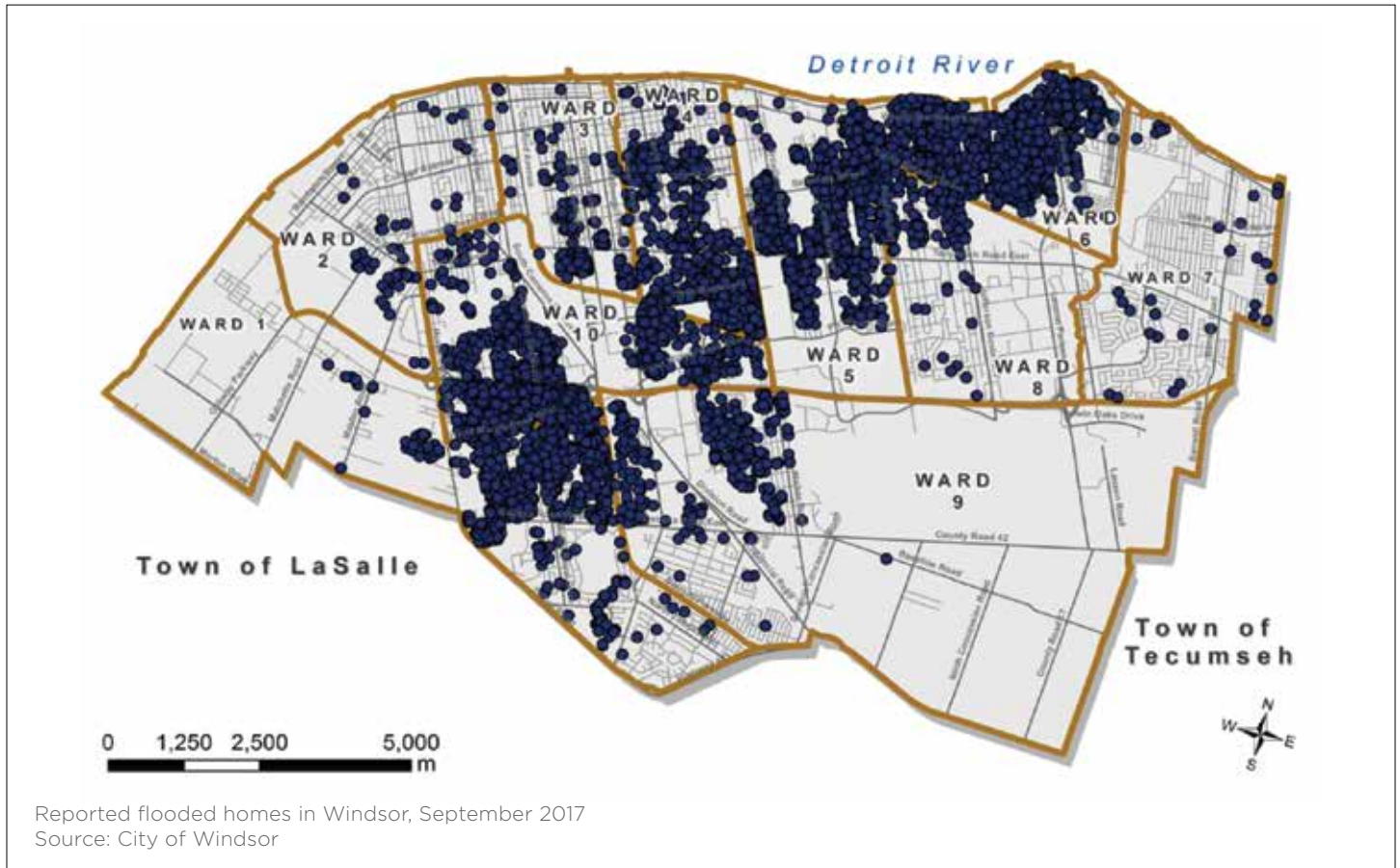


Source: Insurance Bureau of Canada

Insured Catastrophic Losses in Canada

FLOODING IN THE CITY OF WINDSOR

The City of Windsor is located in southwestern Ontario, with an area of approximately 146 km² and a population of 217,188 (2016 Census). Windsor has a long history of flooding, and has experienced several large floods within the last five years, including the wide-spread September 2016 and August 2017 floods. Together, these storms resulted in over 9,000 reported incidences of flooding that resulted in over \$225 million in insured losses (IBC, 2016, 2017).

