



FLOOD RISK REDUCTION IN CANADA:

THE ROAD TO BECOMING A TRUSTED SOURCE FOR PREPAREDNESS INFORMATION

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CHAPTER 1: FLOODING AND FLOOD COMMUNICATION IN CANADA

INTRODUCTION

Flooding has always been a reality in Canada, but the impacts of climate change, population growth, increasing development in flood-prone areas, and aging infrastructure have contributed to an increase in the frequency and severity of flooding events in our communities (Honegger & Oehy, 2016; Lau et. al, 2010). The financial and societal costs associated with flooding are also steadily increasing, impacting the Canadian economy more than any other hazard (Public Safety Canada, 2017). Floods in Canada are responsible for annual average economic losses of over \$1.2 billion, with less than half of these losses being covered by insurance (Honegger & Oehy, 2016). Overland flooding is the largest draw on the federal Disaster Financial Assistance Arrangements (DFAA) program in Canada, and water damage from floods is now the largest cause of household insurance claims in Ontario (Public Safety Canada, 2017; Moghal & Peddle, 2016). The prevalence and costs of flooding in Canada are expected to continually increase (Thistlethwaite et. al., 2017a).

Despite flooding being Canada's most common and costly natural hazard, the majority of Canadians remain unaware of their flood risk and are unprepared for flooding events (Thistlethwaite et. al., 2017a). A 2016 survey of 2,300 Canadians living in designated flood risk areas revealed that only 6% of homeowners know their risk, and less than 30% are taking action to protect their property from flooding. In addition, the majority of homeowners do not believe the risk of flooding will increase in the next quarter century (Thistlethwaite et. al., 2017a). This lack of awareness and preparedness needs to be addressed, as our climate changes and government policies are shifting more responsibility for flood protection and recovery onto Canadian homeowners (Thistlethwaite et. al., 2017a; White, Kingston, & Barber, 2010). Fortunately, Canadians express a demand for more information and tools to help increase their flood risk awareness (Thistlethwaite et. al., 2017a).

Improving communication is important for increasing flood risk awareness and driving behavioural change. With messages, approaches, and tools that effectively communicate the impact of flooding and the role of preparedness, more audiences will have the information they need to reduce flood risk and damage. Flood communication efforts currently exist across the country, with different organizations, levels of government, academic institutions, research groups and insurance companies providing flood risk information and resources. However, risk awareness remains low and it is possible that many of the messages are not being received by the necessary audiences or that the messages themselves are not always understood or applicable. Our current approaches may also fail to consider personal barriers that prevent action, such as those identified by Public Safety Canada: believing it won't happen

to me, or that I have no flood risk; cost; not knowing how to prepare; time; and difficulty in finding information (Public Safety Canada, 2016). Flood risk communication needs to address these barriers in order to motivate and empower individuals to prepare for the next flooding event. Canadians need to assess their own risk, and determine whether options to reduce this risk are within their means and capacity. Additionally, flood communication must be tailored to the individual audience. Working with a community provides communicators with a thorough understanding of their particular flood risks, as well as the community's capacity to take appropriate actions before, during and after a flood (Heldsinger et. al., 2018).

Partners for Action (P4A) is a University of Waterloo-based applied research group that aims to advance flood resiliency in Canada in the face of a changing climate and extreme weather (Partners for Action, 2018). P4A's collaborative approach brings together diverse stakeholders to:

- 1. Facilitate collaboration** between researchers, governments, businesses, and non-governmental organizations;
- 2. Conduct innovative, practical research and foster relationships** to fund such research;
- 3. Share results and best practices**, including measurable activities to reduce risk of flooding; and,
- 4. Inform Canadians** about their flood risk, actions they can take to reduce their risk, and opportunities for risk transfer, such as insurance.

In 2018, P4A partnered with the Canadian Red Cross to develop a collaborative awareness-to-action project that will inform Canadians about their flood risk and encourage behavioural change to create more resilient communities. As part of this project, interviews were conducted with flood and risk communication experts to gain a better understanding of what they want residents to know about flood risk and how to prepare. In addition to expert interviews, online surveys, interviews, and focus groups were conducted in the Spring and Summer of 2018 in two Ontario communities – the city of Windsor and Dufferin County – to better understand the communication needs of Canadian communities and identify barriers to action. In this project, researchers worked with both communities to identify existing flood preparedness behaviours and perceptions and barriers to action. The communities were also asked to share their opinions and feedback on existing Canadian Red Cross flood communication materials in order to provide researchers with an understanding of effective communication messages and approaches towards recommendations for future Canadian Red Cross communication efforts.

BACKGROUND: FLOODING IN THE CITY OF WINDSOR

In the past two years, the City of Windsor has experienced severe rainfall events that have resulted in widespread flooding of roads, homes, businesses and public institutions.

On September 29, 2016, in the hardest hit regions of the City, up to 230 millimeters of rain fell in just a few hours. The rainfall that occurred within a 24-hour period represented the equivalent of 144% of precipitation that normally falls on the region in the entire month of September. During the storm, the City's infrastructure (sewers, drains, outlets, pumping stations, and storm-water management ponds) functioned appropriately, although the sewer system became overwhelmed by the extent of rainfall in such a short period of time. Windsor's Mayor declared a State of Local Emergency due to the severity of the flooding situation and the potential danger to people and property. In total - during the event and in the days following - 2,853 residents in Windsor reported incidences of flooding (City of Windsor, 2017).

As a result of this flood event, the City of Windsor renewed promotion of two flood-related subsidy programs and put plans in place to implement an Emergency Notification System to notify residents in advance of flood-related events as well as to inform them of any unsafe conditions or areas to avoid during and immediately after a flood (City of Windsor, 2017).

On August 28 and 29, 2017, the City of Windsor experienced another flooding event, with more than 200 millimetres of rain falling in less than 24 hours. Roads, basements and the Windsor General Hospital Metropolitan Campus experienced flooding, with over 175 calls to city staff related to flooding in the area (Canadian Press, 2017).

In March 2018, the City of Windsor partnered with the Canadian Red Cross and P4A to improve flood messaging and help residents better prepare for future flood events.

BACKGROUND: FLOODING IN DUFFERIN COUNTY

In the past two years, Dufferin County has experienced significant rainfall events that have led to flooding in many areas.

On June 23, 2017, approximately 120 millimeters of rain fell during a four-hour period, which resulted in flash flooding, sporadic power outages, road closures, and home evacuations from low-lying areas. It was the highest daily rainfall total in 63 years of records, and covered nearly one-third of the Grand River Conservation Authority (GRCA) watershed. Importantly, this event was not forecasted. However, local reservoirs, dams, dykes and other facilities along river channels functioned well and significantly reduced flooding of downstream municipalities. During the flood and in the days following, the GRCA issued several Flood Messages to the public, which were disseminated through their website, email and social media accounts, as well as through local television stations, radio stations, and print media (GRCA, 2017). Dufferin County activated a 211 inquiry

hotline to support residents at high risk of evacuation (Community Connection, 2017). Subsequent to the flood, the GRCA created a residents' flood preparedness guide and a colour-coded flood status indicator, both of which are available on the GRCA's website.

On February 21 and 22, 2018, all municipalities in Dufferin County reported higher-than-normal water levels, as heavy rains combined with melting river ice, resulting in major ice damming along the Grand River. Several roads were closed and others were monitored by Dufferin County Emergency Management. Water levels receded within 36 hours of the flood event and most roads were reopened during that time; however, some roads required significant repairs (Dufferin County, 2018a). Sadly, two lives were lost during this event - one in a submerged vehicle and one along the banks of the Grand River at its peak flow.

In March 2018, Dufferin County identified flooding as a high-risk natural hazard (Dufferin County, 2018b) for the area and shortly thereafter partnered with the Canadian Red Cross and P4A to improve flood messaging and help residents better prepare for future flood-related events.



CHAPTER 2: SOCIAL MARKETING APPROACH

A social marketing approach was used to inform the qualitative data collection process for this study, based on the partners' research goals of increased awareness and action (in the form of preparedness for a flood).

Social marketing uses commercial marketing principles and techniques to promote voluntary behaviour change for the benefit of individuals, groups, and/or society at large (Dao Truong, 2014). The discipline of social marketing emerged in the 1970s, when two commercial marketing experts asserted that their discipline could also be used to influence the acceptability of certain ideas for societal good (Kotler & Zaltman, 1971). Since then, the discipline has evolved substantially. Social marketing now primarily focuses on behaviour change and has demonstrated its success in a number of different sectors including health, environmental protection, sustainability, transportation, and tourism and leisure (Dao Truong, 2014). Social marketing has also been used in the context of disaster management, and it holds great potential to expand in this domain. A subset of social marketing, known as community-based social marketing, draws from the field of social psychology to understand perceived barriers and benefits to adopting, modifying or rejecting particular behaviours (Mackenzie-Mohr, 2011).

Just as commercial marketing is consumer-centric, social marketing focuses on particular segments of the population to better understand their attitudes, values, needs and current behaviours. In the context of disaster management, a citizen-centred approach is critical. By gaining a more in-depth understanding of how various segments of a disaster-affected population “perceive and respond to risks” (Guion et al., 2007), as well as what factors determine their preparedness for and response to disasters, emergency management personnel, governmental institutions, and other support organizations (such as the Canadian Red Cross) will be better equipped to assist them.

The current study, though not a community-based social marketing program, drew heavily upon insights from this approach in the planning and design stages. The online surveys distributed to Windsor and Dufferin County residents included several questions related to respondents' flood preparedness-related behaviours before, during and after flood events, as well as reasons why they would or would not engage in these behaviours (perceived barriers and benefits). Additionally, questions that were posed to disaster management experts during the interview stage asked about their perceptions of barriers to action among Canadian citizens.

The responses to these questions will assist the Canadian Red Cross, P4A and municipalities to gain an in-depth understanding of citizens' reasons for acting or not acting in the context of a flood event, as well as to highlight any discrepancies in our understanding of behavioural motivations versus reality.

The design of the focus group questions was also influenced by a community-based social marketing approach, centering on the key factors that would motivate citizens to become more prepared in the event of a flood. The results from the surveys, interviews and focus groups are discussed in subsequent sections of this report.



Darren Maunu /Orangeville News, 2014

CHAPTER 3: SURVEYS

PURPOSE AND METHODOLOGY

In 2018, P4A partnered with the Canadian Red Cross, the City of Windsor, and Dufferin County to examine the perception that many Canadians are unaware of their flood risk and fail to prepare. The partners sought to improve risk messaging to encourage more residents to take protective actions before, during, and after flood events. P4A developed two surveys (one for each community - see Appendix A for questions) that examined several important themes, including:

1. Individual experiences with flooding in Windsor and Dufferin County;
2. Perceptions of household flood risk and likelihood of future flooding;
3. Current and future protective actions;
4. Preferred sources for information before, during, and after a flood event; and,
5. Awareness of or participation in County or City-led initiatives.

The survey methodology received clearance from the University of Waterloo Office of Research Ethics (ORE #22945).

RESULTS

City of Windsor

The Windsor online survey was available from April 5 to May 15, 2018, and promoted through a variety of outlets, including the City of Windsor's 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. Respondents provided input for survey questions that were relevant to their particular situation. Results presented for this survey 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.

Sixty percent of the respondents were female, 37% were male, and 3% preferred not to answer. When asked if they own or rent, 95% indicated that they were homeowners and 5% were renters. Of the total respondents, 55% had lived in their current residence for more than 10 years, with 49% living in a single storey detached residence. When asked about their level of education, 69% of respondents indicated that they had completed a form of higher education (college, trade school, university or post-grad university). In terms of occupation, 51% of respondents worked full time and 31% were retired. The majority of respondents (62%) were 45 years or older.

This section summarizes findings from the survey based on five key themes.

