

Flooding and Personal Preparedness in Dufferin County

Prepared by Partners for Action
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Chapter 1: Background of 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 Partners for Action (P4A) to improve flood messaging and help residents better prepare for future flood-related events.

Chapter 2: Online Survey

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 fail to prepare against flood risks. The partners sought to understand how to improve their risk messaging to encourage more residents to take protective actions before, during, and after flood events. P4A developed a survey for Dufferin County (see Appendix A for questions) that examined several important themes, including:

1. Individual experiences with flooding in 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-led initiatives.

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

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.

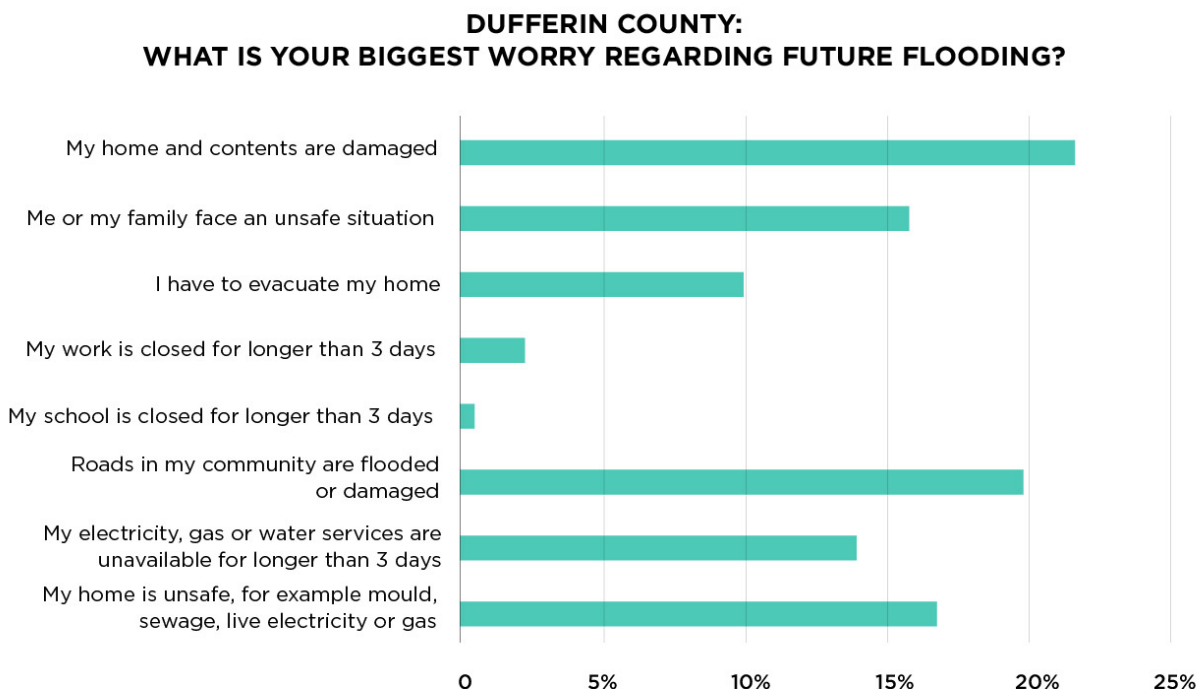
Fifty-four percent said flooding had interfered with their daily activities. The most common impacts included: 1) being unable to use the washer, dryer, furnace, or hot water heater, which meant respondents were unable to do laundry, wash dishes, bathe, or clean; 2) being unable to access their home 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. 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 1).

Figure 1.

