

December 11, 2014: Children with their grandmother look at the flooding from an overpass in Moncton, New Brunswick after torrential rain dumped more than 70mm of rain. THE CANADIAN PRESS/Marc Grandmaison

Turning the tide

How flood risk transparency can drive equitable outcomes in Canada

Introduction

Climate change is increasing the likelihood of more frequent and severe **pluvial**, **fluvial**, and coastal flooding. Flooding is Canada's most common natural hazard, with 80 per cent of Canadian cities built in part on **flood plains** and 10 per cent of homes at high risk of flooding (Public Safety Canada 2019; D'Souza et al. 2021). Floods cause loss and damage to community-sustaining infrastructure, including properties, homes (Henstra and Thistlethwaite 2017), and critical infrastructure like power, road, and telecommunications networks (Kidd 2011). In the next few years, flood disasters are projected to cost \$673 million annually in disaster financial assistance programs (PBO 2016). They also directly affect people's mental and physical health and well-being through temporary, repeated, or permanent displacement (Levine et al. 2007; Burton et al. 2016; Carroll et al. 2010; Henstra and Thistlethwaite 2017).

As climate change continues to worsen flood risks in communities across Canada, the need for effective actions that build resilience to flooding is more pressing than ever. Absent enhanced **adaptation** and resilience measures, flood damage to homes and buildings alone in Canada could increase five-fold in the next few decades and ten-fold by the end of the century, costing as much as \$13.6 billion annually (Ness et al. 2021). Authors: Erik Sparling (Climate Risk Institute), Jimena Eyzaguirre (ESSA Consulting), Janna Wale (Canadian Climate Institute)

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This scoping paper is part of a series commissioned by the Canadian Climate Institute that explores key opportunities for public policy to advance rapid, effective, and just climate change adaptation in Canada.

Positionality statement

The authors acknowledge that systemic injustices and inequalities stemming from historical colonization and ongoing discrimination have positioned certain people and communities at greater risk of physical, social, and economic impacts from climate change and climate policy. This includes Black, Indigenous, and people of colour, lowerincome people, 2SLGBTQI+ people, people with disabilities, and others. These groups and their experiences are often not adequately represented in climate policy development and implementation even though they have considerable stake in the outcomes.

We also acknowledge that our work is predominantly rooted in western ways of thought, that there are many different ways of knowing and being. We recognize our responsibility to strive towards creating policy recommendations that reflect and integrate diverse and underrepresented experiences, values, and worldviews.

We are an interdisciplinary group of individuals with varied life experiences and privileges. We encourage making space for equity-deserving groups to lead and collaborate on this important research moving forward. Engagement with equitydeserving groups should inform community needs and determine priorities for action. Improved **flood risk transparency** entails the mapping, disclosure, and pricing of flood risk to help individuals and communities decide how best to avoid, mitigate, or absorb damages and losses due to flooding. Flood risk transparency has a crucial role to play in Canada's efforts to protect people and communities from the worsening impacts of climate change.

However, in many instances, flood risk transparency practices can have disproportionately negative impacts on **equity-deserving groups**.¹ Perversely, while many equity-deserving communities are more likely to live in flood prone areas, they may be less able to access or use disclosed flood risk information, less likely to trust it, and more likely to be disadvantaged by the flood risk pricing that can make insurance or decent housing unaffordable.

In this paper we consider the current state of knowledge on flood risk transparency practices and their impacts for equity-deserving groups in Canada. Our research was primarily informed by a literature review, with insights supplemented by four semi-structured interviews conducted between April 4 and May 10, 2022, with targeted knowledge holders (see Appendix 1). We conclude by considering policy interventions that could advance social equity in flood risk transparency and move towards transformative **adaptation**—removing inequities and unintended consequences for equity-deserving groups by reorienting or replacing existing approaches and transforming the structures and institutions that shape them (Schlosberg et al. 2017; Burlace et al. 2021; Heck 2021; Burlace et al. 2021).

The paper is structured around three main questions:

- 1. What are the impacts on equity-deserving communities of widespread implementation of flood risk transparency practices in Canada? (Section 3)
- 2. How can governments best ensure flood risk transparency practices result in more socially equitable outcomes? (Section 4)
- 3. What policies might be introduced to help improve outcomes of flood risk transparency for equitydeserving groups? (Section 5)

This paper is focused on what governments can do to help ease the disproportionate and inequitable impacts of **flood risk transparency** on equity-deserving people. More specifically, it focuses on government influence in three specific areas of practice: *flood risk mapping, disclosure, and pricing, or how information about flood risk is represented, shared, and acted upon.* As such, government actions and policies related to direct investments in flood risk mitigation measures such as flood protection infrastructure or relocation of at-risk households—a vital area of involvement—fall outside the scope of this paper.