1. Individual experiences with flooding in the city of Windsor

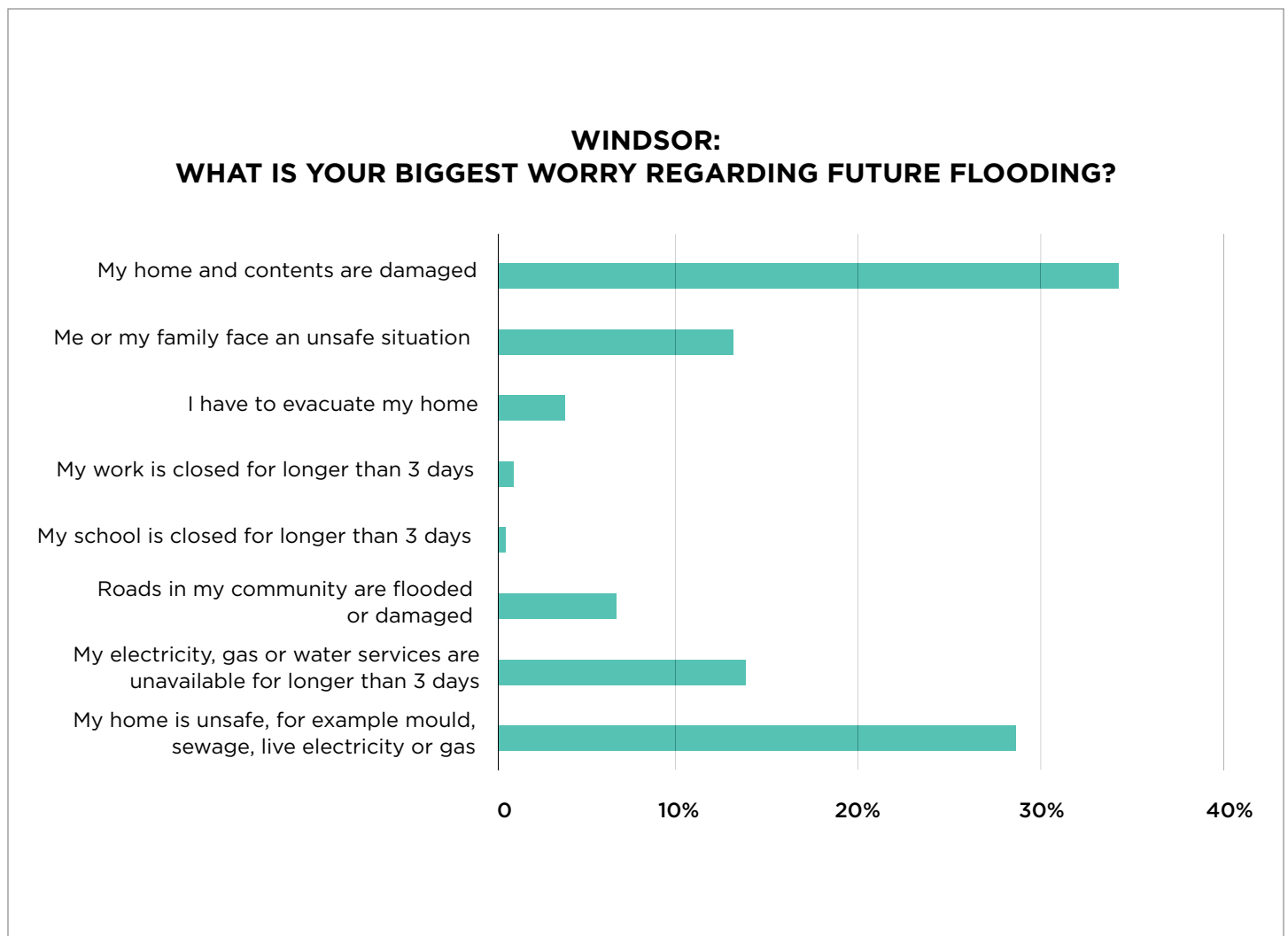
The study partners wanted to understand the socio-economic impacts of recent flooding on Windsor residents. Approximately 81% of respondents had experienced flooding at their home since 2010, and almost half had experienced more than one flood during this period. Many of the respondents indicated that 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.

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 was 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 damage to their homes and property, and less than 1% received government disaster assistance. Others had to take out second mortgages on their home, apply for lines of credit and/or credit cards, or borrow money from friends and family.



Nick Brancaccio /The Windsor Star, 2017

FIGURE 1

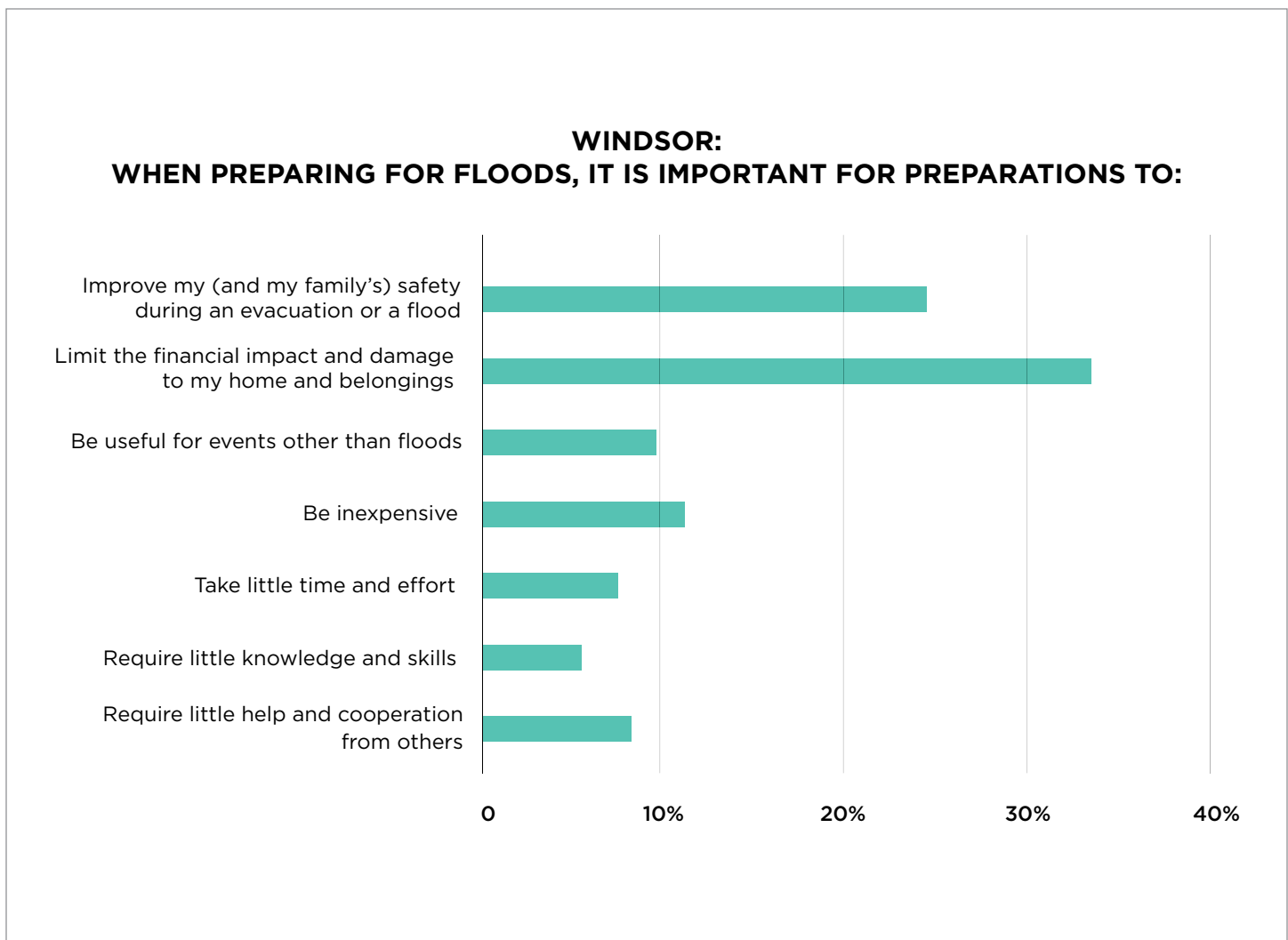
2. Perceptions of household flood risk and likelihood of future flooding

The study partners identified the need to understand residents' risk perceptions and overall levels of concern about future flood events. 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. While this number needs improvement, Windsorites still show 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., 2017a). In addition, while the majority of respondents were concerned about flooding (95%), only 81% felt that their community could flood within the next five years.

Respondents were also asked about their main concerns regarding future flooding. The top three included: damages to homes and contents (34%), homes being unsafe due to mould, sewage, live electricity or gas (28%), and electricity, gas, or water being unavailable for long periods (13%) (Figure 1).

The survey also asked respondents to share their thoughts on what factors are contributing to flooding in Windsor. Respondents blamed aging infrastructure (43%), increasing development (25%), and climate change (23%). Seventy respondents provided more details on their responses, including blaming the City for not maintaining or investing in proper infrastructure.

FIGURE 2



3. Current and future protective actions

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 preparedness actions to limit the financial impact and damage to their homes and belongings (33%), and to improve their family's safety (24%) during a flood event (Figure 2).

The majority of respondents seemed well informed about flood risk and preparedness, as many had already learned about their flood risk (76%) and had gathered information on what can be done to protect their homes (83%). They also had 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 had some form of sewer backup or flood insurance.

Many respondents had 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 used water-resistant building materials (57%) or covered basement window wells/seal basement windows (44%).



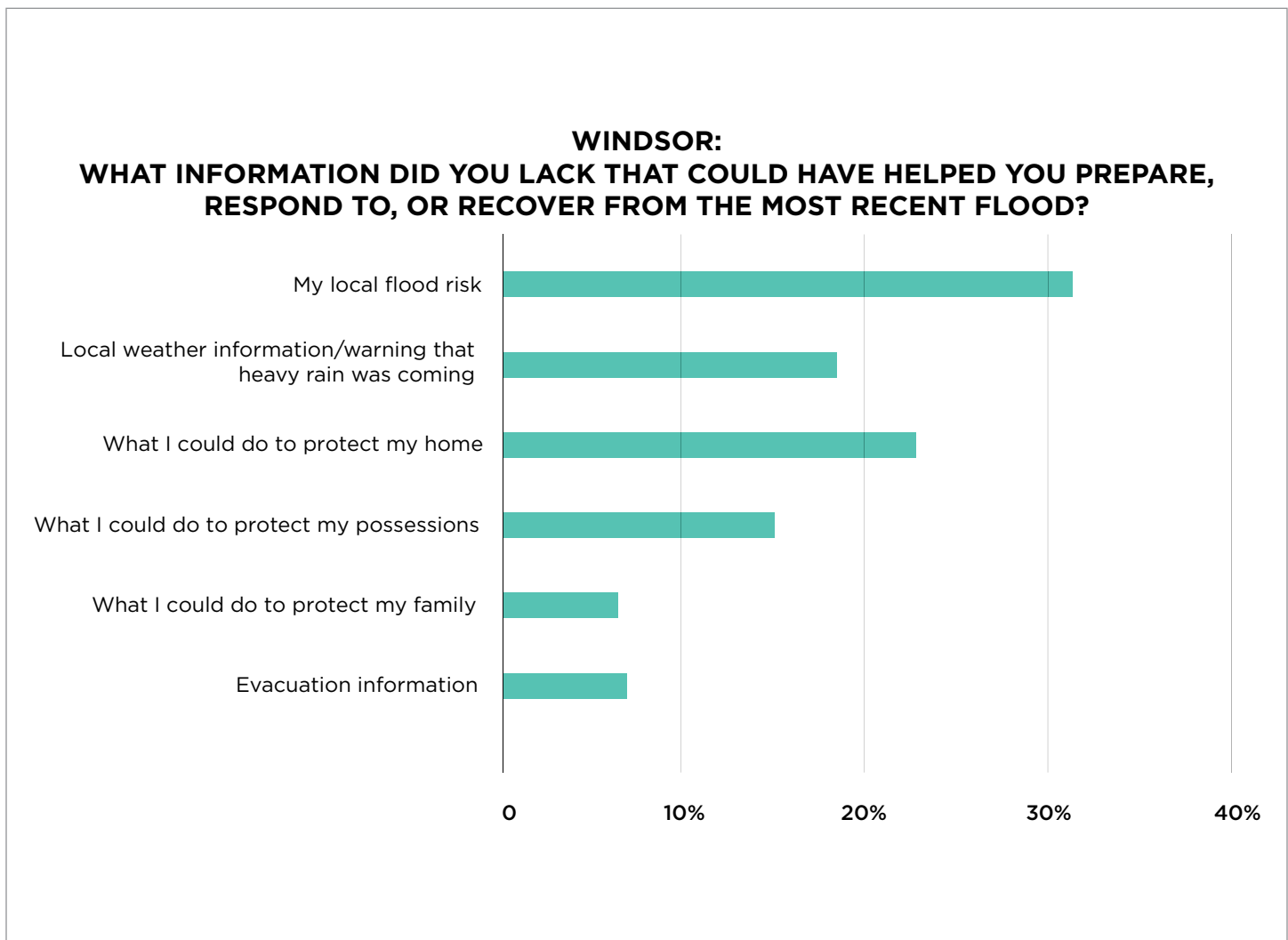
The survey also asked respondents to share details on what they did immediately before, during, and after the most recent flood. Many respondents did nothing different immediately before the flood. Although many respondents felt their homes would not flood, some said they wanted to prepare, but could 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 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.

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 or backwater valve; raising heavy appliances onto platforms; or waterproofing.

Respondents were also asked what advice they would give to friends, family, and neighbours to help them prepare for future flooding. The top advice given by Windsor respondents included:

- Install and maintain sump pumps and backwater valves (along with having battery-operated generators and back-up pumps);
- Keep valuables out of the basement, or at the very least, elevated off the floor in waterproof containers;
- Avoid furnishing or finishing basements into living spaces; instead, invest in waterproofing your property;
- Take advantage of City subsidy programs;
- Disconnect your downspouts (the City will do it for free);
- Understand your insurance coverage and purchase extra if possible; and,
- Check your household drains and eavestroughs often.

FIGURE 3



4. Preferred sources for information and support before, during, and after a flood event

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 their most important source for weather-related 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 from The Weather Network (16%) and local radio (11%) and television stations (11%) before a flood; from local radio (14%) and television (11%) and social media (10%) during a flood; and from the City of Windsor's website (14%) and local radio (11%) and television stations (10%) after a flood.

When asked who would be most helpful to them before, during, and after a flood, respondents indicated that friends, family and neighbours were the most important source of support before (42%), during (45%), and after (33%) a flood, followed by municipal representatives before and after a flood (17% and 14%, respectively), and Emergency Services during (21%) a flood event. Community volunteers and non-profit organizations were also valued during (9%) and after floods (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. Most respondents wanted to know their local flood risk (32%) and what they could do to protect their home (23%). Many felt that they also needed more information about local weather, including warnings of heavy rainfall (18%) (Figure 3).

5. Awareness of or participation in City-led initiatives

The City of Windsor has several city-led initiatives and programs addressing flood risk, 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. Almost 14% of respondents have never heard of these programs before.

Dufferin

The Dufferin online survey was available from June 8 to 30, 2018, and promoted through a variety of outlets, including the Dufferin County website, social media platforms, print, and door-to-door outreach. A total of 104 respondents with postal codes located in Dufferin County completed the survey. Respondents provided input for survey questions that were relevant to their particular situation. Results presented for this survey are based on the percentage of the 104 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 +/- 10.8% at a 95% confidence level.