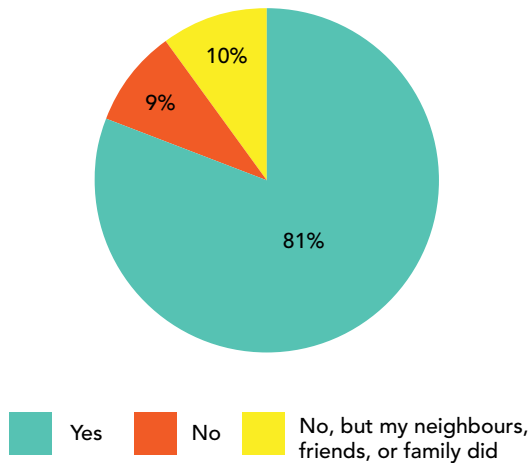


In an effort to reduce the losses from flooding, the City of Windsor has launched a number of initiatives aimed at homeowners. In 2011, the Basement Flooding Protection Subsidy Program began, providing a financial subsidy to residents who install sump pumps, and overflow or backwater valves, up to \$2,800 per household. Approximately 4,000 homes have taken advantage of the subsidy program (M. Winterton, City of Windsor, personal communication, June 8, 2018).

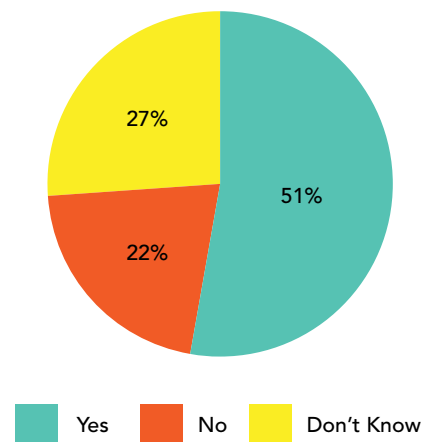
The Downspout Disconnection Program began in 2013, intended to both reduce the amount of runoff entering the sewer system and to raise homeowner awareness on the benefits of downspout disconnection for the City of Windsor. Approximately 4,000 homes (5-10% of total homes that could benefit from disconnection) have participated in this free program to date (M. Winterton, City of Windsor, personal communication, June 8, 2018).

The study partners identified the need to understand residents' risk perceptions and overall levels of concern about future flood events. The survey asked several questions about residents' household flood risk, the perceived likelihood of future flooding, and concern about future flooding. Although 81% of respondents experienced a flood at their home since 2010, only 51% felt they lived in an area that is at risk for flooding. This is still significantly greater risk awareness than Canadians in flood-risk areas surveyed in 2016, with 6% believing they lived in an area at risk for flooding (Thistlethwaite et. al., 2017). Also, many of the respondents indicated that this was the first time their home had been flooded, and that the flood they had experienced was "extremely unexpected" and a "once in a lifetime" event.

HAVE YOU FLOODED IN THE LAST 10 YEARS?



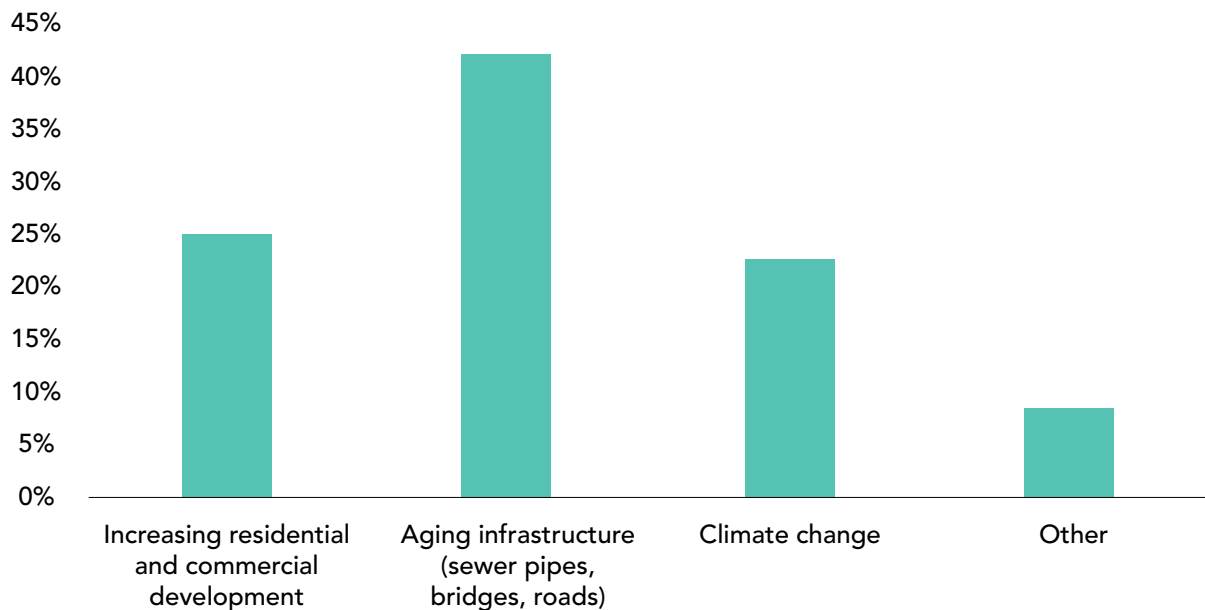
DO YOU LIVE IN AN AREA AT RISK FOR FLOOD?