1 Members of equity-deserving groups are highly diverse. A broad-based scoping paper such as this one does not capture differences of opinion and experience among all such groups and individuals. We consider this review a starting point for further research.

Key concepts

To fully understand the impacts of flood risk transparency for equitydeserving groups, we start by describing key concepts that are foundational to the rest of the paper.

2.1 Flood risk transparency

Flood risk transparency, as discussed, consists of flood risk mapping, disclosure, and pricing. Flood risk maps characterize and illustrate risks in flood-prone areas. **Flood risk mapping** can help reduce the impacts of future floods by informing purchasing, investment, and adaptation decisions (Council of Canadian Academies 2022; Henstra and Thistlethwaite 2018b). **Flood risk disclosure** is the formal practice of ensuring flood risk maps and other flood risk information are made available to parties involved in specific types of financial transactions. Flood risk disclosure facilitates **flood risk pricing**—the reflection of flood risk levels in the cost of real estate, rentals, insurance, and financing.

Canada's approach to flood risk management is cross-jurisdictional, and complex, as it involves Indigenous, municipal, provincial, territorial, and federal levels of government. Governments influence the flood risk transparency practices of flood risk mapping, disclosure, and pricing through policies, regulatory and legislative actions, and investments. Government decisions can also determine whether and how the issue of equity is addressed through policy choices that prioritize and shape adaptation and risk mitigation efforts, and that either address or ignore any inequitable outcomes that may stem from these efforts. Governments are unclear about their responsibilities for flood risk management (CCA 2022; Feltmate et al. 2020; Interview 1), let alone how climate change and equity issues fit in (Table 1).

May 4, 2022: Rebecca Sutherland of Pequis First Nation and Shaine Paul from Red Rose sandbag a home at risk of flooding in Peguis First Nation, Manitoba. THE CANADIAN PRESS/David Lipnowski

Table 1:

Examples of flood risk mapping, disclosure, and pricing

| Flood risk mapping | Flood risk disclosure | Flood risk pricing |
|---|---|---|
| Government flood hazard and risk modelling and mapping Maps and databases of historic flood damage Publicly accessible flood hazard and risk mapping and information portals Real estate tools that incorporate flood risk information into listings | The regulated sharing of information about flood risk or prior flood damage to a property by the person or entity seeking to either sell or lease that property The regulated sharing of information about flood risk and prior flood damage by parties seeking to access funding through the capital markets, or by insurance companies | Changes in property resale values that reflect disclosed flood risk Changes in property and flood insurance premiums Changes in terms and interest rates for home mortgages Changes in terms and rates for municipal loans and bonds |

2.2 Climate change vulnerability and risk

Climate change vulnerability is "the propensity or predisposition to be adversely affected" by a changing climate. It reflects the sensitivity of an individual, community, or asset to one or more climate change-related hazards, and the capacity to adapt (IPCC 2022). **Climate change risk** describes the potential impacts of climate change to an individual, community, or asset; it reflects both the likelihood of exposure to a climate-related hazard and the consequence of that exposure (Figure 1). The consequence is largely a function of vulnerability, as more vulnerable individuals, communities, or assets are less able to withstand the effects of the hazard and recover afterwards.

Human vulnerability to climate change is not intrinsic to individuals or specific groups. It is a product of societal choices, structures, and values, and how they interact with a changing climate. In other words, climate change vulnerability reflects both society's acceptance of the explicit decisions made to address risk in some areas, as well as the implicit decisions associated with inaction on or the deprioritization of other risks (Klein 2009; Nightingale 2017; Scoville-Simonds et al. 2020; Nightingale 2017; Thomas and Warner 2019; Webber 2015). In western societies, the governments and stakeholders responsible for prioritizing specific geographical areas for risk reduction, and investing in specific risk reduction measures, do not proportionately represent the values, priorities, or interests of equitydeserving communities (Ikeme 2003). As a result, social, economic, political, and decision-making processes can produce dramatically different outcomes across society by leaving certain communities less able than others to plan for, cope with, or adapt to the eventual impacts of climate change-related hazards (Oulahen 2021).