Fifty-five percent of respondents were female, 44% were male, and 1% preferred not to answer. When asked if they own or rent, 91% indicated that they were homeowners and 9% were renters, with 61% having lived in their current residence for more than 10 years. In terms of housing type, 41% indicated that they lived in a single storey detached residence and 47% lived in a two-storey detached residence. When asked about their level of education, 70% of respondents indicated that they had completed a form of higher education (college, trade school, university or post-grad university). In terms of occupation, 49% of respondents worked full time, 24% were retired, and 17% were self-employed. The majority of respondents (61%) were 45 years or older.

This section summarizes findings from the survey based on five key themes.

1. Individual experiences with flooding in Dufferin County

When asked about individual flood experience, 57% of respondents indicated that their home had flooded since 2010, and over half had experienced more than one flood during this period. In addition, 20% of respondents had a neighbour, family member, or friend experience a flood at their home since 2010.

Fifty-four percent 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) being unable to access their home for a duration of time, and 3) missing work, either to clean up after the flood or to deal with contractors or insurance adjusters.

Dufferin County respondents also experienced negative financial impacts from flooding since 2010. Sixty percent of respondents who provided details faced over \$1,000 in damages, with 35% having \$10,000 or more in damages. Dufferin County residents paid for these damages primarily with personal savings (53%) and insurance (22%), while others relied on financial assistance from the Ontario government (9%) or from friends and family (4%).

2. Perceptions of household flood risk and likelihood of future flooding

Dufferin residents were asked about their household flood risk, perceived likelihood of future flooding, and concern about future flooding. Similar to Windsor, risk awareness is higher amongst those that have

experienced a flood, as 58% of respondents felt that they live in an area that is at risk for flooding. Concern is also high - 83% of respondents were concerned about future flooding, and 84% felt that their community will likely flood again in the next five years.

Respondents had many concerns regarding future flooding, including damages to homes and contents (22%), roads in the community being flooded or damaged (19%), homes being unsafe due to mould, sewage, live electricity or gas (17%), and themselves and their families facing an unsafe situation (16%) (Figure 4).

Respondents were also asked to share their thoughts on what factors are contributing to flooding in Dufferin County. Respondents blamed climate change (33%), aging infrastructure (23%), and increasing development (19%). Thirty-eight respondents provided more details on their responses, including blaming tile draining of agricultural fields, and log jams.

3. Current and future protective actions

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. Respondents said that it was most important for preparations to limit the financial impact and damage to their home and belongings (29%), improve their family's safety during an evacuation or flood (23%), be useful for events other than floods (13%), and require little help and cooperation from others (11%) (Figure 5).

Many respondents had already learned about their flood risk (65%) and had gathered information on what can be done to protect their homes and families from flooding (60%). For those that hadn't taken these steps just yet, 16% planned to learn about their flood risks over the next 6 months and 21% planned to gather information on what can be done to protect their homes and families from flooding over the next six months.

Also, many respondents had learned about flood insurance (60%), identified safe spaces (72%), placed valuables in tubs (59%), disconnected downspouts (45%), installed sump pumps and/or backwater valves (71%), graded property (64%), cleared snow away from foundation and kept storm drains clear (73%), used water-resistant building materials (42%), or covered basement window wells/sealed basement windows (44%). Forty-seven percent of respondents had some form of sewer backup or flood insurance.

Many respondents also had or will soon have a flood plan (77%), an evacuation plan (70%), a plan with family, friends or neighbours to help each other out (67%), and enough emergency supplies for several days (85%).

The survey also asked respondents to share details on what they did immediately before, during, and after the most recent flood. When asked what they did before the flood, approximately half of respondents said they did "nothing". For those that did act, the most common actions were: moving valuables to higher ground, checking and running sump pumps, stocking up on groceries and emergency kit items, monitoring the local radio for weather and flood updates, and going over an evacuation plan.

FIGURE 4

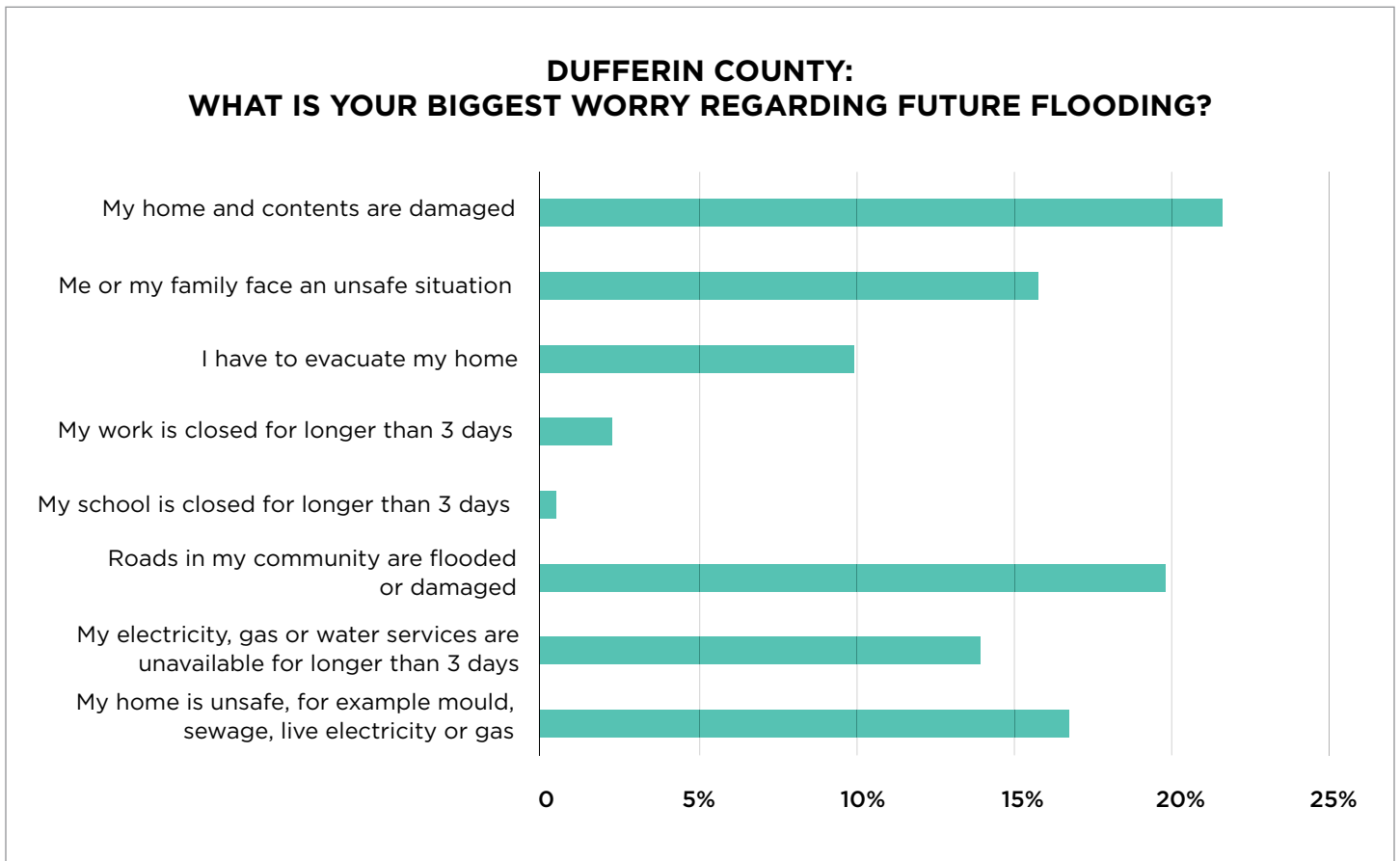
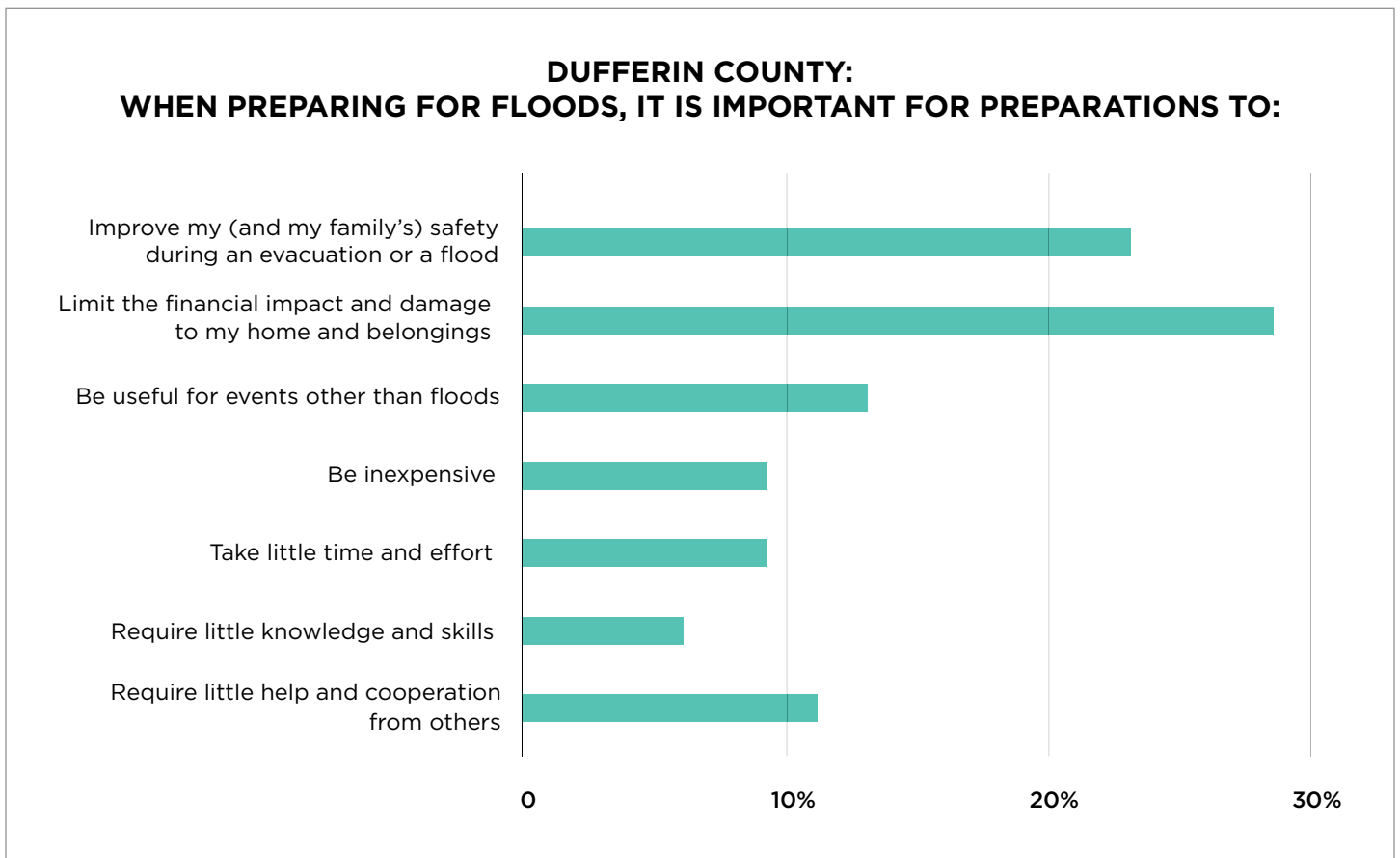


FIGURE 5



During the most recent flood, the most common actions taken by Dufferin respondents were: pumping out water, getting extra sump pumps, checking-in on neighbours and helping each other with pumping and support, and continuing to watch weather updates. Again, approximately half of respondents said they did nothing or just watched the flood happen. After the flood, the majority of respondents engaged in some form of clean-up effort. Other actions included helping and checking-in on neighbours and family, and calling their insurance companies.

When asked what advice they'd give friends or neighbours to help them prepare for flooding, respondents had the following main pieces of advice to give:

- Install a backup generator or sump pump and make sure your current ones are working;
- Move valuables out of the basement or at least up off the floor;
- Prepare an emergency kit (with drinking water and canned food) and be ready to evacuate;
- Ensure you have flood insurance and understand what your insurance covers; and,
- Listen to local weather warnings and stay informed.

4. Preferred sources for information and support before, during, and after a flood event

When asked about the most important sources of weather-related information, respondents identified the top three as The Weather Network (37%), weather apps (13%), and personal observations (12%). Respondents were also asked about where they get information before, during, and after a flood. The Weather Network (22%), watches and warnings from the Conservation Authority (10%), and resources on the County's website (8%) were identified as most important before

a flood. During a flood, respondents selected The Weather Network (17%), family/friends/neighbours/coworkers (10%), and local radio stations (9%). Lastly, respondents indicated that resources on the County's website (13%), The Weather Network (12%), and family/friends/neighbours/coworkers (11%) were their top sources of information after a flood.