While the majority of respondents were concerned about flooding (95%), only 81% felt that their community could flood within the next five years. Previous research has shown that people who go through many small flood events can overestimate their ability to handle larger events (e.g., Mileti and O'Brien, 1993; Paton et al., 2000). Respondents who believe flooding is likely in the next five years were less likely to be concerned, but those who felt a flood was less likely in the next five years were more concerned, perhaps because they were thinking about floods like the 2016 and 2017 events, which many respondents believed were "once in a lifetime".

Respondents were also asked to share their thoughts on what factors are contributing to flooding in the City of Windsor. Respondents blamed inadequate and/or aging infrastructure (43%), increasing residential and commercial development (25%), and climate change (23%). Seventy respondents provided more details on their responses, including blaming construction of new highways. There was also a strong belief held by a small minority that the 2017 flood occurred because the pumping station was turned off - either due to human error or negligence.

WHAT IS CONTRIBUTING TO FLOODING IN WINDSOR?



IMPACTS OF RECENT FLOODING IN THE CITY OF WINDSOR

The study partners also wanted to understand the socio-economic impacts of the flooding experienced by Windsor residents. Approximately 81% of respondents had experienced flooding at their home since 2010, and almost half had experienced more than one flood during this period. Over 60% of respondents said flooding had interfered with their daily activities. The most common impacts included: 1) being unable to use the washer, dryer, furnace, or hot water heater, which meant respondents were unable to do laundry, wash dishes, bathe, or clean; 2) missing work, either to clean up after the flood or to deal with contractors, insurance adjusters, or City workers; and, 3) being unable to access the basement, which was used as a recreational and/or bedroom space.

The economic impact of flooding since 2010 is substantial. Sixty-nine percent of respondents who provided details faced over \$10,000 in damages, with 17% having \$50,000 or more in damages. Windsor residents paid for these damages with personal savings (41%) and insurance (45%), but some indicated that they could not pay for the damages to their homes and property, and only 0.6% received government disaster assistance. Others had to take out second mortgages on their homes, apply for lines of credit and/or credit cards, or borrow money from friends and family. For those individuals with limited resources, the flooding since 2010 has had negative financial consequences.

Respondents were asked to think back to the most recent flood that affected their home or community, and share information about how they prepared for the flood. Almost half of respondents indicated that they did nothing to prepare. When asked why, these respondents said they had thought they were safe or that they had lived in their homes for years without a flood, so they were not expecting this one to impact them:

“We had not prepared. We have lived in the house for fifteen years and had never flooded. Our neighbours have lived in the neighbourhood for over 50 years and never flooded. We did not expect to flood.”

(Homeowner, 35-44 years old)

“My home is 34 years old and had never previously flooded. I did not think it ever would flood – no special flood prevention was in place.”

(Homeowner, 65-74 years old)

However, many respondents indicated that they did prepare prior to the most recent flood. These preparations ranged from installing sump pumps and backflow valves, fixing drainage on their property, disconnecting downspouts, and waterproofing. It is important to note, however, that preparations cannot eliminate all flood risk:

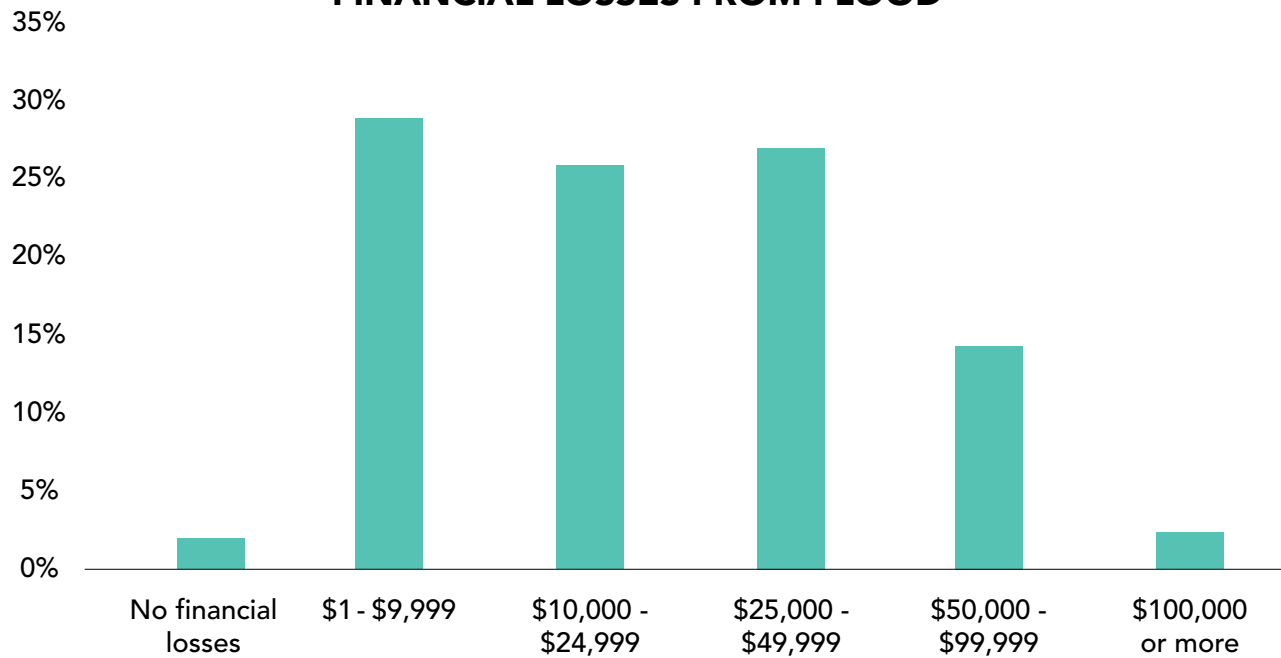
“We were flooded less than a year before the most recent event. We purchased a back-up sump pump (even though ours has always worked properly) and installed a routing system that allowed any water from the sump pump to be directed into the backyard immediately, should the infrastructure become over capacity. We also have a back flow valve. Despite all this, we flooded again. The water was coming up from our washbasins.”

(Homeowner, 35-44 years old).

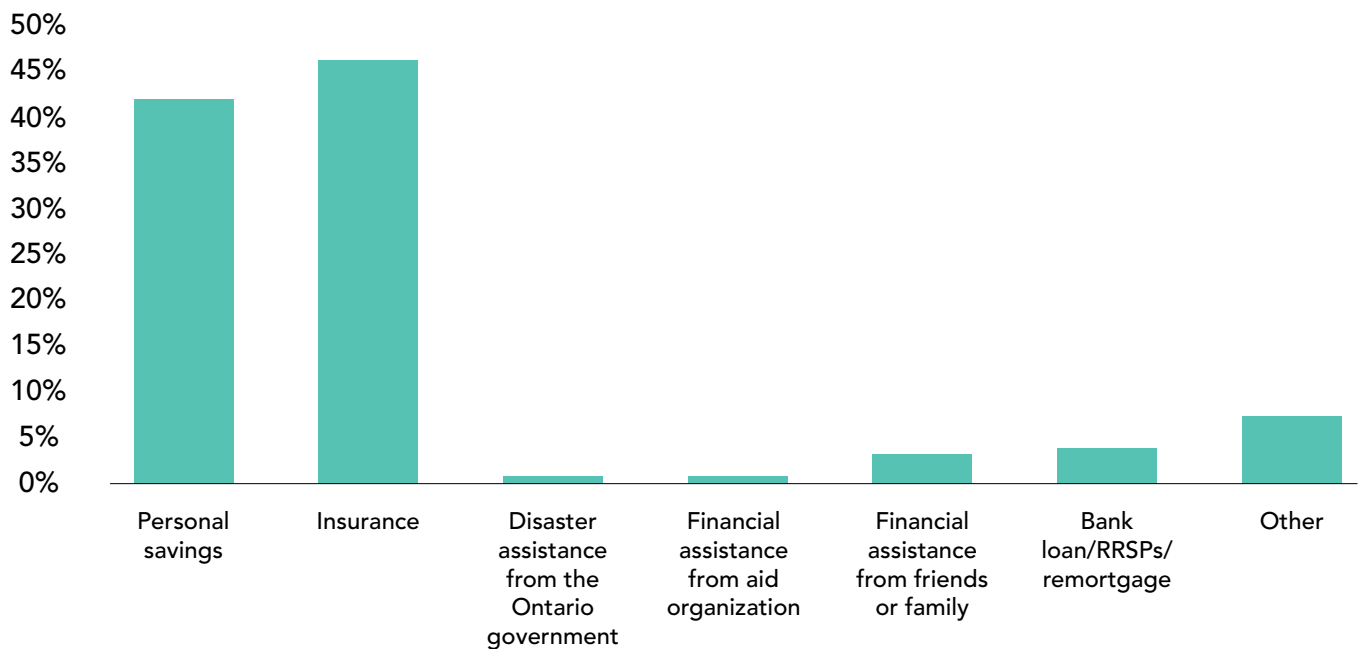
Respondents also said that, prior to the flood, they put items in bins and/or moved them to higher elevations, put heavy appliances such as washers and dryers on blocks, and purchased insurance. Only four respondents indicated that they had existing emergency supplies in their home.