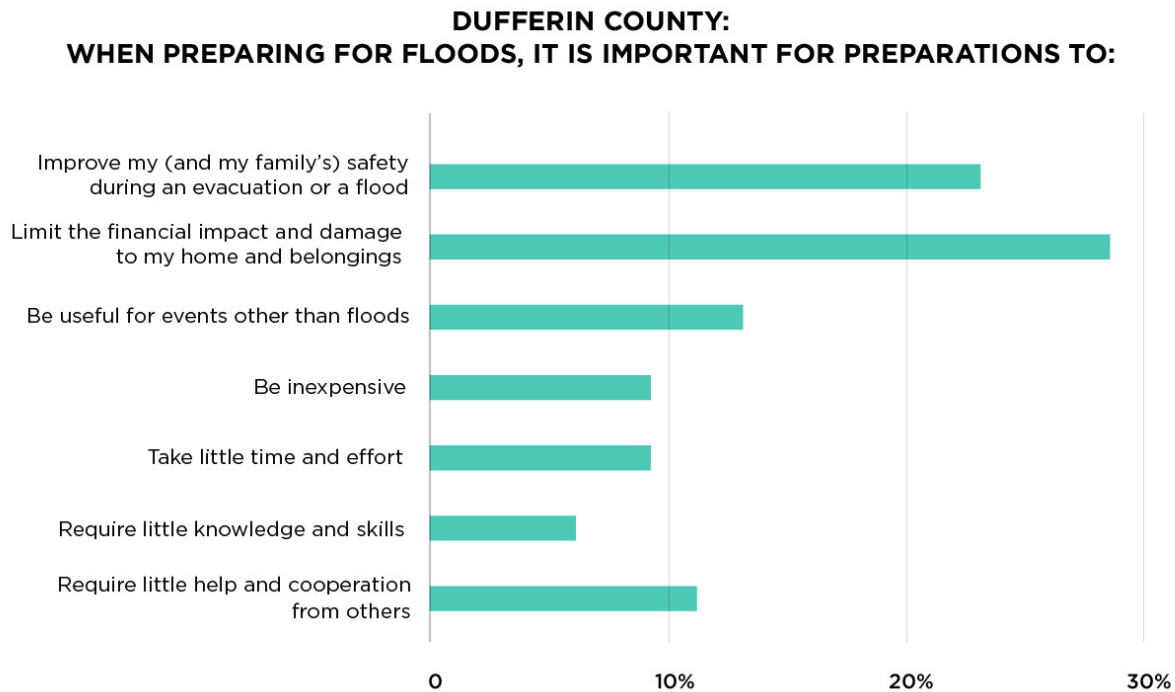


Respondents were also asked to share their thoughts on what factors are contributing to flooding in Dufferin County. Respondents blamed climate change (33%), aging infrastructure (23%), and increasing development (19%). Thirty-eight respondents provided more details on their responses, including blaming 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 2).

Figure 2.



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.

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.

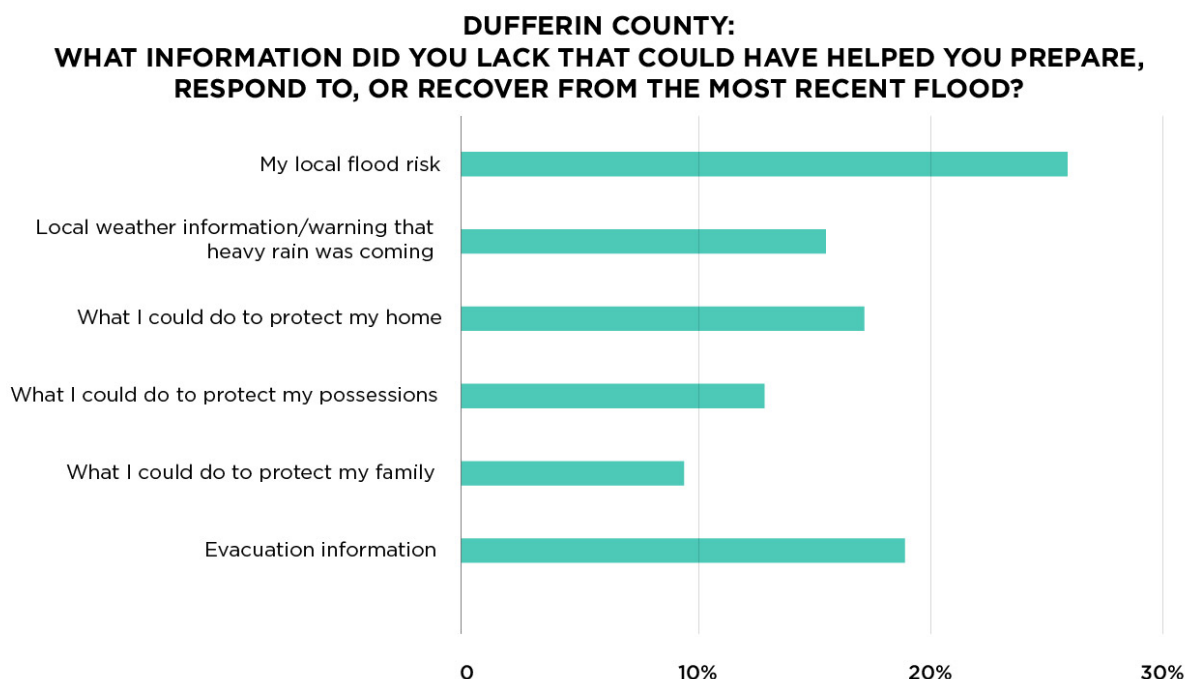
4. Preferred sources for information and support before, during, and after a flood event

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 3).

Figure 3.



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".