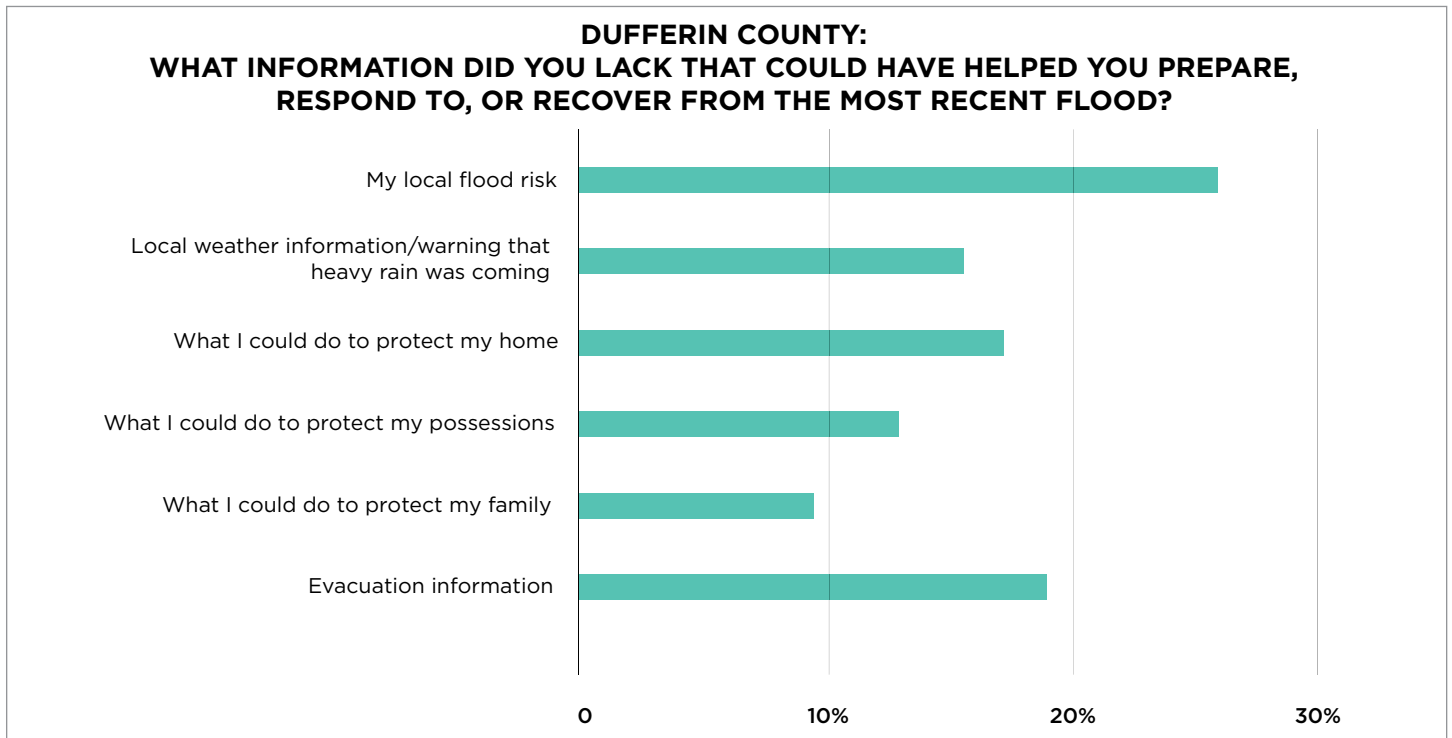
When asked who would be most helpful to them before, during, and after a flood, respondents indicated that friends, family and neighbours were the most important source of support before (36%), during (34%), and after (30%) a flood. Municipal representatives were also identified as helpful before a flood (15%), Emergency Services during (19%) and after (13%) a flood, and community volunteers/non-profit organizations after (13%) a flood.

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. Respondents wanted to know more about their local flood risk (26%), evacuation information (19%), and what they could do to protect their home (17%) (Figure 6).

5. Awareness of or participation in County-led initiatives

Only 11% of respondents said they notified Dufferin County about flooding at their home and business. When asked why not, the majority of respondents said: 1) they didn't think the damage they experienced was significant enough to call; 2) they didn't know they should or could notify the County; and 3) they didn't think notifying the County would be helpful. A small number of respondents noted that they didn't notify the County because they thought "they would send services that would cost money".

FIGURE 6



BARRIERS

The surveys conducted in Windsor and Dufferin County highlighted many barriers that prevent residents from taking preparedness actions. The reasons why respondents did not prepare varied by preparation type, but were similar for both communities. 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. Evacuation or sheltering in place were not seen as real possibilities by some respondents in Windsor, making planning and emergency supplies unnecessary. Many respondents also noted that they had emergency supplies throughout their home (pantries, camping supplies, etc.), but did not feel they needed to keep them all in one location.

A number of other barriers to preparedness 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 complete certain actions, such as learning about flood risk, disconnecting downspouts, grading property, and covering and sealing basement windows.

Based on these findings, the top barriers that prevent survey respondents in both communities from taking preparedness actions include:

1. Too expensive
2. Not important
3. Not effective to protect my home or family
4. Don't know how to do this
5. Takes too much time/effort
6. Not my responsibility



Nick Brancaccio /The Windsor Star, 2018

RECOMMENDATIONS

Based on the surveys conducted in Windsor and Dufferin County, P4A offers the following recommendations to the Canadian Red Cross for 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. Create messages that address motivators - reducing damage to property, and eliminating unsafe conditions in the home or in the car. Being prepared reduces stress and worry, so encourage preparing well in advance of a flood event, as you may not have the time, resources, or warning to do anything as it happens. Also, create messages that personalize how it feels to go through a flood - the helplessness, the burden of discarding your belongings, cleaning your basement, and dealing with contractors, insurers, and City staff.
4. In a recent Canadian Red Cross survey, 25% of respondents identified the Canadian 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.
5. Build disaster risk reduction and natural hazard awareness raising events into the Canadian Red Cross volunteer model, empowering volunteers to work within their communities to raise awareness and reduce risk. Develop and lead preparedness training and workshops that include and support family/friends/neighbours and coworkers, as these are the key sources of information and support for our survey respondents.
6. 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.

CHAPTER 4: EXPERT INTERVIEWS

PURPOSE AND METHODOLOGY

To gain a better understanding of what experts want residents to know about flood risk and how to prepare, interviews were conducted with ten flood and risk communication experts across Canada working in government, insurance, water management, and research roles, as well as ten community-level service providers and staff in community services, emergency preparedness, management, and response roles at both Windsor and Dufferin County (see Appendix B for interviewee organizations). Interviews were conducted over the phone and were approximately 20-30 minutes in length (see Appendix C for questions).

Interviewees were asked to share their experiences and expert opinions on the current state of public flood risk awareness, critical information that individuals and residents should know about flood risk and how to prepare, and current methods to communicate flood risk and preparedness. Interviewees were also asked about communication gaps and barriers, as well as suggestions on how to improve flood risk and preparedness messaging and approaches going forward. By gaining insight into what Canadians need to know and the barriers to action, the information gathered from these expert interviews can help stakeholders examine current messages and delivery methods, and rework these approaches towards overcoming barriers and enhancing community flood preparedness and resiliency.

The expert interview methodology received clearance from the University of Waterloo Office of Research Ethics (ORE #23018).

RESULTS

1. What preparation means

Most interviewees agreed that being prepared includes being informed, making a plan, and having an emergency kit; however, they also provided more in-depth details on what a flood-prepared Canada would look like. Interviewees emphasized that residents should understand the flood risk associated with their neighbourhood and property, and should talk with their neighbours about how they would help each other in the case of an emergency. Residents should also understand the implications of flooding and how floods can impact many aspects of daily routines, including transportation, work and school, bathing and laundry, and quality of drinking water.

Interviewees agreed that being prepared includes understanding how your basement is being used and taking steps, such as installing sump pumps, using water-resistant building materials, and grading your property, to make it more flood-resistant and mitigate flood damage. Interviewees also suggested that emergency kits should contain items that responders would have greater difficulty supplying, such as copies of personal documents, medications, spare clothes that fit, and items for pets. Having an emergency kit with these types of items is also beneficial for being prepared for a broad spectrum of disasters that could impact Canadian communities, not just floods.

Two interviewees suggested that preparation should not just be an action, but a part of day-to-day lifestyle. For example, it is not just about having an emergency kit and plan at home, but also having one at work, in the car, or when away on vacation. Preparation should be a particular lifestyle, where you are able to adapt and respond wherever you may be.

Interviewees also agreed that a prepared community extends beyond the actions of homeowners - it involves the actions of multiple stakeholders, including all levels of government and financial corporations. For example, governments could invest in mitigation programs such as flood mapping, banks could restrict lending in flood-prone areas, and insurers could provide incentive programs for clients that take preparedness measures. Everyone has a role to play when it comes to flood-resilient communities.



Dan Janisse /The Windsor Star, 2016

2. What residents should know

When asked what they want people to know before a flood, interviewees highlighted a number of key pieces of information. Interviewees want residents to understand how flooding happens, the different types of floods that can happen, and with storm patterns changing, that any community could be hit next. Interviewees in urban communities also want residents to have a better understanding of how drainage and water systems and municipal infrastructure works, and to understand the limitations of these systems to handle large storm events.

Interviewees want homeowners and renters to understand what they are personally responsible for, and to understand that they have the capability to take steps to minimize their flood risk. For example, homeowners can take simple steps in their basement, such as raising furniture, appliances and electronics, and placing valuables in plastic containers and on shelves, to minimize damage from future floods. Interviewees also want homeowners and renters to understand their insurance coverage, as well as options for additional coverage. Knowing that some devices, such as backwater valves and sump pumps (with battery backup), need to be regularly checked and maintained was also important.

Interviewees stressed that residents need to understand the dangers of wading or driving through flood waters. Residents should also understand that they may need to leave their homes for a duration of time, and should know when and how to evacuate and be prepared to be away from their home base. Residents need to understand that they may not receive immediate attention from first responders, and need to be able to take care of themselves for a few days. Residents should also be aware of where to look for reliable flood-related alerts and information.

3. Barriers I - Why people do not prepare

When asked why some people prepare for floods while others do not, the majority of interviewees stated that many residents have an “it won’t happen to me” mentality. While residents believe that it is unfortunate when flooding happens elsewhere, they tend to remain in denial and believe that flooding will not happen in their own community or affect them personally. This denial may be associated with residents’ busy lifestyles, as they feel as though they do not have the time to think about or prioritize the potential dangers of flooding. Many interviewees indicated that flooding history is also a factor, as those that have had a flood in the past are more likely to be prepared.

Language and literacy barriers were also identified as a reason why some people do not prepare for floods. For residents whose first language is not English, or for those with lower literacy, there may be a lack of understanding in terms of flood risk and how to prepare, as well as a lack of ability and confidence to seek assistance and information.

Misplacement of responsibility was also identified as a reason why some people do not prepare. Many homeowners believe that the government will take care of them, while many renters believe that landlords are responsible and will take care of them. It was noted that residents often find comfort and a false sense of security in placing the blame and responsibility onto someone else.

Cost was another barrier identified by interviewees. A lack of disposable income may prevent residents from taking preparedness actions or from purchasing extra insurance coverage. Even for those with medium to high incomes, the cost of certain preparedness actions, such as sloping or grading property, or using water-resistant materials during renovations, may be seen as too expensive.

Interviewees also reported that many residents lack knowledge and understanding when it comes to flood risk. When purchasing a new property or moving into a new community, many residents are not aware of the flood risk associated with that area. In addition, it was noted that there may be a visual effect in play - if someone lives close to a waterway and there is a lot of rain, they can see the water rise for themselves; however, for those living in urban centres, water networks are underground, so people do not have those visual reminders and tend to assume water just goes away and is not a problem once it goes down the drain.

The tendency for residents to think about short-term rather than long-term rewards can also impede motivation to prepare. For example, when residents are renovating or finishing their basements, they typically do not want to invest the extra money upfront to protect that basement with water-resistant materials. Residents often do not consider how investing in protection measures upfront can minimize future damage and cost. One interviewee stated that residents need to understand how “an ounce of prevention is better than a pound of cure”. This is especially relevant now that it is becoming more common for residents to finish and use basements as living or recreation spaces. Residents may also feel overwhelmed with the variety of actions available to them, and may not know where to start or how to execute the action.

4. Barriers II - Current messages

In addition to the barriers preventing residents from preparing for floods, interviewees also identified limitations in current preparedness messaging. Language was identified as a major barrier, as many materials are not translated into other languages to reach diverse segments of the population. Literacy was also identified as a barrier, as many messages and materials contain technical or scientific information that is not easily comprehensible to the majority of residents. For example, many residents do not understand what a “1-in-100 year flood” represents - new wording is needed to convey levels of risk to the public and make risk relevant to their daily lives. Having materials that present information at a variety of education levels may also be beneficial.

A lack of unity and consistency amongst various stakeholders can also impact the effectiveness of current messaging. Interviewees acknowledged that unless consistent messaging is being delivered by multiple sources, it may not be reaching residents or viewed as important or urgent. In addition, information may be contradictory, such as when sources tell residents to look at local flood maps to determine their risk, but these local maps may not actually be available or accessible to those residents.

It was also noted that misinformation and false messages can circulate after a flood that staff need to monitor and address. False information can go viral on social media, resulting in confusion on what to do or whether to evacuate, or residents shifting blame onto others for flooding damage. Community staff need to monitor, address, and dispel these rumours as quickly as possible, while providing concise, accurate information as it becomes available.

5. Message channels

Our interviewees agreed that messages should be distributed using a combination of materials and sources, as different groups of people respond to different platforms. For example, elderly residents may prefer traditional media (i.e. print, television, radio), while younger residents may prefer social media, mobile apps, and videos. Common themes and consistent messaging should be carried throughout all channels, provided by a trusted, perhaps external, source. Channels suggested by interviewees included: social media, traditional media, websites, infographics, brochures, mailers, door-to-door knocking, face-to-face groups or workshops, videos, public meetings, and phone/text messages. While some interviewees suggested that social media, videos, and infographics are becoming more popular due to residents not wanting to spend time reading lots of information, it was also noted that some groups or communities may have technical limitations or may prefer paper copies they can read or share with others, and as such, using new media exclusively is not recommended.

Most interviewees highlighted the effectiveness of face-to-face interactions between residents and messengers. One-on-one conversations can help identify residents' misconceptions and fears regarding flooding, which could easily be addressed in person. Door-to-door campaigns are also effective, especially in rural and farming communities where residents may not follow media.