FINANCIAL LOSSES FROM FLOOD



HOW DID YOU PAY FOR RECOVERY FROM THE FLOOD?



The survey also asked respondents to share what they did immediately before, during, and after the most recent flood. Most respondents did nothing out of the ordinary immediately before the flood. Although many of these respondents felt their homes would not flood, some said they wanted to prepare, but could not leave work to do so. The most common actions taken in the hours before the flood included: remaining vigilant (e.g., checking sump pumps, watching the rain, turning on the weather forecast); and moving things to higher ground or putting them in tubs. Some respondents talked about their emotional state, saying that they were “worried”, “panicked”, or that they spent time “hoping and praying”.

When asked what they did during the most recent flood, 47% of respondents said that they did “Nothing”. The main reason was that the water came too quickly (230mm in 24 hours), and that they were unable to stop the flooding once it had started. The most common actions taken during the flood were damage control: mopping, bailing water with buckets, getting extra sump pumps, and blocking areas where water was coming into the home. Respondents also took items and furniture to higher ground or put them into bins.

“We were helpless. All we could do was sit back and watch. My husband is not in the best of health, so he could only move so much physically by himself.”

(Homeowner, 45-54 years old)

“My parents were pushing the water that came up from the drains to the sump pump. We also put a bunch of towels on the drain [...] to stop the water from coming up. It wasn’t working water was coming up fast. My brother-in-law and myself was moving furniture and boxes up off the floor and pushing water. My sister was on the phone with our insurance company.”

(Homeowner, 35-44 years old)

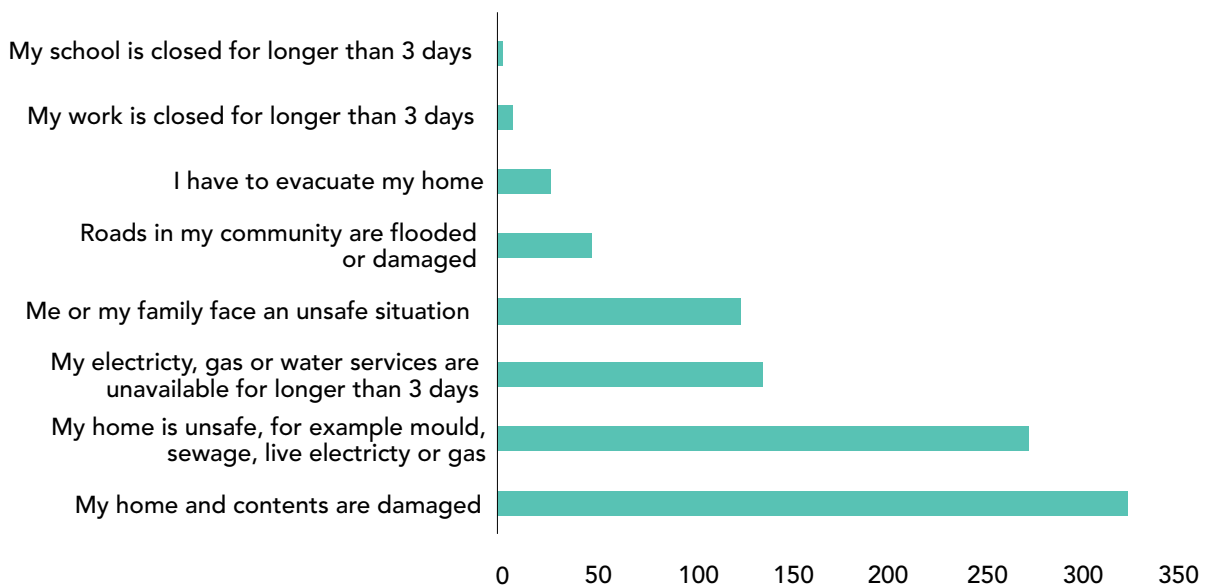
Lastly, respondents shared their experiences in the days and weeks following the flood. Almost all engaged in some form of clean-up, including: throwing out personal belongings and furniture; sanitizing and bleaching floors and walls; calling insurance and/or the City; ripping out carpet and drywall; and buying dehumidifiers and fans. Many said that they decided to prepare for the next flood by purchasing a sump pump/backwater valve; raising heavy appliances onto platforms; or waterproofing.

