

A person wearing a bright yellow raincoat and yellow rubber boots stands in a flooded area during a heavy rainstorm. The person is seen from behind, looking out over a flooded street. The rain is falling in thick, diagonal streaks across the entire scene. In the background, there are green trees and a white fence. The ground is covered in water and some debris, including a pile of grass and leaves near the person's feet.

CANADIAN VOICES ON CHANGING FLOOD RISK

Findings from a National Survey

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UNIVERSITY OF WATERLOO
FACULTY OF ENVIRONMENT



PARTNERS FOR ACTION

Interdisciplinary Centre on Climate Change





About the Interdisciplinary Centre on Climate Change

The Interdisciplinary Centre on Climate Change (IC³) brings together experts across disciplines to consider the impacts of climate change from every angle. A fresh approach, built on smart science, working toward achievable solutions – because at Waterloo, change really does matter. Established in 2008, IC³ seeks to advance research on climate change by facilitating interdisciplinary research and providing relevant scientific information that empowers business, government and civil society to prepare and respond effectively to weather events and climate change.

For more information: uwaterloo.ca/climate-centre.

About Partners for Action (P4A)

Partners for Action (P4A) is an applied research network advancing flood resiliency in Canada in the face of a changing climate and extreme weather. The collaborative approach brings together diverse stakeholders to create and share knowledge, address information needs, and drive action. P4A is based out of the Faculty of Environment at the University of Waterloo, with founding support provided by The Co-operators Group Ltd. and Farm Mutual Re.

For more information: uwaterloo.ca/partners-for-action.

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EXECUTIVE SUMMARY

Canada's approach to flood management is going through a policy shift that will place more responsibility on homeowners. The federal government is reducing its burden for the costs of Canada's most common and expensive natural hazard by expanding the financial responsibility of provinces, municipalities and, ultimately, homeowners. This policy shift comes as the costs of flooding continue to grow and flood risk increases in a changing climate.

Canadians have yet to be given a voice on their growing responsibility for flood protection and recovery. This report presents the findings of a national survey, which gathered the opinions of 2,300 individuals from across the country who live in communities with high flood risk.

The findings reveal that homeowners lack awareness of flood risk and the protection options available for them to play their part in reducing flood risk.

This is unfortunate, considering that 83% of Canadians believe they have a responsibility to protect their own property from flood damage.

Even with this sense of duty, Canadians show little action to protect their homes and financial security. Less than 30% of respondents use property-level flood protection, such as sump pumps, water resistant materials in basements and rain barrels. They also express limited demand for overland flood insurance that would help them recover from flood damage, with 50% saying they would not consider purchasing coverage.

Why are Canadians not taking action if they believe they should play a part in managing flood risk?

Canadians' self-assessment of flood risk does not align with actual risk. Seventy-four percent do not think they are vulnerable to flooding, despite living in areas designated as high-risk by the federal government. Only 6% of homeowners know they are located in a designated flood risk area.

The lack of risk awareness is worrying. Some provincial governments are no longer willing to provide disaster assistance when insurance is available. Failure to protect property or purchase insurance coverage will leave homeowners solely responsible for damage costs and increase the risk of mortgage defaults.

Fortunately, Canadians support policy changes that could substantially improve flood risk awareness. Over 90% of homeowners agree that flood maps should be made publicly available, sellers of property should be required to disclose flood risk, and property owners should be notified if their home is located in a flood risk area.

Governments and other stakeholders can and should meet the demand from homeowners for more information. Doing so will help Canadians be informed about the flood risk to their property or a property they are considering purchasing. Informing Canadians about their new responsibilities and financial implications of being uninsured under the new disaster assistance rules is vital to empower their participation in the country's evolving flood management policies.

KEY FINDINGS

Due to rising costs, the federal and provincial governments are finding ways to reduce flood risks and share responsibility for protection and recovery with Canadian homeowners.