Some interviewees noted that the timing of message distribution also plays a part in successful uptake by the public. The best time to capture attention is when there is a flood happening locally, nationally or internationally that is highlighted on the news. During and immediately after these events, flooding is fresh in residents' minds, and they are more likely to absorb flood related information and take action. These are perfect opportunities to host flood workshops and public meetings. In communities that flood regularly, flood workshops have also been successful when held just prior to spring thaw and flooding season.

Interviewees also suggested that community partners and groups (i.e. church groups, senior councils, local clubs, etc.) should be included in message delivery, as direct contact is an effective way to promote public education and message traction, and can extend reach beyond the individual. And while interviewees noted that all population groups were important, some suggested targeting smaller groups, such as young people and students, who are most eager to learn. High risk groups, such as the elderly, those with disabilities, those with limited financial ability to react, those living in flood zones, or simply those with basements, are important to educate.



Chris Campbell/CTV Windsor, 2018

RECOMMENDATIONS

Interviewees provided the following suggestions on how to improve messaging and personal flood preparedness in Canada:

1. Personalize the impacts of flooding - show how flooding can impact daily routines (i.e. flooded roads and highways, loss of power, property damage, missed time from work, etc.). Link to human health impacts to help personalize risk, such as how flooding can result in polluted water, mould, and psychological impacts.
2. Explain to urban residents that flooding can happen anywhere, to anyone, and provide information on how water systems and municipal infrastructure works, the limitations of these systems, and how they can still be impacted.
3. Connect to personal stories and anecdotes in addition to statistics - the faces and stories of flood survivors can resonate more with people versus an overload of numbers and data.
4. Explain why self-sufficiency immediately following a flood (or any disaster) is critical - first responders may not be able to get to you for a few days. Also explain how, when and why evacuations are required, and the importance of avoiding driving through flood waters.
5. Clearly outline the roles and responsibilities of all stakeholders (i.e. different levels of government, aid organizations, landlords, residents) so that residents better understand what they are personally responsible for, and to eliminate a false sense of security that someone else will take care of them.
6. Translate messages and materials into multiple languages and at multiple literacy levels. Replace heavily scientific or technical language with style and terminology more easily understood by the public.
7. Promote low-cost actions that residents can take to prepare for flooding, and where appropriate, promote locally available subsidy or rebate programs.
8. Promote small, tangible, incremental steps (easy wins) that people can take to protect themselves and their homes from flooding, to avoid feeling overwhelmed and not knowing where to start. Make instructions simple and straightforward, with links to supplemental information.
9. Provide information on flood risk and preparedness as people are considering purchasing a new property. Real estate agents and home inspectors need to be educated on these issues to inform their clients. Flood risk and history should be declared at the time of sale and should be registered on the land title. Banks and mortgage lenders should also be aware of flood risks prior to lending.
10. Highlight the long-term rewards of being prepared, and how investing a small amount of time and money upfront can prove to be beneficial and cost-saving after a flood.
11. Create messages that are consistent and persistent among many stakeholders, and repeat them often over a long period of time. Partner with other groups to amplify reach and increase legitimacy and trust.
12. Address and dispel misinformation that arises during and after a flood event, to avoid confusion during a flood and false blame after the fact.
13. Use a combination of media channels to deliver flood messages, as different groups of people respond best to different media platforms. Deliver messages outside of flood events, so residents know what to do and where to go for information immediately before, during and after an event.
14. Consider the timing of message delivery. During or immediately after a flood event - whether it be local, national, or international - may be the best time to capture attention with flood preparedness messages.



CHAPTER 5: FOCUS GROUPS

PURPOSE AND METHODOLOGY

To further understand personal flood awareness and preparedness, P4A conducted focus groups in Windsor and Dufferin County. The first goal of the focus groups was to identify what community members want to know and how they want to receive flood-related information. The second goal was to determine effectiveness of existing flood and preparedness messaging, materials, and approaches for raising awareness and preparing communities for floods.

To recruit participants, emails were sent to respondents for the Windsor and Dufferin County surveys who had provided their contact details to the researchers for further discussion on the topic of flood preparedness in their communities. A recruitment poster was also distributed via social media, print, and door-to-door outreach (Dufferin County). Interested participants completed an online form to indicate their availability, and available candidates were sent an invitation email that confirmed their spot in the focus group in their own community. Two sets of focus groups were held in Windsor, on August 1, 2018 (10 participants) and August 2, 2018 (8 participants), and one focus group was held in Dufferin on July 30, 2018 (4 participants) (Table 1). The majority of participants had experienced a flood in the home in recent years.

TABLE 1. NUMBER OF PARTICIPANTS, LOCATIONS AND TIMES OF FOCUS GROUPS

FOCUS GROUP	# OF PARTICIPANTS	LOCATION	DATE AND TIME
Group A	4	Dufferin County - Amaranth Municipal Office	Monday, July 30, 2018 7:00pm - 9:00pm
Group B	10	Windsor - Budimir Public Library	Wednesday, August 1, 2018 6:30pm - 8:30pm
Group C	8	Windsor - Optimist Community Centre	Thursday, August 2, 2018 6:30pm - 8:30pm

Upon arrival at the focus group, participants provided their informed consent to participate in the research study, and were asked to complete an optional demographic survey to assist with data interpretation (see Appendix D for survey). Staff at each focus group included a facilitator (see Appendix E for questions) and staff from P4A and each partner municipality. Participants were seated in a circle to encourage participation, and the conversations were audio-recorded to assist with note-taking. Each focus group was approximately two hours in duration, and participants were compensated for their time with a \$50 gift card.

The focus group methodology received clearance from the University of Waterloo Office of Research Ethics (ORE #23195).



RESULTS

1. Participant Characteristics

A total of 22 participants took part in the focus groups. There was an equal distribution of male and female participants, and all participants spoke English as their main language at home. Ninety-one percent of participants had personal experience with flooding, and 95% of participants owned the residence in which they lived. Seventy-seven percent of participants were between the ages of 45-74, and 82% had a combined annual household income of \$80,000 or above. It should be noted that due to their personal experience with flooding, this group of participants were very informed, risk-aware, and prepared, which is not necessarily representative of the Windsor and Dufferin County populations as a whole.

2. Preparedness

To begin the discussion at each focus group, participants were asked about their perception of flood risk in their community, their opinion on being prepared for floods and their personal level of preparedness. All participants acknowledged the importance of being prepared, but also noted that their main motivator was previous experience with flooding. Participants felt that other residents would only prepare if they experienced a flood themselves, as most residents have an ‘it won’t happen to me’ mentality.

“[...] doesn’t really register for many people if they haven’t lived through it.”

Dufferin County resident

“Unless you’re personally affected or unless your life has been impacted some how – is it really that big of a deal?”

Dufferin County resident

Most of the participants had taken a number of steps to prepare for future flooding, including:

- Removing valuables from the basement;
- Keeping valuables in plastic containers, and/or on shelves;
- Raising appliances in the basement off of the floor;
- Replacing basement wood studs with steel studs;
- Replacing basement floors with vinyl flooring;
- Installing or upgrading backwater valves and sump pumps;
- Disconnecting downspouts;
- Grading driveways and property;
- Installing water-resistant landscaping and rain gardens;
- Making electronic copies of important documents; and,
- Installing water-resistant insulation.

Many participants felt they had completed all of the “basic” steps that had been recommended to them by their municipality and many wanted to know “what’s next” or what else they could do to ensure protection from the next flood. Although many participants had taken preparedness actions, there was a general concern of whether or not these actions would be effective during the next flood. This lack of certainty and on-going worry about the next flood has caused feelings of anxiety and helplessness for some participants.

“[...] We want to get the information, we want to get the answers so we can protect ourselves, especially if you’re in a flood risk kind of place [...]”

City of Windsor resident

Some participants wanted to prepare; however, because they are renters or live in a condominium or shared building, the decision to make adjustments to their home was not theirs. These participants expressed frustration that they had been unsuccessful in convincing their landlords or property managers to take preparedness measures, such as disconnecting downspouts, landscaping, or installing backwater valves. Even some participants that owned detached homes felt that municipal building regulations and/or Conservation Authority regulations restricted them from taking action on their properties.

“[Disconnecting downspouts...] that’s another thing I can’t do because of where I live [...]”

City of Windsor resident

“I don’t think the municipality is in any way, shape or form prepared [...]”

City of Windsor resident

Most participants felt that their municipality was not taking enough action to protect its citizens, and wanted further information and clarification on the roles and responsibilities of the municipality in preparing for the next flood event. Some participants expressed feelings of mistrust towards the municipality and felt that their personal preparedness actions were insufficient if the municipality was not preparing as well.

“Only people with low income can get access to government assistance after a flood [...] The process to apply doesn’t make much sense.”

City of Windsor resident

“If you’re having the contractors come in and do work, you better read the contracts that they present to you [...] so you really have to be careful what they offer to you.”

City of Windsor resident

A number of participants were frustrated and worried about the stipulations associated with Disaster Financial Assistance Arrangements (DFAA) and insurance coverage, and were often unsure about their financial coverage until after a flood had hit. Many participants also expressed concern over contractors and repair businesses raising prices after a flood and taking advantage of distressed community members, and the length of time to complete cleanup and repair projects. These participants advised other residents to read contracts and bills thoroughly to ensure contractors are held accountable.

Participants also want to know the following to better prepare themselves and their communities for flooding:

- Available options for protecting homes from flooding, beyond the ‘basic’ recommended steps;
- A flow chart of available protection measures and next steps (“Where do I go from here if I’ve done what’s suggested on the City’s website?”);
- Video and audio flood protection tutorials and case studies;
- Information on the City/County’s flood mitigation and protection efforts;
- Uptake of flood-protection measures (i.e. Downspout Disconnect) on City or County-owned properties;
- Information on the DFAA and the conditions for qualification; and,
- Information on insurance policy coverage and options.

3. Information sources

Participants were asked about their preferred source for weather and flood-related information. For weather information, participants rely on Facebook, Twitter, personal observations, radio, local news, The Weather Network (often deemed unreliable), Environment and Climate Change Canada weather alerts (again, often deemed unreliable), Google Home, weather apps, Reddit, and American weather networks (in Windsor). Most Windsor participants agreed that they don’t follow Canadian weather forecasts, but instead, follow Detroit/USA weather forecasts and information, which they felt were more accurate.

For flood preparation information, participants rely on Facebook, municipal websites, social media, radio, and generic internet searches. Some participants mentioned that they didn’t know where to look for flood-related information, and had conducted a generic internet search to try to find out more. Most did not know that the Canadian Red Cross had flood-related preparedness information on their website, as the Canadian Red Cross was seen as a “humanitarian agency” that helped people after a disaster. They do look at municipal websites, and suggested the Canadian Red Cross partner with the municipalities and share their information there.

“I was away, but was on Twitter and Facebook so that’s where I would get a lot of information and I remember people talking about what was happening in their houses, so I knew something was wrong on my street [...]”

City of Windsor resident

Participants had the following suggestions on how they want to receive information:

- Ensure information and websites are easily accessible and regularly updated with new and relevant information;
- Consolidate all information in one spot (i.e. on municipal websites) – residents do not typically visit the Canadian Red Cross website to access flood information;
- Send information by mail to high-risk neighbourhoods, including homes that registered previous floods using Windsor’s 311 service (or County equivalent);
- Tailor information to specific communities;
- Teach flood preparedness to kids in school;
- Place preparedness information in local retailers, community centres, and offices;
- Provide information and emergency alerts through Conservation Authorities;
- Create preparedness checklists and distribute through mail and online;
- Use mailing lists to send out important, community-relevant information and include with other important mailings, such as Emergency Management calendars, garbage collection calendars, MP and MPP calendars;
- Have real estate agents provide flood-related information to new home buyers;
- Provide news updates on social media platforms; and,
- Develop an emergency preparedness e-newsletter that residents can subscribe to.



Dax Melmer/The Windsor Star, 2015

4. Canadian Red Cross messages and materials

Participants were presented with existing Canadian Red Cross materials to determine effectiveness in raising awareness and preparing communities for floods (see Appendix F for materials). Participants were asked to give feedback on the content and style of the materials.

Most participants were not aware that the Canadian Red Cross was a source for preparedness information, as they perceived Canadian Red Cross to be a humanitarian organization that only got involved after a major disaster, such as the Fort McMurray, AB wildfires or the Saint John, NB floods. Many participants admitted that they would have never thought to check the Canadian Red Cross for information to prepare and recover from events like basement flooding. Participants agreed that Canadian Red Cross should clarify their role with Canadian residents in regards to emergency preparedness and response at the community level, and should partner with municipalities to distribute preparedness information.

“Never have even thought about it – because I think when you associate the Red Cross with anything its disaster [...] We did have a disaster but not in a magnitude that you would think that they would answer to. So I would never have thought about going to them.”

City of Windsor resident

“[...] I would never have thought to go to the Red Cross before my last flood.”

City of Windsor resident

“When would the Red Cross come to help? We needed help after the last flood – could I have called them for help?”

City of Windsor resident

Participants had the following suggestions to create a more effective campaign that motivates people to prepare:

1. Consolidate preparedness information in one spot, such as on municipal websites – residents are more familiar with their resources than those of the Canadian Red Cross.

“[...] I'd rather go to one source, and just go to the City to get my information [...] I don't feel I need to go to 14 different places [...]”

City of Windsor resident

2. Make print and online materials more visually appealing to attract readers. Participants liked the bright red colour and banners but suggested more images and photos, less text, and catchier, bolded titles.

3. Provide information when it is most applicable, such as during or directly after a disaster.

4. Showcase personal stories or case studies.

5. Make messages relevant and specific to the personal situation of the reader, and tailor to specific groups (i.e. rural communities, urban communities, homeowners, tenants, etc.).