Unsurprisingly, respondents had many concerns about possible future flooding. The three most common concerns were:

- 1) damages to homes and their contents (34%);
- 2) homes being unsafe due to mold or sewage (28%); and,
- 3) electricity, gas, or water being unavailable for long periods (13%).

There was much less concern about issues such as work or school closures, evacuations, or impacts to public roads.

WHAT IS YOUR BIGGEST WORRY FOR FUTURE FLOODING?



PREPARATIONS, THEN AND NOW

Although it is impossible to completely eliminate flood risk, being prepared can drastically reduce flood impacts. Respondents were asked about what preparations they had taken prior to the most recent flood, and what actions they had taken or planned to take to prepare for the next flood. Most people wanted the actions to limit the financial impact and damage to their homes and belongings, and to improve their family's safety during a flood event. The majority of respondents seemed well informed about flood risk and preparedness, as many have already learned about their flood risk (76%) and have gathered information on what can be done to protect their homes (83%). They also have or will soon have a flood plan (84%), make and share an evacuation plan (68%), and gather enough emergency supplies for several days (76%). The majority of respondents (69%) also have some form of sewer backup insurance. These results are similar to those for people impacted by the 2013 Calgary flood (City of Calgary, 2016).

MOST RESPONDENTS HAVE TAKEN SOME ACTIONS TO PREPARE FOR FLOODING:

76% learned about their flood risk

83% gathered information on what can be done to protect their homes

84% will, or soon will, have a flood plan

68% have or will soon have and share an evacuation plan

76% already have, or plan to gather enough emergency supplies for several days

69% have some form of sewer backup insurance

Many respondents have already learned about flood insurance (82%), identified safe spaces (87%), placed valuables in tubs (79%), disconnected downspouts (74%), and installed sump pumps and/or backwater valves (65%). Fewer respondents use water-resistant building materials (57%) or cover basement window wells/seal basement windows (44%).

Respondents were also asked why they did not prepare, and the reasons varied by preparation type. For those that had not prepared, actions such as gathering flood-related information, making and sharing flood plans, evacuation plans and plans with neighbours, and placing valuable documents in waterproof containers, were thought to be unimportant or ineffective in protecting respondents' homes or families.

There were a number of other barriers to preparedness that were identified by respondents. Purchasing flood insurance, disconnecting downspouts, using water-resistant building materials, and grading property were seen as being too expensive, too difficult, or requiring too much time. Some respondents felt that certain preparations were also not their responsibility, such as gathering flood-related information, purchasing flood insurance, and disconnecting downspouts.

Lastly, some respondents felt they did not know how to prepare, including learning about their flood risk, disconnecting downspouts, grading property, and covering and sealing basement windows.

Twenty-four percent of respondents were uninterested in an emergency kit, and do not have one or plan to purchase one. When asked why, these respondents overwhelmingly felt that emergency kits were unimportant or ineffective. Many respondents indicated that floods in the City of Windsor were too small to warrant evacuation or that they had enough groceries in the house.

The City of Windsor has several city-led initiatives and programs, such as the Downspout Disconnect and Basement Flood Protection Subsidy programs. Most respondents had heard about these programs, but only 52% had taken advantage of them. Although these numbers are significantly higher than the City of Windsor overall, almost 14% of respondents still have never heard of these programs before.

WHAT ADVICE DO YOU HAVE FOR YOUR FRIENDS, FAMILY AND NEIGHBOURS TO HELP THEM PREPARE FOR THE FUTURE?