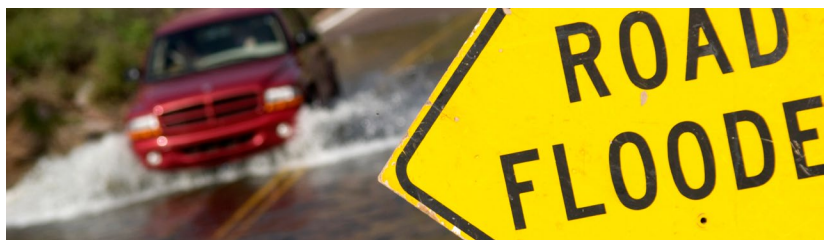
Canadians are ready to take on a greater role in flood protection — 83% believe that homeowners are responsible for personal protection.

Despite this sense of duty, less than 30% of Canadians are taking actions to protect their property from flooding and show limited interest in flood insurance.

This inaction is a result of a gap in flood risk awareness. Only 6% know they live in a designated flood risk area, and only 21% believe that the risk of flooding will increase over the next 25 years.

Canadians need and want more information to be actively engaged in flood management and protected from flood risks. There is a major opportunity for transparent information sharing.

Over 90% of homeowners think that flood maps should be made publicly available, sellers of property should be required to disclose flood risk, and property owners should be notified if their home is located in a flood risk area.



CANADA'S APPROACH TO FLOOD MANAGEMENT IS CHANGING

In February 2016, the Parliamentary Budget Officer (PBO) reported on the unsustainable costs of Canada's Disaster Financial Assistance Arrangements (DFAA) program.¹ Established in 1970, the DFAA is a framework for federal-provincial cost sharing for disaster recovery. Each province has a population-based threshold that must be reached before requesting federal financial assistance for eligible disaster expenses. The federal government currently pays approximately \$1 billion each year to help provinces and territories respond to and recover from disasters, ten times the annual budget of \$100 million. Seventy-five percent of this amount is allocated to flood-related damages. DFAA costs are expected to double over the next five years, while the budget is expected to stay the same.

In the 1970s, the federal and provincial governments mapped "designated flood risk areas", locations throughout the country that are vulnerable to severe and repeated flooding.² A minimum national standard required protection of properties from the "1-in-100-year flood," a major flood expected every 100 years on average (now also referred to as a "1% flood", meaning there is a 1% chance of a flood of this magnitude happening each year). Dikes, dams and other structures were built to protect communities based on these flood maps.

Since that time, DFAA program payouts have increased rapidly. Flood-related costs have grown steadily due to: outdated flood maps; development in flood-prone areas; deferred maintenance and replacement of municipal stormwater infrastructure, dikes, dams, and flood protection structures; reliance on basements as living areas (and moving more expensive items to basements); and changing weather patterns.

Faced with these rising disaster assistance costs, the federal and provincial governments have started looking for ways to reduce flood risk and share the responsibility of flood protection through several actions that include:



- Raising the provincial and territorial expense thresholds for federal disaster assistance, effectively reducing the Government of Canada's financial liability for disaster-related recovery;³
- Encouraging insurers to offer residential overland flood insurance through updating flood maps, increasing investment in flood defences, promoting flood risk awareness, and offering incentives to encourage flood risk mitigation;⁴
- Launching the \$200 million National Disaster Mitigation Program to fund flood mapping, risk assessments and small structural flood protection projects;⁵ and,
- Developing the Federal Floodplain Mapping Framework, including technical guidance for floodplain mapping that recommends the use of risk assessments for local communities.⁶

Several insurers now offer residential flood insurance.⁷ Because private flood insurance is becoming "readily and reasonably available," some provincial governments (e.g. British Columbia) are notifying residents that flood damage no longer qualifies for disaster assistance.⁸

These changes could have serious implications for Canadians. By reducing the availability of disaster assistance and tightening the eligibility to receive it, the federal and provincial governments have shifted more financial liability and responsibility to homeowners. Governments assume that homeowners will respond to this new responsibility by taking actions that reduce flood risk (e.g. purchasing overland flood insurance).