6. Provide the ‘what’, ‘why’ and the ‘how’. For example, if readers are told to turn off their gas or electricity, they should be given instructions on how to do so and why it is an important action to take. Information should also be provided on the clean-up process (i.e. where to start, what types of protective clothing are needed?) and what to do during the flood (i.e., how to evacuate and not wading or driving through flood waters).

7. Provide details about the insurance process and DFAA, such as taking photos and keeping receipts of basement items before a flood hits.

8. Teach flood preparedness to kids in school, as they bring information and materials home to share with their families.

9. Practice flood drills in schools and workplaces, similar to fire and tornado drills, to familiarize residents on what to do in the case of a flood.

10. Mail Canadian Red Cross-branded materials to high-risk areas, such as pamphlets, booklets, calendars, and checklists.

11. Distribute materials in a variety of ways to reach different groups (i.e. face-to-face meetings or workshops, flyers, social media, emails, websites, etc.).



Dax Melmer/The Windsor Star, 2015

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

Partners for Action worked with the Canadian Red Cross to study flood risk awareness and preparedness in two Canadian communities, the City of Windsor and Dufferin County. Using a social marketing approach to inform the larger study, the researchers conducted surveys, interviews and focus groups to understand how residents perceive flood risk, what barriers prevent personal preparedness, and recommendations for improving the effectiveness of flood communication. Recommendations throughout this report are intended to provide Canadian Red Cross with valuable information to increase the effectiveness of their flood communication and to support their efforts in creating flood-resilient communities across Canada.

A summary of key recommendations and findings is provided below:

1. Messaging and Materials: The Canadian Red Cross should provide Canadians with solutions-oriented flood messaging and materials. This information should be provided on municipal websites to leverage existing relationships between municipalities and residents as well as facilitate access across the country. Many residents do not recognize the Canadian Red Cross as a known and trusted source for flood risk information, therefore the Canadian Red Cross needs to partner with information sources that are currently engaging residents (i.e. the municipality or local news outlets).

When developing flood messaging and materials, the Canadian Red Cross should consider following the characteristics of effective preparedness messages (Coppola and Maloney, 2009):

- Messages must be accessible (i.e. translated into multiple languages, easy to digest, and easy to locate), considering demographic characteristics of the target community.
- Materials must be delivered in a variety of ways (i.e. print, mail, online, and social media) to reach multiple audiences.
- Messages must be appealing in terms of content, (i.e. easy-to-follow steps, action items, community-specific information, solution-oriented, case studies, and personal stories) and style (i.e. colourful, minimal text, photos, images, and branded).
- Messages must be consistent and repetitive across stakeholders and updated on a regular basis.
- Messages must link risk to action to motivate and empower.
- Messages must emphasize why flood preparedness is important and how it can benefit a resident and a community.

2. Empower Residents through Confidence in their Ability to Cope: Many respondents were unsure of what to do, or whether their protective actions were enough to reduce their flood risk. Coping appraisal involves having enough information to understand what options are available to you, their efficacy, cost, time requirements, and your own ability to perform the actions. When creating communication materials, combine risk awareness information with options to reduce risk, to give residents confidence and ownership of the problem and the solution (Thistlethwaite et. al., 2017b; Grothmann and Reusswig, 2007).

3. Campaigns and Drills: Community residents need to be motivated to take preparedness action. It is important not to overwhelm with information, so campaigns should promote small, tangible, incremental steps that people can take to protect themselves and their homes from flooding, as well as actions that are low-cost and take minimal time and effort. Instructions need to be simple and straightforward. In addition to building disaster risk reduction and natural hazard awareness raising events, flood drills should be practiced and implemented in schools and workplaces, similar to fire and tornado drills, to familiarize residents on what to do in the case of a flood.

4. Multi-Stakeholder Approach: Include cross-sector stakeholders in flood preparedness programs and decision making, and highlight their roles and responsibilities for residents. A prepared community extends beyond the actions of residents – it involves the actions of multiple stakeholders, including all levels of government and financial corporations. For example, governments can invest in mitigation programs such as flood mapping, banks can restrict lending in flood-prone areas, real estate agents can provide flood information to new home buyers, and insurers can provide incentive programs for clients that take preparedness measures. Everyone has a role to play when it comes to flood-resilient communities.



Jill Nichols /CBC News, 2016

5. Consider a Social Marketing Plan: Develop and implement social marketing plans in individual communities across Canada to gain a thorough understanding of residents' attitudes, values, needs and current behaviours. This approach will also provide information about the experiences, needs, and barriers of a community and their current ideas about flood preparedness. Work with each community to create programs and communications that will increase flood resiliency. Follow these steps to complete a community-based social marketing plan (Lee & Kotler, 2016; Mackenzie-Mohr, 2011):

Step 1: Describe the issue, background, purpose and focus

Step 2: Conduct a situation analysis – your resources and capabilities, internal and external supports, and partnerships

Step 3: Select target audiences and secondary supportive audiences needed for success

Step 4: Set behaviour objectives, targets and goals

Step 5: Identify target audience barriers, beliefs, benefits and motivators

Step 6: Develop a positioning statement – who do you want to act, and what do you want them to do?

Step 7: Develop a marketing strategy

- Product – the benefits of the behaviour
- Price – costs of undertaking the behaviour, but also the costs of inaction
- Place – how and where will you support the behaviour and any groups that can join your efforts
- Promotion – messages, messengers, creative strategies and communication channels

Step 8: Develop a plan for monitoring and evaluation

Step 9: Establish budgets and funding sources

Step 10: Complete an implementation plan

Effective messaging is key to developing flood risk communication towards behavioral change among Canadian residents. Personalize risk and vulnerability, and link to easy, accessible action items, so residents can become motivated and begin developing habits that support flood preparedness. Communications must be continuously shared with residents and promoted through social networks to create support and to drive action at home, work, school, and play. Communications must also overcome barriers through easy-to-find information linking risk to action; funding and financial incentives (i.e. insurance discounts, subsidies and avoidance of fines and taxes); policy changes (i.e. building code updates and land use planning); and technology (i.e. apps for tracking weather and river levels). It is also important to highlight success stories of residents who have acted and subsequently reduced their risk (Heath and Heath, 2010). Combining these measures will create a multi-faceted approach that will enable Canadians to personalize risk and vulnerability, empowering preparedness action (Coppola and Maloney, 2009). With this approach, the Canadian Red Cross should leverage existing materials, partnerships, and profile to enhance their reputation as a trusted source for preparedness information. Through partnerships and consistent, timely communication, the Canadian Red Cross can support effective flood risk management in Canada over the long run.



REFERENCES

- Boyd, D. (July 24, 2017). Grand River Conservation Authority. Record Rainfall Flood Event. [Powerpoint presentation].
- City of Windsor (2017). *2016 Flooding Event Follow-up Report*.
- Community Connection/211 Central East Ontario. (June 23, 2017). After Action Report: Flooding in Simcoe, Dufferin, and Huron Counties.
- Coppola, D., and E. Maloney (2009). *Communicating Emergency Preparedness: Strategies for creating a disaster resilient public*. New York: CRC Press Taylor and Francis Group.
- CTV News (2017). Waterlogged: Record-breaking rainfall floods roads and basements in Windsor-Essex. Available at: <https://windsor.ctvnews.ca/waterlogged-record-breaking-rainfall-floods-roads-and-basements-in-windsor-essex-1.3565861>
- Dao Truong, V. (2014). Social marketing: A systematic review of research 1998-2012. *Social Marketing Quarterly*, 20(1), 15-34.
- Dufferin County Emergency Management Division (2018a). IMS 201 Incident Briefing – 2018-02-20 High water event – FINAL, February 22, 2018.
- Dufferin County (2018b). Community Risk Profile: County of Dufferin and Member Municipalities Emergency Management Program.
- Dufferin County Emergency Management Division (2017). IMS 201 Incident Briefing – 2018-06-23 Flash flood – FINAL, June 23, 2017.
- Guion, D. T., Scammon, D. L., & Borders, A. L. (2007). Weathering the Storm: A Social Marketing Perspective on Disaster Preparedness and Response with Lessons from Hurricane Katrina. *Journal of Public Policy & Marketing*, 26(1), 20-32.
- Heath, C., and D. Heath (2010). *Switch: How to change things when change is hard*. New York: Broadway Books.
- Heldsinger, N., MacKinnon, J., & Peddle, S. (2018). *A Community Guide to Flood Risk Communication: Promoting Personal Preparedness*. Waterloo, Ontario: Partners for Action.
- Honegger, C., & Oehy, C. (2016). The road to flood resilience in Canada. Zurich: Swiss Reinsurance Company Limited. Retrieved from http://media.swissre.com/documents/The_road_to_flood_resilience_in_Canada.pdf
- Grothmann T, Reusswig F (2006) People at risk of flooding: why some residents take precautionary action while others do not. *Nat Hazards* 38(1-2):101-120.
- Kotler, P. et al. (2002). *Social marketing: Improving the quality of life*. (2nd ed.). Sage Publications.
- Kotler, P. & Zaltman, G. (1971). Social marketing: An approach to planned social change. *Journal of Marketing*, 35(3), 3-12.
- Lau, C. L., Smythe, L. D., Craig, S. B., & Weinstein, P. (2010). Climate change, flooding, urbanisation and leptospirosis: fuelling the fire? *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 104(10), 631-638.
- Lee, N. R., and P. Kotler (2016). *Social Marketing: Changing Behaviours for Good*. 5th Edition. Los Angeles: Sage Publishing.
- Mackenzie-Mohr, D. (2011). *Fostering sustainable behavior: An introduction to community-based social marketing*. Gabriola Island: New Society Publishers.
- Partners for Action (2018). *What is Partners for Action?* University of Waterloo. Available at: <https://uwaterloo.ca/partners-for-action/what-partners-action-p4a>
- Public Safety Canada. (2017). Federal Floodplain Mapping Framework. Retrieved from Public Safety Canada: <https://www.publicsafety.gc.ca/cnt/mrgnc-mngmnt/dsstr-prvntn-mtgtn/ndmp/fldpIn-mppng-en.aspx>
- Public Safety Canada, 2016. Flood Mitigation Public Awareness Campaign – Baseline Study. Prepared by TNS, under Public Safety Contract OD160-170402/001/CY
- The Canadian Press (August 29, 2017). Heavy rainfall flooding roads, basement, hospital in Windsor. *The Star*. Available at: <https://www.thestar.com/news/canada/2017/08/29/heavy-rainfall-flooding-roads-basement-hospital-in-windsor.html>
- Thistlethwaite, J., Henstra, D., Peddle, S., & Scott, D. (2017a). *Canadian Voices on Changing Flood Risk: Findings from a National Survey*. Waterloo: Partners for Action.
- Thistlethwaite, J., Henstra, D., Brown, C., & Scott, D. (2017b). How Flood Experience and Risk Perception Influences Protective Actions and Behaviours among Canadian Homeowners. *Environmental Management*, 2018, Vol.61(2), pp.197-208
- White, I., Kingston, R., & Barber, A. (2010). Participatory geographic information systems and public engagement within flood risk management. *Journal of Flood Risk Management*, 3(4), 337-346.
- Winterton, M. (September 27, 2017). City of Windsor. *2016 Flooding Event Follow-up Report*.

APPENDICES

APPENDIX A: SURVEY QUESTIONS

WINDSOR SURVEY QUESTIONS

1. Since 2010, have you experienced flooding at your home?

- Yes
- No
- Don't know/can't recall
- No, but my neighbours, friends, or family experienced a flood at their home

IF NO, OR NOT AT YOUR HOME, SKIP TO QUESTION 9 (skip capability is built into online survey program)

2. If yes, did flooding impact your daily activities, such as preventing you from going to school or work, preparing meals, bathing, doing laundry, or other activities?

- Yes
- No

PLEASE DESCRIBE _____

3. Since 2010, how often have you experienced flooding that caused property damage, financial loss, or negative impacts on your daily life?

- Never
- 1 time
- 2-5 times
- More than 5 times

4. Have you ever had to evacuate your home during a flood?

- Yes
- No
- Don't know/can't recall

5. If you answered yes to Question 4, how long were you away from your home?

- 1-2 days
- 3-5 days
- 6-10 days
- More than 10 days
- Have not yet returned home

6. If you answered yes to Question 4, where did you go?

- Friends/family
- Community shelter
- Hotel
- Other: _____

7. If your home has been flooded since 2010, what were the total financial losses for damage to your home from flooding?

- No financial losses
- Less than \$499
- \$500 - \$999
- \$1,000 - \$4,999
- \$5,000 - \$9,999
- \$10,000 - \$24,999
- \$25,000 - \$49,999
- \$50,000 - \$99,999
- More than \$100,000

8. How did you pay for your recovery from the flood (check all that apply)?

- Personal savings
- Insurance
- Disaster assistance from the Ontario government
- Financial assistance from aid organization
- Financial assistance from friends or family
- Bank loan/RRSPs/remortgage
- Other: _____

9. If you own a business, has it been impacted by flooding since 2010?

- Yes
- No
- Don't know/can't recall
- Not applicable, I do not own a business associated with a property in Windsor

10. Do you currently have flood insurance for your home?

- Yes
- No
- I am unable to get flood insurance for my home
- Don't know

11. Do you live in an area that is at risk for flooding?

- Yes
- No
- Don't know

12. What do you think is contributing to flooding in the City of Windsor? (check all that apply)

- Increasing residential and commercial development
- Aging infrastructure (sewer pipes, bridges, roads)
- Climate change
- Don't know
- Other: _____

13. How concerned are you about future flooding?

- Very concerned
- Somewhat concerned
- Neither concerned nor unconcerned
- Somewhat unconcerned
- Not at all concerned

14. How likely do you think it is that your community will flood again in the next five years?

- Very unlikely
- Somewhat unlikely
- Neither likely nor unlikely
- Somewhat likely
- Very likely

15. What is your biggest worry regarding future flooding? (Check your top 3)

Your home and contents are damaged	
You or your family face an unsafe situation	
You have to evacuate your home	
Your work is closed for longer than 3 days	
Your school is closed for longer than 3 days	
Roads in your community are flooded or damaged	
Your electricity, gas or water services are unavailable for longer than 3 days	
Your home is unsafe due to mold, sewage, live electricity or gas	

16. Think back to the most recent flood that impacted your home or community. How did you prepare before the flood?

17. Think back to the most recent flood that impacted your home or community. What did you do immediately before the flood?