1. Install and maintain sump pumps and backwater valves (along with having battery-operated generators and back-up pumps).
2. Keep valuables out of the basement. If there are valuables in the basement, keep these items and appliances elevated off of the floor, in waterproof containers.
3. Avoid furnishing or finishing basements into living spaces, instead, invest in waterproofing your property.
4. Take advantage of City subsidy programs.
5. Disconnect your downspouts (the City will do it for free!).
6. Understand your insurance coverage and purchase extra coverage if available.
7. Check your household drains and eavestroughs often.
8. Ask about flood risk when purchasing a home.
9. Know how to shut off the electricity in the event of a flood.



INFORMATION SOURCES AND NEEDS

When faced with environmental uncertainty, such as a potential flood, people seek out information to try to minimize this uncertainty. Every person’s information needs, preferences, and habits are unique, and no two individuals obtain and interpret information in exactly the same way. It is important to understand from what source and in what format residents want information about floods and flood risk. When asked about the most important source of weather information, respondents indicated that The Weather Network (20%), weather “apps” (18%), local TV (15%), and local radio (10%) were most common. Internet websites (8%) and social media (5%) featured less prominently.

Respondents were also asked about where they get information before, during, and after a flood. Most people preferred to get information before a flood from The Weather Network and local radio and television. During a flood, local radio and television and social media were seen as the most valuable sources of information, followed closely by The Weather Network and Emergency Services. Respondents also indicated that they relied on their personal networks during a flood (e.g., family and friends, telephone calls, text messages). After the flood had passed, respondents relied on the City of Windsor’s website, and local radio and television.

Respondents were also asked who would be most helpful to them before, during, and after a flood as a source of information, support, or guidance. Family, friends and neighbours were considered to be the most important source of help before (42%), during (45%), and after (33%) a flood event. Municipal representatives and elected officials were also relied upon before a flood event (17% and 14%, respectively). During a flood, respondents also relied on fire and police services (21%), and community volunteers and non-profit organizations (9%). Finally, after a flood, respondents also relied on municipal representatives (14%) and community volunteers and non-profit organizations (13%).

Next, respondents were asked what information they lacked that could have helped them prepare for, respond to, or recover from the most recent flood that affected their home or community. Most respondents wanted to know their local flood risk and what they could do to protect their home and belongings. Many felt that they needed more information about local weather, including warnings of heavy rainfall. Only a small portion of respondents wanted additional information about how to protect their families or when/where to evacuate.

WHAT INFORMATION COULD HAVE HELPED YOU PREPARE?
.....
My local flood risk (32%)

What I could do to protect my home and belongings (23%)

Local weather information/warning that heavy rain was coming (18%)

What I could do to protect my possessions (15%)

CONCLUSIONS AND NEXT STEPS

Over the last decade, the City of Windsor has experienced several large flood events that affected thousands of families and caused over \$225 million in insured losses (IBC, 2016, 2017). Researchers at Partners for Action asked Windsor residents for their thoughts on flood risk and preparation for flooding within the city. This section summarizes the most important findings from this survey, and discusses the implications of this work in terms of flood risk communication and encouraging homeowners to protect themselves from flooding.

Summary of Key Findings

1. Flood risk awareness in Windsor is almost nine times the national average - 51% of respondents believe they live in an area at risk for flooding, compared to only 6% of Canadians. .

2. While just over half of respondents were acting to protect themselves from flooding, many did nothing, mostly because they felt they had done enough or were safe from flooding because it had never happened to them before.

3. Respondents that had not made flood and evacuation plans, or shared these plans with their neighbours, felt these were **ineffective** or **unimportant**. Those that did not purchase flood insurance, install sump pumps, use water-resistant materials, or grade their property, felt these actions were too **expensive**, or too **difficult**. Many who did not take action to protect themselves from flooding felt it was **not their responsibility**, or they **did not now how**.

4. Many respondents did nothing to prepare for the most recent flooding to affect their home. Overwhelmingly, this was because they **felt they were safe from flooding**.

5. Twenty-four percent of respondents do not own or plan to own an emergency kit, mostly because they **feel an emergency kit is unnecessary** because they will never have to evacuate their homes or they have enough supplies on hand.

6. People do not obtain information about floods from the same sources that they obtain information about daily weather. Respondents rely on The Weather Network and local radio and television stations for information before a flood; local radio and television and social media for information during a flood; and the City of Windsor's website and local radio and television stations for information after a flood.