¹ Office of the Parliamentary Budget Officer. 2016. *Estimate of the Average Annual Cost for Disaster Financial Assistance Arrangements due to Weather Events*.

² de Loë, Rob. 2000. "Floodplain Management in Canada: Overview and Prospects." *The Canadian Geographer* 44 (4): 322-439.

³ Public Safety Canada. 2017. *DFAA Interpretation Bulletin Number 5*.

⁴ Public Safety Canada. 2015. *Residential Flood Insurance*. Briefing for the Minister.

⁵ Public Safety Canada. 2015. *National Disaster Mitigation Program*.

⁶ Public Safety Canada. 2017. *Federal Floodplain Mapping Framework*.

⁷ Thistlethwaite, Jason. 2016. "The Emergence of Flood Insurance in Canada: Navigating Institutional Uncertainty." *Risk Analysis*, doi:10.1111/risa.12659.

⁸ Emergency Management British Columbia. 2016. *Disaster Financial Assistance and Residential Flood Insurance*.

FLOOD RISK IS INCREASING AND THE COSTS ARE HIGH

Many Canadian communities have suffered the economic and social costs of flooding. It is Canada's most common and costly natural hazard.

The most expensive disaster in Canadian history occurred in 2013, when flooding in Alberta cost Canadian taxpayers, homeowners and insurers over \$6 billion.⁹ That same summer, Toronto and Halton Region saw record rainfall — 100 millimeters in two hours — that caused severe flooding, power outages for approximately 300,000 residents, insured property losses of more than \$940 million, and municipal costs of more than \$65 million for response and recovery.¹⁰

In September 2016, flooding damaged over 1,700 homes and led to states of emergency in Windsor and Tecumseh, Ontario. A month later, Sydney, Nova Scotia set a new daily record for rainfall, as 225 millimeters of rain caused roads to close and homes to flood. And while these major events made national headlines, as a country we have experienced approximately 80 flood events since 2000, with the most frequent and costly unnoticed by those outside of the flood-hit areas.

Canadians personally bear roughly \$600 million in flood-related losses every year.¹¹ But beyond the direct financial impact of flooding, there is a range of health and social impacts caused by the natural hazard, including business failure and unemployment, mould-related health effects, population displacement¹², family and community disruption, and mental health issues such as post-traumatic stress disorder, depression, and anxiety.¹³

The costs of flooding are high. Population growth, increasing economic activity in flood-prone areas, and more extreme weather triggered by a changing climate are increasing those costs.¹⁴



RIVERINE | Heavy rainfall or springsnow melt causes rivers or creeks to overflow.



PLUVIAL | Heavy rainfall in neighborhoods or downtowns can be too much for storm systems to handle, or in rural areas can cause flood because the ground is frozen or saturated and can't absorb rain fall.



GROUNDWATER | Heavy rainfall causes underground water levels to rise above ground level and rain over land.



ICE JAM | River ice breaks and jams in spring causing rivers to backup and flood.



STORM SURGE | Heavy winds force waves inland from a large water body (Lake or Ocean).



TIDAL WAVE/Tsunami | An earthquake offshore forces a large all of water onshore.

Canadians personally bear roughly **\$600 million** in flood-related losses every year.



⁹MunichRE NatCatSERVICE. 2017. Natural Catastrophic Insurance Losses for Canada, 1980-2016.

¹⁰City of Toronto. 2013. *Follow-up on the July 8, 2013 Storm Event*. Staff Report; Nelson, Jacqueline. 2014. "Canadian Insurers Made Record Payouts in 2013." *Globe and Mail*, January 20.

¹¹SwissRe Canada. 2016. *The Road to Flood Resilience in Canada*

¹²Levine, Joyce N. et al. 2007. "Population displacement and housing dilemmas due to catastrophic disasters." *Journal of Planning Literature*, 22 (1): 3-15.