Figure 1: Relating climate vulnerability and risk (IPCC, 2014)



2.3 Structural drivers of inequity

Marginalization is the process by which people from equity-deserving groups experience disadvantages, discrimination, and "othering" as a result of the ignorance, racism, and socio-cultural bias present within a society (Partners for Resilience 2020; Chakraborty et al. 2022; Abdillahi and Shaw, 2020). Marginalization is a result of how accepted cultural norms, institutions, and socially constructed systems influence political decision making and resource allocation to favour the well-being of the dominant (non-marginalized) group. Marginalization can drive climate change vulnerability by increasing sensitivity to hazards while limiting adaptive capacity through the inequitable distribution of resources (Interview 2, Partners for Resilience 2020; Chakraborty et al. 2022; Shi et al. 2016). It can also increase exposure to hazards (Box 1).

BOX 1

March 24, 2022: Paulus Velt, far right, whose home was washed away and farm destroyed during the November floods, speaks with former Assembly of First Nations National Chief RoseAnne Archibald as he shows her and Shackan Indian Band Chief Arnie Lampreau (Swakum), second left, where his home once stood on his property on the Nicola River, west of Merritt, British Columbia.THE CANADIAN PRESS/Darryl Dyck

Marginalization driving vulnerability and risk

In 2021, Indigenous communities across British Columbia experienced catastrophic flooding. Communities like Shackan Indian Band and Cook's Ferry in the Interior of B.C., who had been forcibly relocated onto floodplains under the Indian Act of 1876, were inundated (Brend 2021; Murphy et al. 2022). The forced relocations have simultaneously increased exposure to flooding and eroded adaptive capacity, since communities are no longer within their traditional territories where knowledge is held (Yumagulova 2020; Savard et al. 2016; Murphy et al. 2022).

Similarly, anti-Black racism in Atlantic Canada has shaped settlement and development patterns in ways that increase vulnerability and risk. Black communities are more likely to be situated near industrial and chemical sites, while being under-provisioned with social services and public infrastructure (e.g. clean drinking water and transportation) through exclusion from more desirable settlement areas (Jean-Pierre 2021; Waldron 2020; Faber 2015; Interview 1).

2.4 Social justice

Social justice centres on principles of fairness, equality, equity, rights, and participation (Khechen 2013). Adopting a social justice lens acknowledges that; i) the distribution of benefits, resources, and rights is unequal; ii) historical and ongoing marginalization and discrimination have resulted in and entrenched these inequalities, creating significant disadvantages for equity-deserving populations (Shi et al. 2016); and iii) the redistribution of resources and rights is necessary as a result (Schlosberg et al. 2017). We adopt the following *three social justice principles* to both identify problems and lay out solutions with respect to flood risk transparency and equity.

RECOGNITIONAL JUSTICE

Processes that actively recognize and tackle rooted inequities, by recognizing and legitimizing different identities as well as histories of oppression (Mohtat and Khirfan 2021).

DISTRIBUTIVE JUSTICE

The fair distribution of resources, benefits, and costs (Burlace et al. 2021; Mason and Rigg 2019), inclusive

> of fair spatial and temporal distributions of resources, regardless of socioeconomic status, adaptive capacity, and political voice (Mohtet and Khirfan 2021).

PROCEDURAL JUSTICE

EQUI

JUSTICE

The opportunity and ability to participate in decision-making and the power to refuse if agreements are not met (Burlace et al. 2021; Heck 2021).

Impacts of flood risk transparency practices for equity-deserving groups

This section focuses on the impacts of flood risk mapping, disclosure, and pricing for members of equity-deserving groups. The process of evaluating the equity impacts of current flood risk transparency practices in Canada requires a critical look at the inequalities embedded in social systems, and how entrenched racism, marginalization, and exclusion have contributed to invalidating the experiences and identities of equitydeserving communities. In so doing, this section seeks to embody the practice of recognitional justice.

3.1 Impacts of flood risk mapping for equity-deserving groups

Flood risk maps are increasingly recognized as a critical tool for understanding and mitigating flood risks (Minano and Peddle 2018; Pralle 2019). Timely and accurate flood mapping is an effective and cost-efficient adaptation tool that can provide communities with insights into how climate change impacts may affect their lives and livelihoods. However, issues related to the availability, accuracy, and accessibility of flood risk maps, and to the ways in which these products characterize risk, can further contribute to the marginalization of equity-deserving groups.

i. The availability and accuracy of public flood maps is poor for many areas where equity-deserving groups are overrepresented.