7. Respondents indicated that **friends, family and neighbours** are the most important source of support before, during and after a flood, followed by **municipal representatives** before and after a flood, and **Emergency Services** during a flood event. **Community volunteers** and **non-profit organizations** are also valued during and after floods.

8. As a result of the most recent flood, many respondents have decided to engage in additional preparedness actions, such as: purchasing a sump pump or backwater valve; raising expensive appliances off the floor; and disconnecting their downspouts.

People rarely prepare on their own, even when they perceive themselves to be at risk for flooding, so increasing risk awareness is not enough to drive community preparedness. Information should consider what community members need to cope - knowing whether actions will be effective, but also understanding their cost (in time and money). This survey found that many respondents believe that certain actions (such as having an emergency kit, putting valuable items in bins, and having emergency plans) are not effective at reducing their risk. Accordingly, it is important to highlight the usefulness and effectiveness of these measures for flood preparation, and also linking emergency preparedness to other events, such as a major winter storm, tornado, or blackout.

Other adjustments were perceived to be too expensive, such as installing sump pumps and backwater valves, and disconnecting downspouts. This study found that 14% of respondents did not know about Windsor's Downspout Disconnection Program or the Basement Flooding Protection Subsidy Program. Increasing awareness of these campaigns, including the costs and benefits to residents, may demonstrate their affordability and effectiveness for homeowners.

Lastly, respondents indicated that friends/family/neighbours, municipal representatives, and community/non-profit organizations are most helpful after a flood has occurred. The City and the Canadian Red Cross should focus efforts on communicating about flood risk and what to do before, during, and after a flood to well in advance of flooding, to ensure residents know what to do, and who to turn to for advice and guidance. The City and its partners should also host preparedness events for families, friends and neighbours that encourage learning how to prepare and reduce risk, together.

We offer the following recommendations to the City of Windsor towards effective flood risk communication in their community:

- 1.** Clarify roles and responsibilities for managing flood risk by explaining what residents can do, what the City can do, and how to work together to make the community more flood resilient.
- 2.** Inform residents that flood protection is for everyone, everywhere, and has many components. Residents need to make sure they are doing enough to protect themselves from flooding and should recognize that being prepared extends to other emergencies.
- 3.** Provide information on available resources and solutions that will allow residents to make informed decisions about their ability to protect themselves –the effectiveness and importance of protection, and also the time, effort, and cost involved. Where possible, link to financial incentives or supports – these can help both those without the financial or physical resources, and those who are ambivalent, to prepare (Coppola and Maloney, 2009).
- 4.** Promote incentive programs offered by the City, and how effective they are in reducing flood risk – many saw disconnecting downspouts as beyond the responsibility of the homeowner, and installing backflow valves and sump pumps was seen as too expensive. Explaining why these efforts can help reduce flood risk, and how the City can help reduce costs and effort will help overcome these obstacles.
- 5.** Develop a plan and work with local media, social media leaders, and community groups, like the Canadian Red Cross, to communicate not just weather information, but updates before, during, and after flood events. Work with partners to notify residents about upcoming flooding online, and through the Essex Region Conservation Authority.
- 6.** Host preparedness events and training opportunities for families, friends, and neighbours that encourage learning how to prepare and reduce risk, together.
- 7.** Communicate success stories of residents who have taken actions to reduce their flood risk and use these stories to motivate other members of the community.

We offer the following recommendations to the Canadian Red Cross towards effective flood risk communication nationally:

- 1.** Inform residents that flood protection is for everyone, everywhere, and has many components. Residents need to make sure they are doing enough to protect themselves from flooding and should recognize that being prepared extends to other emergencies.
- 2.** Provide information on available resources and solutions that will allow residents to make informed decisions about their ability to protect themselves –the effectiveness and importance of protection, and also the time, effort, and cost involved. Where possible, link to financial incentives or supports – these can help both those without the financial or physical resources, and those who are ambivalent, to prepare (Coppola and Maloney, 2009).
- 3.** In a recent Red Cross survey, 25% of respondents identified the Red Cross as their first source of information following a disaster (Canadian Red Cross, 2018). We recommend expanding this trust further by forming strong local relationships with municipalities, traditional and social media outlets, and community groups to communicate not just following a disaster, but also through materials and the Be Ready App for weather information/watches and warnings, and updates before, during, and after flood events.
- 4.** Build disaster risk reduction and natural hazard awareness raising events into the CRC volunteer model, empowering volunteers to work within their communities to raise awareness and reduce risk.
- 5.** Communicate success stories of Canadians who have taken actions to reduce their flood risk and use these stories to motivate other individuals and communities across the country.



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