¹³Lamond, Jessica et al. 2015. "An Exploration of Factors Affecting the Long Term Psychological Impact and Deterioration of Mental Health in Flooded Households." *Environmental Research*, 140: 325-334.

¹⁴Casey, Michael. 2015. "Global Cost of Flooding to Increase Tenfold by 2030." *CBS News*, March 5; Winsemius, Hessel C. et al. 2016. "Global Drivers of Future River Flood Risk." *Nature Climate Change*, 6 (4): 381-385.

GIVING CANADIANS A CLEAR VOICE

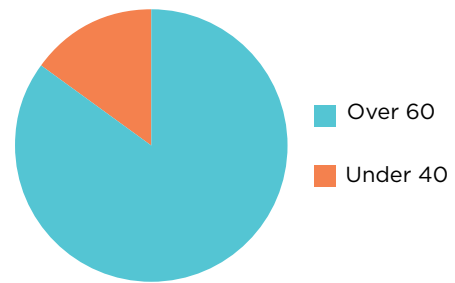
The federal and provincial governments are expecting Canadians to play a larger role in reducing flood risk at a time when the frequency and costs of flooding are anticipated to increase. Are Canadians ready to embrace more responsibility in reducing flood risk?

A bilingual national survey was conducted online in Spring 2016. It provided Canadians an opportunity for a clear voice on their expanding role in flood management.

The survey targeted participants in communities designated as “flood risk areas” by the Government of Canada’s Flood Damage Reduction Program (FDRP), which operated from 1975 to 1999.¹⁵

Through 57 questions, Canadians were asked to share their perceptions of their risk of flooding and their attitudes about actual or intended actions to protect themselves against flood damage.

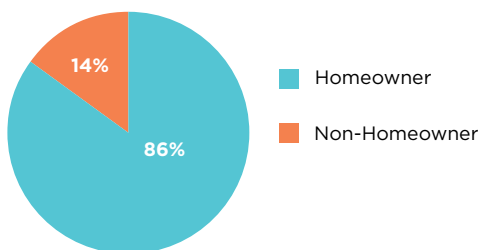
AGE



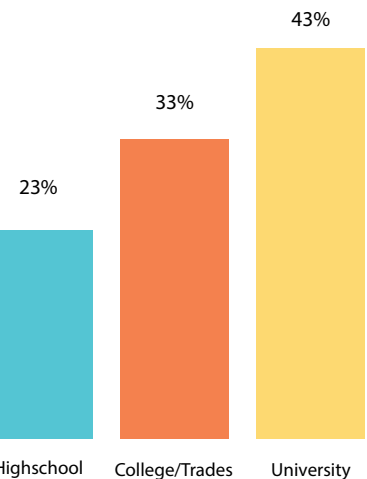
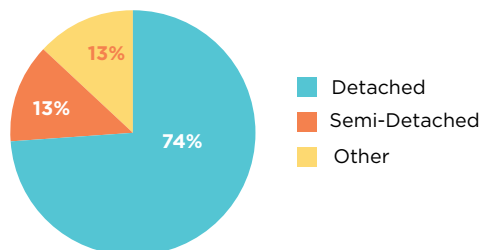
GENDER