18. Think back to the most recent flood that impacted your home or community. What did you do during the flood?

19. Think back to the most recent flood that impacted your home or community. What did you do after the flood?

20. A) There are many things you can do to protect yourself from flooding. Do you plan to do any of the following?

	Have already done this	Plan to do this over the next 6 months	Do not plan to do this over the next 6 months
KNOW YOUR RISKS			
Learn about your flood risk at home, on vacation, at school and at work			
Gather information on what you can do to protect your home and family from flooding			
If you rent, discuss your plans and responsibilities with your landlord			
PROTECT YOUR FAMILY			
Make and share a plan for what you would do in case of flooding			
Make and share a plan to evacuate from your home, condo, or apartment			
Make and share a plan with family, friends or neighbours for how you can help each other during a flood			
Gather enough emergency supplies for several days (food, water, first aid kit, portable radio, medications, important documents, etc.)			
PROTECT YOUR HOME			
Learn about your flood insurance options			
Identify a safe place for valuable items and documents			
Place valuable documents (e.g., marriage and birth certificates, passports) in waterproof containers			
Use water-resistant building materials in your basement			
Disconnect your downspouts from the municipal water system and extend them more than six feet from your foundation			
Grade your property so water drains away from your foundation			
Install a sump pump and/or backwater valve, and maintain it regularly			
Clear snow away from your foundation and keep storm drains clear			
Cover basement window wells and seal basement windows			

*If participants select “Do not plan to do this over the next 6 months” for any of the above options, they will be redirected to the following questions (skip capability is built into online survey program):

20. B) Why do you not plan to do this over the next 6 months (check all that apply)?

- Not important
- Another flood won't happen here
- Not my responsibility
- Not effective to protect my home or family
- Won't protect me from other risks, like a fire or tornado
- Too expensive
- Takes too much time/effort
- Don't know how to do this
- Too difficult – not physically able/need help from others

21. When preparing for floods, it most important to (check all that apply):

- Improve my (and my family's) safety during an evacuation or a flood
- Limit the financial impact and damage to my home and belongings
- Be useful for events other than floods
- Be inexpensive
- Take little time and effort
- Require little knowledge and skills
- Require little help and cooperation from others

22. What is your most important source for weather information (select one)?

- Personal observations - storm clouds or heavy rain
- The Weather Network
- Internet websites
- Social media (e.g., Twitter, Facebook, Instagram)
- Local radio stations
- Local television stations
- Watches and Warnings from Essex Region Conservation Authority
- Cell phone/text messages
- Weather apps
- Family/friends/neighbours/coworkers
- Other: _____

23. What are your top 3 ways to receive information on what to do before, during and after a flood (select three for each category - before, during, and after)?

	Before a flood	During a flood	After a flood
The Weather Network (website or television station)			
Resources on the City's website			
Emergency Services - Fire, Police, Paramedics			
Non-profit Organizations			
Pamphlets/brochures			
Social media (e.g., Twitter, Facebook, Instagram, YouTube)			
Community Meetings			
Local radio stations			
Local television stations			
Watches and Warnings from Essex Region Conservation Authority			
E-mail			
Text message			
Sirens			
Home or mobile phone call			
Family/friends/neighbours/coworkers			
Community organizations			
Faith organizations			
Cell phone "app" notification			
Other:			

24. Who would be most helpful to you before, during or after a flood (check all that apply)?

	Before a flood	During a flood	After a flood
Friends/family/neighbours			
Fire or Police Services			
Faith leaders			
Community leaders			

	Before a flood	During a flood	After a flood
Co-workers			
Municipal representatives			
Elected officials			
Community volunteers/non-profit organizations			

25. Think of the most recent flood to affect your home or community. What information did you lack that could have helped you prepare, respond to or recover from the flood?

- My local flood risk
- Local weather information/warning that heavy rain was coming
- What I could do to protect my home
- What I could do to protect my possessions
- What I could do to protect my family
- Evacuation information

26. Have you taken advantage of Downspout Disconnect and Basement Flood Protection Subsidy programs offered by the City of Windsor?

- Yes
- No
- I did not know about these Subsidy programs

27. Are you aware of the following City-led initiatives to plan for a changing climate and future flood risk?

- Stormwater Management Plan
- Climate Change Adaptation Plan
- I am not aware of either of these initiatives

28. What do you think the City could do to help you better prepare for floods?

- Online notifications of weather events
- More information on City websites
- Better cooperation with the Essex Region Conservation Authority to let you know when floods may happen
- Better advertising of City programs, such as the Downspout Disconnect and Basement Flood Subsidy programs
- Other: _____

29. What would you do differently to prepare for the next flood?

30. What advice would you give your friends and neighbours to help them prepare for flooding?

31. Is there anything else you would like to tell us about flooding and being prepared in Windsor?

DEMOGRAPHICS

The following questions are intended to place your answers within the broader social context. The information in this section will not be used to identify you or your household. You may skip any question(s) that you do not wish to answer.

1. How do you identify?

- Male
- Female
- Other
- Prefer not to say

2. Are you a tenant or homeowner?

3. What are the first 3 digits of your postal code?

4. How long have you lived at this residence?

- 0-2 years
- 3-5 years
- 6-10 years
- More than 10 years
- Prefer not to say

5. How many people (including children) live in your household?

6. What is the size of your home?

- 0-999 square feet
- 1000-1,999 square feet
- 2000-2,999 square feet
- More than 3000 square feet
- Prefer not to say

7. What type of property is your home?

- Apartment
- Condominium
- Townhouse
- Duplex
- Single story detached residence
- Double story detached residence
- Mobile home
- Social housing/seniors home/assisted living
- Other: _____
- Prefer not to say

8. What is your age?

- 18-24 years old
- 25-34 years old
- 35-44 years old
- 45-64 years old
- 65-74 years old
- 75 years or older
- Prefer not say

9. What is the highest level of formal education that you have completed?

- Completed grade school
- Some high school
- Completed high school
- Some college/university/trades school
- Completed college/university/trades school
- Completed post-graduate university degree
- Prefer not to say

10. What is your current work status?

- Working full-time (35 or more hours per week)
- Working part-time (less than 35 hours per week)
- Self employed
- Student attending full time school (not working)
- Unemployed and not looking for work
- Full-time caregiver/parent
- Retired
- Prefer not to say
- Other: _____

11. Which of the following categories best describes your total household income? That is, the total income of all persons in your household combined, before taxes?

- Under \$20,000
- \$20,000 to \$39,999
- \$40,000 to \$59,999
- \$60,000 to \$79,999
- \$80,000 to \$99,999
- \$100,000 to \$119,999
- \$120,000 or above
- Prefer not to say

DUFFERIN COUNTY SURVEY QUESTIONS

1. Since 2010, have you experienced flooding at your home?

- Yes
- No
- Don't know/can't recall
- No, but my neighbours, friends, or family experienced a flood at their home

IF NO, OR NOT AT YOUR HOME, SKIP TO QUESTION 9 (skip capability is built into online survey program)

2. If yes, did flooding impact your daily activities, such as preventing you from going to school or work, preparing meals, bathing, doing laundry, or other activities?

- Yes
- No

PLEASE DESCRIBE _____

3. Since 2010, how often have you experienced flooding that caused property damage, financial loss, or negative impacts on your daily life?

- Never
- 1 time
- 2-5 times
- More than 5 times

4. Have you ever had to evacuate your home during a flood?

- Yes
- No
- Don't know/can't recall

5. If you answered yes to Question 4, how long were you away from your home?

- 1-2 days
- 3-5 days
- 6-10 days
- More than 10 days
- Have not yet returned home

6. If you answered yes to Question 4, where did you go?

- Friends/family
- Community shelter
- Hotel
- Other: _____

7. If your home has been flooded since 2010, what were the total financial losses for damage to your home from flooding?

- No financial losses
- Less than \$499
- \$500 - \$999
- \$1,000 - \$4,999
- \$5,000 - \$9,999
- \$10,000 - \$24,999
- \$25,000 - \$49,999
- \$50,000 - \$99,999
- More than \$100,000

8. How did you pay for your recovery from the flood (check all that apply)?

- Personal savings
- Insurance
- Disaster assistance from the Ontario government
- Financial assistance from aid organization
- Financial assistance from friends or family
- Bank loan/RRSPs/remortgage
- Other: _____

9. If you own a business, has it been impacted by flooding since 2010?

- Yes
- No
- Don't know/can't recall
- Not applicable, I do not own a business associated with a property in Windsor

10. Did you notify Dufferin County about flooding at your home or business? (select one)

- Yes
- No
- Don't know/can't recall
- If no, why not? _____

11. Do you currently have flood insurance for your home?

- Yes
- No
- I am unable to get flood insurance for my home
- Don't know

12. Do you live in an area that is at risk for flooding?

- Yes
- No
- Don't know

13. What do you think is contributing to flooding in Dufferin County? (check all that apply)

- Increasing residential and commercial development
- Aging infrastructure (sewer pipes, bridges, roads)
- Climate change
- Don't know
- Other: _____

14. How concerned are you about future flooding?

- Very concerned
- Somewhat concerned
- Neither concerned nor unconcerned
- Somewhat unconcerned
- Not at all concerned

15. How likely do you think it is that your community will flood again in the next five years?

- Very unlikely
- Somewhat unlikely
- Neither likely nor unlikely
- Somewhat likely
- Very likely

16. What is your biggest worry regarding future flooding? (Check your top 3)

Your home and contents are damaged	
You or your family face an unsafe situation	
You have to evacuate your home	
Your work is closed for longer than 3 days	
Your school is closed for longer than 3 days	
Roads in your community are flooded or damaged	
Your electricity, gas or water services are unavailable for longer than 3 days	
Your home is unsafe due to mold, sewage, live electricity or gas	

17. Think back to the most recent flood that impacted your home or community. How did you prepare before the flood?

18. Think back to the most recent flood that impacted your home or community. What did you do immediately before the flood?

19. Think back to the most recent flood that impacted your home or community. What did you do during the flood?

20. Think back to the most recent flood that impacted your home or community. What did you do after the flood?

21. A) There are many things you can do to protect yourself from flooding. Do you plan to do any of the following?

	Have already done this	Plan to do this over the next 6 months	Do not plan to do this over the next 6 months
KNOW YOUR RISKS			
Learn about your flood risk at home, on vacation, at school and at work			
Gather information on what you can do to protect your home and family from flooding			
If you rent, discuss your plans and responsibilities with your landlord			
PROTECT YOUR FAMILY			
Make and share a plan for what you would do in case of flooding			
Make and share a plan to evacuate from your home, condo, or apartment			
Make and share a plan with family, friends or neighbours for how you can help each other during a flood			
Gather enough emergency supplies for several days (food, water, first aid kit, portable radio, medications, important documents, etc.)			
PROTECT YOUR HOME			
Learn about your flood insurance options			
Identify a safe place for valuable items and documents			
Place valuable documents (e.g., marriage and birth certificates, passports) in waterproof containers			
Use water-resistant building materials in your basement			
Disconnect your downspouts from the municipal water system and extend them more than six feet from your foundation			
Grade your property so water drains away from your foundation			
Install a sump pump and/or backwater valve, and maintain it regularly			
Clear snow away from your foundation and keep storm drains clear			
Cover basement window wells and seal basement windows			

*If participants select "Do not plan to do this over the next 6 months" for any of the above options, they will be redirected to the following questions (skip capability is built into online survey program):

20. B) Why do you not plan to do this over the next 6 months (check all that apply)?

- Not important
- Another flood won't happen here
- Not my responsibility
- Not effective to protect my home or family
- Won't protect me from other risks, like a fire or tornado
- Too expensive
- Takes too much time/effort
- Don't know how to do this
- Too difficult - not physically able/need help from others

22. When preparing for floods, it most important to (check all that apply):

- Improve my (and my family's) safety during an evacuation or a flood
- Limit the financial impact and damage to my home and belongings
- Be useful for events other than floods
- Be inexpensive
- Take little time and effort
- Require little knowledge and skills
- Require little help and cooperation from others

23. What is your most important source for weather information (select one)?

- Personal observations - storm clouds or heavy rain
- The Weather Network
- Internet websites
- Social media (e.g., Twitter, Facebook, Instagram)
- Local radio stations
- Local television stations
- Watches and Warnings from Essex Region Conservation Authority
- Cell phone/text messages
- Weather apps
- Family/friends/neighbours/coworkers
- Other: _____

24. What are your top 3 ways to receive information on what to do before, during and after a flood (select three for each category - before, during, and after)?