Throughout the survey, respondents were given multiple opportunities to share additional thoughts and comments. From this open-ended information, it was found that many respondents would like to see the County and the Conservation Authority provide more updates on what actions they are taking to minimize flooding (i.e. updates to infrastructure), in addition to just telling residents what steps to take. Many respondents would also like to see the flood risk of a home be disclosed at the time of purchase. One respondent also noted that it may be beneficial to some Dufferin County residents if more information on road closures was provided in formats other than social and digital media.

Barriers

The survey highlighted many barriers that prevent residents from taking preparedness actions. 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. 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 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

Recommendations

Based on the survey results, P4A offers the following recommendations to Dufferin County to improve the effectiveness of flood risk communication:

1. Clarify roles and responsibilities for managing flood risk by explaining what residents can do, what the County can do, and how to work together to make the community more flood resilient.
2. Inform residents that flood protection is for everyone, everywhere, and has many components. Residents need to make sure they are doing enough to protect themselves from flooding and should recognize that being prepared extends to other emergencies.
3. Provide information on available resources and solutions that will allow residents to make informed decisions about their ability to protect themselves –the effectiveness and importance of protection, and also the time, effort, and cost involved. Where possible, link to financial incentives or supports - these can help both those without the financial or physical resources, and those who are ambivalent, to prepare (Coppola and Maloney, 2009).

4. 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 municipal staff.
5. Develop a plan and work with local media, social media leaders, and community groups, like the Canadian Red Cross, to communicate not just about weather information, but updates before, during, and after flood events.
6. Host preparedness events and training opportunities for families, friends, and neighbours that encourage learning how to prepare and reduce risk, together.
7. Communicate success stories of Dufferin County residents who have taken actions to reduce their flood risk and use these stories to motivate other members of the community.

Chapter 3: Focus Group

A focus group was held in Dufferin County on July 30, 2018 at the Amaranth Municipal Office. Less than ten participants were in attendance. Despite the small size, this was an informed and well-prepared group that had high quality conversations and provided insightful feedback. The goals of the focus group were to identify what community members want to know and how they want to receive flood-related information, and to determine effectiveness of existing flood and preparedness messaging, materials, and approaches for raising awareness and preparing communities for floods. During the focus group, participants also commented on flood materials specific to the community in which they live.

Participants discussed potential messaging for use in Dufferin County regarding not driving through flood waters, such as the US National Oceanic and Atmospheric Administration (NOAA) “Turn Around, Don’t Drown” campaign. The group agreed that the messaging itself is effective, however, they felt it was too alarmist and not appropriate for their community. Due to a recent fatality in the County related to driving in flood waters, participants felt that this wording hit too close to home. Participants suggested that road signs should more explicitly caution people of a danger and explain why it is not safe. It was agreed that a “Road Closed” sign does not indicate that there is a danger and therefore does not stop everyone from driving through. To make the signs more effective, participants suggested the use of the word “Danger” and link to consequences like fines, insurance ineligibility, personal safety, or damage to cars.

Participants were also asked about their level of preparedness, and the risk of flooding in Dufferin County. 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

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. Some participants that owned detached homes felt that municipal building regulations and/or Conservation Authority regulations restricted them from taking action on their properties. 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.

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.

Based on the discussions about preparedness, participants 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;
- Video and audio flood protection tutorials and case studies;
- Information on the County’s flood mitigation and protection efforts; and,
- Information on insurance policy coverage and options.

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 the County’s website);
- Send information by mail to high-risk neighbourhoods, including homes that registered previous floods;
- Tailor information on flood preparedness to specific communities;
- Teach flood preparedness information to kids in school;
- Place preparedness information in community retailers, 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 for the community on social media platforms; and,
- Develop an emergency preparedness e-newsletter that residents can subscribe to.

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

1. Consolidate preparedness information from many sources into one spot, such as on the County website - residents do not typically go to the Canadian Red Cross

website to access flood information;

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 their personal situation, and tailor to specific groups (i.e., rural communities, urban communities, homeowners, tenants, etc.).
6. Provide both the 'what' 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. 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 disaster assistance, such as taking photos and keeping receipts of basement items before a flood hits.
8. Teach flood preparedness information 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 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.).

Chapter 4: Conclusions and Key Recommendations

Partners for Action worked with the Canadian Red Cross to study flood risk awareness and preparedness in Dufferin County, Ontario. 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 and Dufferin County with valuable information to increase the effectiveness of 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:** Flood-related messages and materials should be solutions-oriented, and provided on municipal websites, as this is a key source of information for residents. Partnering with a trusted source, such as the Canadian Red Cross, would further the uptake of information by residents.

When developing flood messaging and materials, 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 homebuyers, and insurers can provide incentive programs for clients who take preparedness measures. Everyone has a role to play when it comes to flood resilient communities.

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).

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