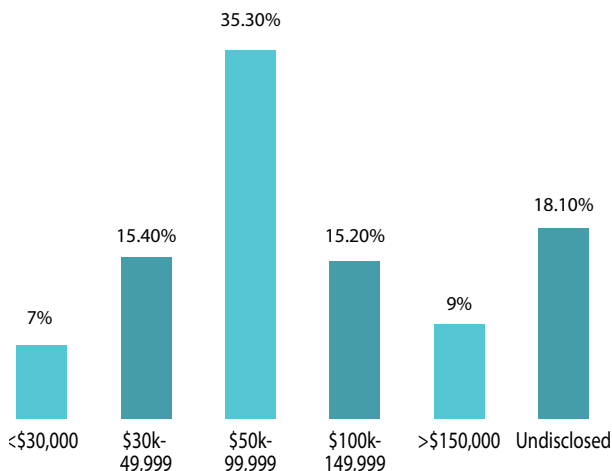
HOMEOWNERSHIP



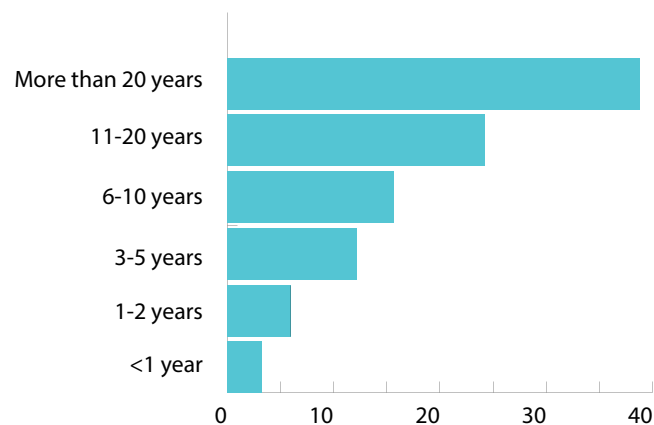
TYPE OF HOME



EDUCATION



ANNUAL (PRE-TAX) HOUSEHOLD INCOME



YEARS SPENT IN CURRENT HOME

¹⁵Government of Canada. 2013. Flood Damage Reduction Program.

OPEN TO SHARING RESPONSIBILITY, BUT UNCERTAIN ABOUT ACTION

Canadians are willing to share and assume responsibility for flood risk management.

More than 80% of homeowners believe they have a responsibility to protect their own property from flood damage. And Canadians see themselves as having the second-most responsibility (55%) for protecting their residential property.

When asked about the costs of flood damage, Canadians believe they should bear a third of the responsibility. But they also support sharing responsibility through insurance: 78% of homeowners identified insurers as responsible for paying for flood damage.

There is variation in this position based on income and province. Canadians in lower income households (less than \$30,000 a year) support the government taking more responsibility to pay for flood damage. Homeowners in Manitoba, Saskatchewan and Quebec believe the government should be more responsible for flood damages, while Atlantic Canadians believe the government should be less responsible. These opinions reveal potential opposition to Canada's new approach to reducing flood risk.

Despite the sense of duty among Canadians, the adoption of property-level protection measures is low. Over 50% of homeowners grade their property away from their home foundation, but less than 30% of homeowners report the use of property-level flood protection measures, such as sump pumps, water resistant materials in basements and rain barrels. This figure highlights that Canadians may be uncertain about their options for protecting their property.