	Before a flood	During a flood	After a flood
The Weather Network (website or television station)			
Resources on the City's website			
Emergency Services - Fire, Police, Paramedics			
Non-profit Organizations			
Pamphlets/brochures			
Social media (e.g., Twitter, Facebook, Instagram, YouTube)			
Community Meetings			
Local radio stations			
Local television stations			
Watches and Warnings from Essex Region Conservation Authority			
E-mail			
Text message			
Sirens			
Home or mobile phone call			
Family/friends/neighbours/coworkers			
Community organizations			
Faith organizations			
Cell phone "app" notification			
Other:			

25. Who would be most helpful to you before, during or after a flood (check all that apply)?

	Before a flood	During a flood	After a flood
Friends/family/neighbours			
Fire or Police Services			
Faith leaders			
Community leaders			
Co-workers			
Municipal representatives			
Elected officials			
Community volunteers/non-profit organizations			

26. Think of the most recent flood to affect your home or community. What information did you lack that could have helped you prepare, respond to or recover from the flood?

- My local flood risk
- Local weather information/warning that heavy rain was coming
- What I could do to protect my home
- What I could do to protect my possessions
- What I could do to protect my family
- Evacuation information

27. What would you do differently to prepare for the next flood?

28. What advice would you give your friends and neighbours to help them prepare for flooding?

29. Is there anything else you would like to tell us about flooding and being prepared in Dufferin County?

DEMOGRAPHICS

The following questions are intended to place your answers within the broader social context. The information in this section will not be used to identify you or your household. You may skip any question(s) that you do not wish to answer.

30. How do you identify?

- Male
- Female
- Other
- Prefer not to say

31. Are you a tenant or homeowner?

32. What are the first 3 digits of your postal code?

33. How long have you lived at this residence?

- 0-2 years
- 3-5 years
- 6-10 years
- More than 10 years
- Prefer not to say

34. How many people (including children) live in your household?

35. What is the size of your home?

- 0-999 square feet
- 1000-1,999 square feet
- 2000-2,999 square feet
- More than 3000 square feet
- Prefer not to say

36. What type of property is your home?

- Apartment
- Condominium
- Townhouse
- Duplex
- Single story detached residence
- Double story detached residence
- Mobile home
- Social housing/seniors home/assisted living
- Other: _____
- Prefer not to say

37. What is your age?

- 18-24 years old
- 25-34 years old
- 35-44 years old
- 45-64 years old
- 65-74 years old
- 75 years or older
- Prefer not say

38. What is the highest level of formal education that you have completed?

- Completed grade school
- Some high school
- Completed high school
- Some college/university/trades school
- Completed college/university/trades school
- Completed post-graduate university degree
- Prefer not to say

39. What is your current work status?

- Working full-time (35 or more hours per week)
- Working part-time (less than 35 hours per week)
- Self employed
- Student attending full time school (not working)
- Unemployed and not looking for work
- Full-time caregiver/parent
- Retired
- Prefer not to say
- Other: _____

40. Which of the following categories best describes your total household income? That is, the total income of all persons in your household combined, before taxes?

- Under \$20,000
- \$20,000 to \$39,999
- \$40,000 to \$59,999
- \$60,000 to \$79,999
- \$80,000 to \$99,999
- \$100,000 to \$119,999
- \$120,000 or above
- Prefer not to say

APPENDIX B: INTERVIEWEE ORGANIZATIONS

Interviewees were from the following organizations:

- Alberta Emergency Management Agency
- Canadian Red Cross
- Canadian Water Resources Association
- City of Markham
- City of Windsor
- Dufferin County
- Emergency Management Ontario
- Environment and Climate Change Canada/Meteorological Service of Canada
- Green Communities Canada
- Insurance Bureau of Canada
- Ontario Provincial Police
- Public Safety Canada
- Toronto Region Conservation Authority
- University of Western Ontario, Department of Anthropology
- Windsor Essex Community Housing Corporation

APPENDIX C: EXPERT INTERVIEW QUESTIONS

1. Can you please describe your role and background in the field of emergency preparedness or response?
2. As you know, a large percentage of the public is not prepared for emergencies such as floods (i.e., does not have a basic 72-hour disaster kit, family communication plan, or information about how to prepared for risks and emergencies in their community).
 - a. Why do you think some people prepare for floods while others do not?
 - b. How do you define preparation – these three basics, the seven Public Readiness Index actions (having a supply kit, a portable supply kit, a communications plan, a meeting place, having practiced or drilled, volunteered to help, or taken First Aid within the past five years) or some other way?
 - c. Are there other skills you would like people to have?
3. How can we increase the number of people who prepare for floods (as you have defined it above)?
4. We are trying to segment the general public into smaller groups in order to improve our training effectiveness. One way this is typically done is to identify 1) those who are at highest risk, 2) those who are most ready for the training, and 3) those who are most crucial for the success of the training. For example, in our community, we might identify seniors in high rises as most in need of education on evacuation and shelter-in-place.
 - a. Could you please suggest a population for each of these three groups?
 - b. Do you know how we can reach members of these groups?
5. Do you have any stories of when public flood preparation was successful?

APPENDIX D: SOCIO-DEMOGRAPHIC SURVEY QUESTIONS

1. Do you rent or own the residence you live in?

- Rent
- Own
- Prefer not to say

2. What is your gender identity? Choose all that apply.

- Male
- Female
- Transgender
- Genderqueer
- Non-binary
- Prefer not to say

3. What is your age?

- 18-24 years old
- 25-34 years old
- 35-44 years old
- 45-54 years old
- 55-64 years old
- 65-74 years old
- 75 years or older
- Prefer not to say

4. What is the primary language spoken in your household?

- English
- French
- Other: _____
- Prefer not to say

5. Which of the following categories best describes your total household income? (the total income of all persons in your household combined, before taxes in 2017)

- Under \$20,000
- \$20,000 to \$39,999
- \$40,000 to \$59,999
- \$60,000 to \$79,999
- \$80,000 to \$99,999
- \$100,000 to \$119,999
- \$120,000 or above
- Prefer not to say

APPENDIX E: FOCUS GROUP QUESTIONS

Phase 1 – Perceived risk and level of preparedness

1. What do you think is the level of risk for flooding in this region (low, medium or high)? And why?
2. How important do you think it is for people living in this region to be prepared for flooding? Why?
3. If another flood was to happen in your community, do you believe that you are prepared?
 - a. If no, why not? What would motivate you to become more prepared?
 - b. If yes, in what ways do you feel you are prepared? What was your biggest motivator (e.g. feeling of fear, a family member, the flooding itself)?

Phase 2 – Reviewing Canadian Red Cross materials and messaging

Present messages to participants in printed format. Give 5-7 minutes for everyone to review.

1. Looking at this material, what do you think is the overall message?
2. Does this material convince you why you need to take action?
3. Does this material give you the information you need to take action?
4. Is this material appealing to you? In content and in style? If not, how could it be improved?

After all materials have been presented the next set of questions will be asked to the group.

5. Is there other information that would better help you or others to be more prepared for a flood?
6. Who would you prefer to receive flood preparedness messages from?
7. In what ways would you like to receive flood preparedness messages? (e.g. text message alerts, website, social media, TV station, radio station, neighbours)
8. As a group, discuss the best possible ways that the Canadian Red Cross and the municipality can improve messaging in content, style and medium.

APPENDIX F: CANADIAN RED CROSS MATERIALS

2.7.2.1 Floods: Before, During & After

Floods can happen anywhere and at any time of the year. The best way to protect yourself and your family in case of a flood is to follow these steps:

- Monitor local weather and alerts: Know your risk.
- Turn around, don't drown – avoid flood waters.
- Clean up carefully and wear protective clothing.

Before

- Know the flood risk in your community by calling your municipality and insurance company.
- Know and practice evacuation routes.
- Monitor local weather and alerts and follow instructions if told to evacuate.

Actions to Take:

- Protect your valuables in waterproof containers. Place them above potential water levels.
- Put sealant around basement windows and the base of ground-level doors.
- Raise large appliances in the basement above the potential water level from a flood.
- Make sure your sump pump is working and install a battery-operated backup.
- Check that your roof and eavestroughs are draining properly in heavy rains.

During

- Listen to area radio and television stations and Weatheradio for possible flood warnings and reports of flooding in progress.
- Be prepared to evacuate at a moment's notice.
- When a flood or flash flood warning is issued for your area, head for higher ground and stay there.
- Turn around – don't drown! Stay away from flood waters. They could be deeper than you think.
- Keep children and pets away from flood water.
- Be especially cautious at night when it is harder to recognize flood danger.

After

Consult the [Canadian Red Cross Guide To Flood Recovery for step-by-step instructions](#).

Continue to take precautions and listen to and follow directions from local authorities.

- Listen to the radio for further instructions from officials.
- Do not return home until you are advised it is safe to do so.
- Contact your insurance company and let them know what happened. They will want to know a record of damage to your home and belongings and may request photos or video.
- Maintain good hygiene during flood cleanup by minimizing contact with floodwater or anything that may have come in contact with it.
- Wear protective clothing, including rubber boots or sturdy boots, safety glasses, hard hat, rubber gloves and a dust mask.
- Do not use water that could be contaminated.
- Discard any food items which may have been in contact with flood waters. When in doubt, throw it out!
- Do not use any appliances, heating, pressure, or sewage system until electrical components are dry and have been inspected by a qualified electrician.
- Check with local authorities on how to properly dispose of damaged items from your home.

To learn more about the common causes and the impact of floods, visit **Floods: Information and Facts**.

GET A KIT

The Red Cross recommends that you keep a disaster preparedness kit in your home with enough supplies to meet your family's needs for at least 72 hours. By taking the time now to store food, water and other supplies, you can provide for your entire family in the event of an emergency. The following list is a guide of suggested items to have in your disaster preparedness kit at home. It is important that you check it every year and to resupply it after every use.



Use this table as a checklist to ensure you are well prepared.

- Water
- Food (non-perishable)
- Manual can opener
- Crank or battery-operated flashlight, with extra batteries
- Extra keys, for your house and car
- First aid kit
- Cash in small bills
- Special needs items (i.e. medications, infant formula)
- Personal hygiene items
- Important family documents (i.e. copies of birth and marriage certificates, passports, licenses, wills, land deeds and insurance)
- A copy of your emergency plan

Additional items to consider

- Change of clothing and footwear for each person
- Plastic sheeting
- Scissors and a pocket knife
- Whistle
- Hand sanitizer
- Pet food and pet medication
- Garbage bags and twist ties
- Toilet paper
- Multi-tool or basic tools (i.e. hammer, wrench, screwdriver etc.)
- Duct tape
- Sleeping bag or warm blanket for each member of your house hold

It is important to store these supplies together in a sturdy and easy-to-carry bag, such as a backpack that can easily be used in an emergency situation. Get your kit at www.shop.redcross.ca.

Vehicle emergency preparedness kit

An emergency can happen at any time when you are in your car. Be prepared to help yourself and your family if you are ever stuck in your vehicle for an extended period of time. In addition to your emergency preparedness kit, it is recommended that you **keep the following items in your car:**

- Water
- Food (non-perishable)
- Blanket
- Extra clothing and shoes
- Crank or battery operated flashlight, with extra batteries
- Road maps
- Road flares
- Work gloves
- Windshield washer fluid
- Jumper cable or batter pack
- Sand, salt or kitty litter
- Shovel and ice scraper
- De-icer (methyl hydrate)

KNOW THE RISKS

Canadians have faced many emergency situations in the past, from floods to ice storms to power outages. Understanding the risks in your community will help you be ready.

According to recent polling by the Red Cross, two thirds of Canadians say they have not taken steps to prepare in the event of a disaster, such as an earthquake or flooding. Most often they say it's because they think it is unlikely to happen or they haven't thought about it. This is despite the fact that **nearly half of Canadians have personally experienced at least two different types of emergencies.**



As a family, discuss what types of natural and technological disasters are most likely to happen in your community.

Although the consequences of various disasters can be similar, knowing the risks in your area can help you better prepare. Across Canada, we face a number of hazards, such as earthquakes in British Columbia, hurricanes in New Brunswick and tornadoes in Ontario. Some of the risks may be relevant to your community. Please note this list is not exhaustive and other disasters may occur in your area, such as landslides, tsunamis and industrial or transportation accidents.

How to Identify Risks

- Call your local municipality and ask what types of risks are common in your area.
- Explore the Public Safety Canada Disaster Database online to find historical information on disasters in your area.

Common Emergencies

Use the following list to identify which emergency may apply to your area.

- House fires
- Power outages
- Earthquakes
- Floods
- Forest fires
- Hurricanes
- Thunderstorms
- Tornadoes
- Winter storms/Extreme cold
- Extreme heat
- Other _____

MAKE A PLAN

It is important to ensure that the entire family is prepared and informed in the event of a disaster or emergency. You may not always be together when these events take place and should have plans for making sure you are able to contact and find one another.



- Determine the best ways to evacuate your home in case of an emergency such as a house fire.
- Make sure everyone in the house knows the location of your emergency kit and water supply.
- Establish a safe place for your family to meet.
- Include a plan for evacuating your pets.
- Practice your evacuation plan frequently.
- If you can't evacuate your home, prepare to be self-sufficient in your home for 72 hours (or seven to 10 days in a health emergency)
- If a member of your family has special needs that would require extra assistance, work those details into your family emergency plan and emergency kit.

Know your neighbourhood

- Work with your neighbours to identify people who may need extra help during an emergency, or who you can turn to for help.
- Identify your community's emergency plan.
- Identify your community's evacuation routes.
- Identify where emergency shelters are located.
- In the event of a disaster, listen to local radio and television. If local officials ask you to evacuate your neighbourhood, follow the routes and go to the location specified by officials. Do not take shortcuts as they could take you to a blocked or dangerous area.

Establish an out-of-town emergency contact

- Plan for each family member to call or e-mail the same out-of-town contact person in case of an emergency.
- Choose an out-of-town contact that lives far enough away that he or she will not have been affected by the same event.
- Ensure that the designated person knows they are your family contact.
- Ensure that you and your family members know or carry the number and e-mail address.



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PREPARED FOR THE CANADIAN RED CROSS | SEPTEMBER 2018