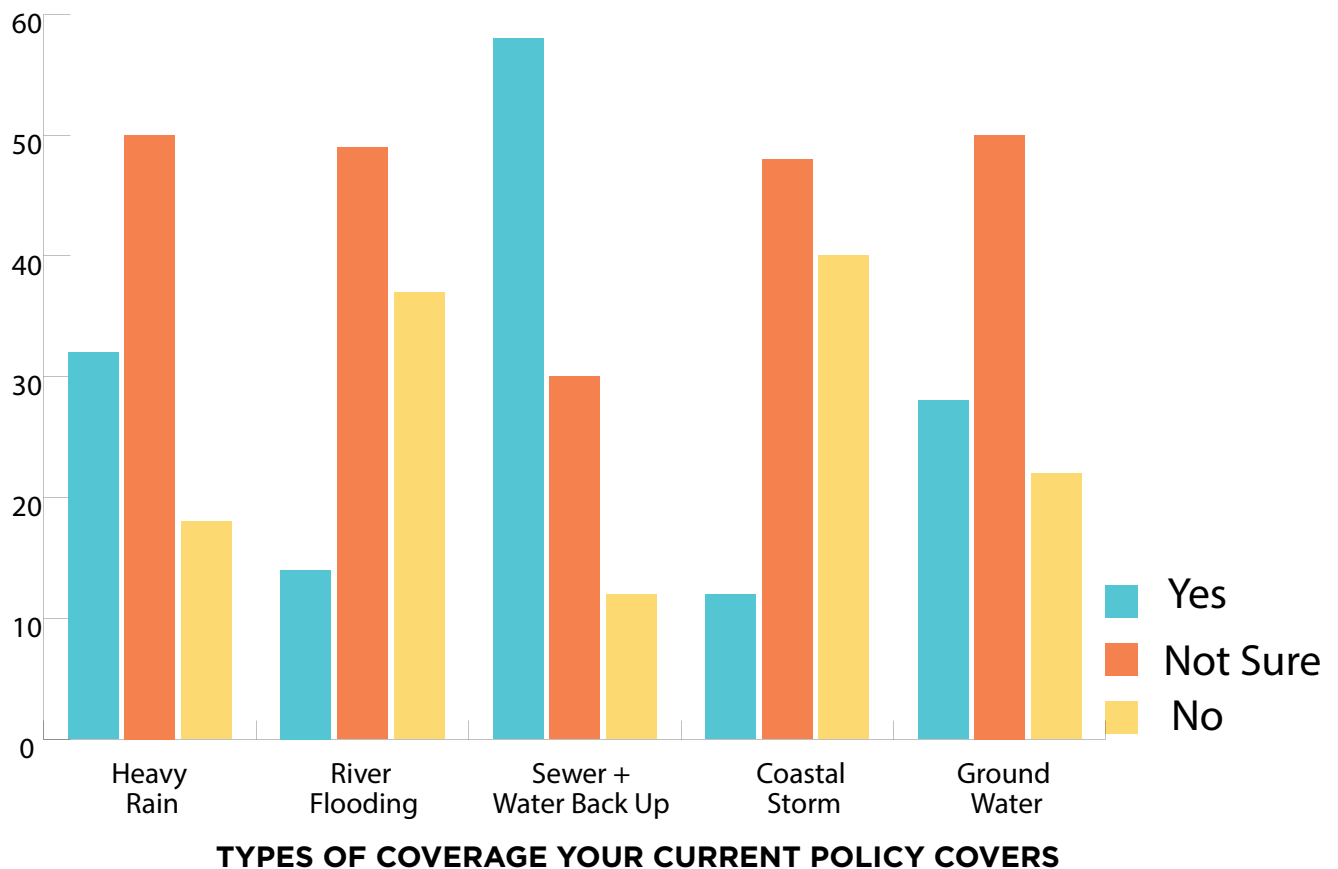
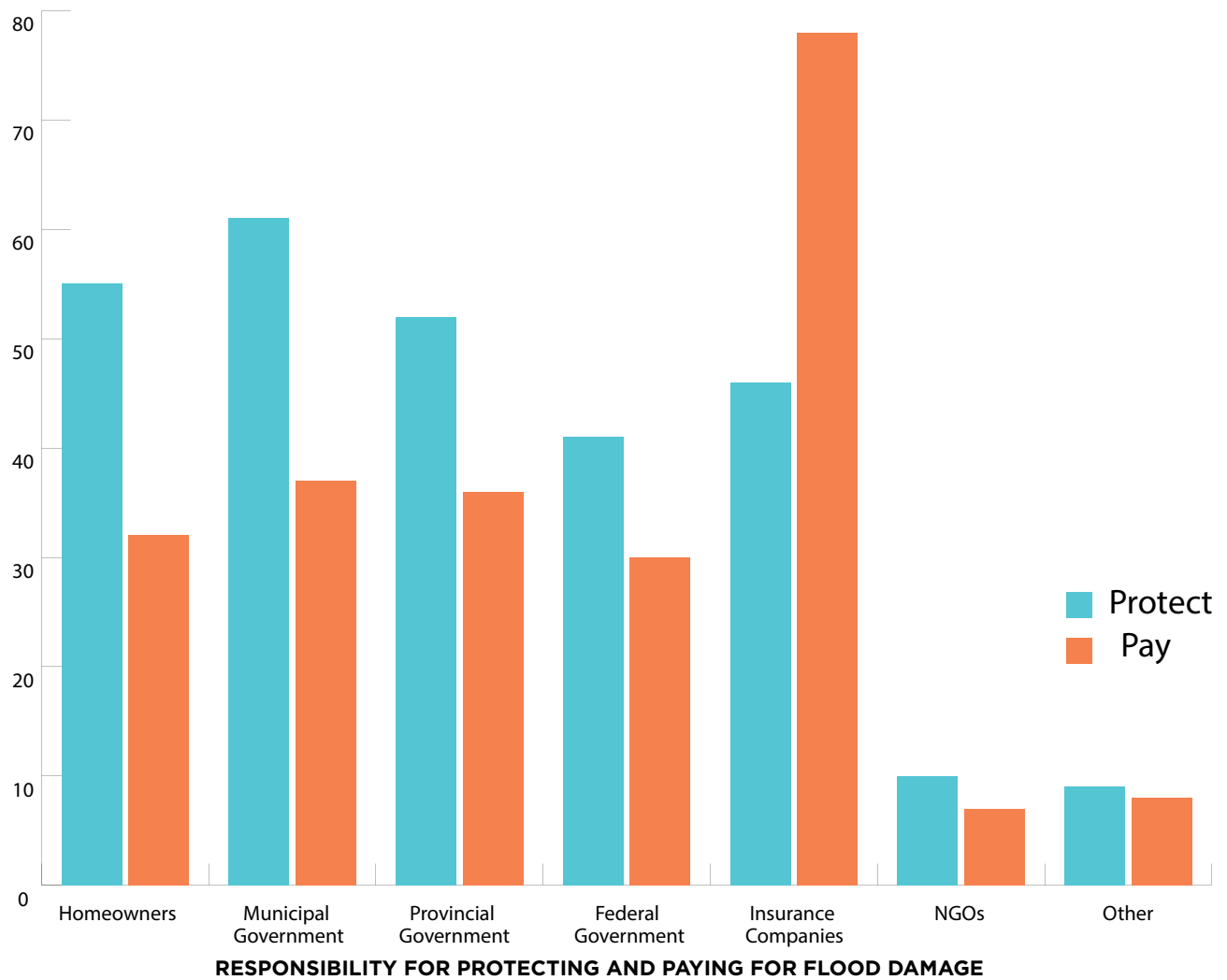
This finding is also evident in the survey responses on the use of insurance to pay for flood damage costs. Most homeowners are currently protected from sewer backup under their home insurance policies. But apart from this coverage, many Canadians are unsure of what type of flood damage their home insurance policy covers. Roughly half of homeowners do not know if they are covered for damages from heavy rain, riverine flooding, coastal storms, or groundwater infiltration.

Insurance for overland flooding (storm surge, ground water or riverine flooding through windows and doors) became available in Canada in 2015. While over half of Canadians think flood insurance should be mandatory for residential and commercial properties, few homeowners (23%) express interest in purchasing flood insurance if it was available in their province, and 67% wanted to pay less than \$100 per year.

Keeping in mind that survey respondents come from designated flood risk areas, it is notable that most homeowners who were not interested in flood insurance (89%) do not believe they are at risk of flooding. Asked if they would consider purchasing overland flood insurance that is readily available and reasonably priced, specifically in the hypothetical context of no more disaster assistance for residential properties, only 9% would absolutely purchase coverage.



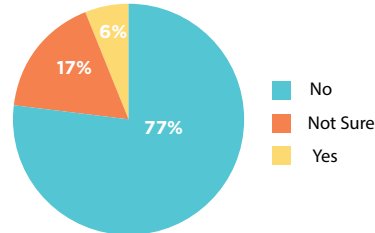
More than **80%** of homeowners believe they have a responsibility to protect their own property from **flood damage**.



CANADA'S FLOOD RISK AWARENESS GAP

Canadians are not taking action because they lack awareness about the risks they face. Of the 2,300 homeowners surveyed, only 6% know that their home is located in a designated flood risk area. When asked how concerned they are about flood risk, 50% express no concern at all. And an alarmingly low number of homeowners — only 21% — believe that the risk of flooding will increase over the next 25 years.

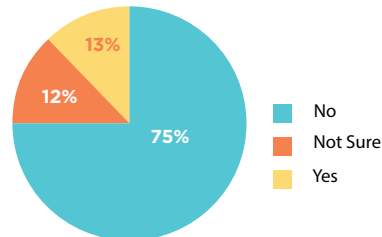
IS YOUR HOME IN A DESIGNATED FLOOD RISK AREA?



Of the **2,300** Canadians surveyed, only **6%** know that their home is located in a designated flood risk area.

Weak flood risk awareness, poor knowledge of insurance coverage, and weak uptake of property protection actions highlight a troubling void. Homeowners throughout the country need better information about flood risks to be responsibly engaged in flood risk management and make informed choices about how to protect themselves.

IS YOUR HOUSE IN AN AREA VULNERABLE TO FLOODING?



RECOMMENDATIONS: EMPOWERING CANADIANS FOR FLOOD RISK MANAGEMENT

Canadians' lack of engagement in flood risk management is a problem, especially since financial responsibility is shifting to homeowners who will receive less disaster relief than expected. For example, homeowners in this survey who had experienced flood damage received, on average, \$30,000 from government to help in recovery. This is a serious gap in protection for most Canadians. In British Columbia, for example, a flooded homeowner can expect to receive up to 80% of a claim, to a maximum of \$300,000, which is less than half of the average home price in the province (\$688,000).¹⁶

1. Governments must inform Canadians about what is expected of them, what could happen to them if a flood occurs, and which actions are best for their home.

Governments and providers of property-level information, such as realtors and insurers, must improve flood education and information sharing. The insurance industry must also do a better job of educating clients, since only 25% of respondents had been approached by their agent to discuss potential options for home flood insurance. We must act together to provide appropriate and timely information to make decisions to reduce risk.

The findings show that Canadians, in search of information, support policy changes that could substantially improve flood risk awareness. Ninety-two percent of homeowners believe that flood risk maps produced by governments or insurance companies should be publicly available. Ninety-one percent agree that sellers of property should be required to inform potential buyers about the risk associated with the property if it is located in a designated flood risk area. Similarly, 90% would like to know if their current home is located in a designated flood risk area.

There are segments of the population, based on geographic location and income, that require tailored information. For example, homeowners in Alberta are less likely to believe their flood risk is increasing, while Canadians in Atlantic Canada

and British Columbia are more likely to believe this. Homeowners in Quebec show the least willingness to pay for flood protection measures, but the highest level of awareness on insurance policies. Atlantic Canadians have the least awareness on insurance policies, but believe the government should be less responsible for paying for flood damage.

2. A national flood risk strategy should be developed that encourages property-level flood protection by communicating the risks of flooding for homeowners through publicly available flood risk maps and disclosure during real estate transactions.

A majority of Canadians believe households most vulnerable to flooding should be protected from the significant costs of flood damage through insurance. This demand creates a challenge as insurance is often unaffordable in high risk areas and Canadians demonstrate a low willingness-to-pay. In addition, the costs of flooding in high-risk areas are expected to increase and already disproportionately contribute to homeowner, insurance and government liability. Flood insurance on its own will not be affordable in high risk areas without support from governments and homeowners to share financial responsibility for flood risk.

3. Governments, insurers and homeowners should work together to develop policies that ensure insurance is available by sharing financial responsibility for flood damage in high risk areas.

As the responsibility for flood protection and financial liability for flood damages increase for Canadians, it is critical that governments and providers of property-level flood risk information be transparent and enable homeowners to be active, engaged and informed participants in Canada's future flood risk management strategy.



¹⁶ Canadian Real Estate Association. 2017. *National Average Price Map*.



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