While the availability of publicly developed flood maps is generally patchy in Canada, areas in which equity-deserving groups are overrepresented tend to have especially large gaps. For example, rural and remote areas Nov. 23, 2021: In Abbotsford, British Columbia, a farm manager's son walks past items he and his father salvaged from inside the lower floor of their rented house on a farm that flooded. THE CANADIAN PRESS/ Darryl Dyck

Timely and accurate flood mapping is an effective and cost-efficient adaptation tool that can provide communities with insights into how climate change impacts may affect their lives and livelihoods. have not been prioritized for flood mapping, due to the lower concentrations of people and lower numbers of government-owned assets in these areas (Yumagulova 2020; Mcclearn 2019). Even in urban areas, where maps are generally more available, poorer and marginalized communities often don't have access to up-to-date maps. Evidence from other jurisdictions suggests a need to guard against more affluent urban neighbourhoods disproportionately benefiting from accelerated flood mapping efforts (Song et al. 2019).

For many communities across Canada where flood maps do exist, those maps may be 25 years or more out of date (Macdonald 2019). In 2020, the federal government announced it would begin updating available maps, and committed to updating flood maps nationwide in the National Adaptation Action Plan, under the Flood Hazard Identification and Mapping Program (ECCC 2023; Insurance Bureau of Canada 2023a). However, some experts say this process may take up to 10 years (Macdonald 2019; Reuters 2020). Also, there is no indication that the updated maps will reflect the influence of climate change. Yet, as the impacts of climate change accelerate, demand for higher-resolution maps of current *and future* flood hazards and risks will increase. In the meantime, many communities continue to lack maps or settle for outdated mapping products that inaccurately portray local risks, detracting from their capacity to adapt, make informed decisions about property ownership or renting, and prepare for emergencies.

Though missing or inaccurate flood maps can be problematic for any community, communities in which equity-deserving groups are disproportionately represented can face a more difficult path to recovery once impacted by flooding; individuals in these communities are generally less able to rely on savings to smooth over the impacts and tend to lose a greater share of their overall wealth (Hallegatte and Rozenberg 2017).

ii. Flood maps remain inaccessible for many equity-deserving communities.

A range of factors compromise the accessibility of flood maps for equity-deserving communities. To begin with, compared to other jurisdictions, in Canada most flood maps remain physically difficult to access, often requiring a visit to the local government office to obtain a paper copy (Mcclearn 2019). In contrast, in the U.S., England, and France, citizens can enter a postal code on a government website and access information about a property's susceptibility to flooding (FEMA 2016; GOV.UK 2019; Ministry of Ecological Transition and Terrestrial Cohesion 2022. Based on this obstacle alone, it is not surprising that a cross-country survey of property owners affected by flooding revealed fewer than one in ten respondents had prior knowledge of living in a floodplain (Henstra and Thistlethwaite, 2018b). Because certain equity-deserving groups experience restricted mobility, if a map is only available in hard copy, this can pose a significant barrier to accessing it.

Furthermore, the content of flood maps is generally targeted to audiences with technical skills and specialized backgrounds, like hydrologists and engineers; they can be difficult for people without scientific and technical knowledge to fully understand (Mcclearn 2019). Since many equity-deserving groups are underrepresented among scientific and technical specialists (Engineers Canada 2020), they are also less likely than other Canadians to understand currently available flood maps or have someone in their networks capable of supporting them to understand.

Language issues, coupled with the use of disempowering messages, can also detract from how equitydeserving groups access, perceive, and therefore use flood risk maps (Lechowska 2018; Partners for Action 2019). Few, if any maps in Canada, are available in languages other than English or French, posing potential barriers for those with other mother tongues. Meanwhile, hazard and risk messages included in maps have been shown to lead to increased mental stress, a sense of decreased safety and belonging, and a reduced sense of well-being unless accompanying information is provided about how to manage the risks (Bakos et al 2022; Berry et al. 2022). Unfortunately, such information is rarely provided. Negative reactions to hazard and risk information in maps may be particularly strong among equity-deserving groups already contending with the negative effects of marginalization.

iii. Current flood risk maps are not generally informed by equity considerations.

Until recently, Canada's federal flood mapping framework had not included justice and equity considerations in determining values and priority areas within the mapping process. Most flood maps in Canada are hazard maps, which do not characterize the people or assets at risk (Interview 3; Cutter et al. 2013; Guillard-Goncalves et al. 2015; Lianxiao and Morimoto 2019; Török 2018). Where flood risk maps are developed or where flood hazard maps are used for flood risk assessments, risk is usually assessed based on the value of buildings and real estate alone. As such, flood maps usually lead to the identification of areas with the biggest economic risks, and not necessarily the areas where equity-deserving or vulnerable people are most at risk.

To effectively build equity considerations into mapping, public engagement processes are required. Not only is skillful engagement with stakeholders and rights holders needed to understand local context—by making use of the experiential knowledge of affected communities and individuals—it is also required to establish awareness among the engaged parties, and to build trust and buy-in to the mapping process and products, including messaging related to risk management interventions (Box 2). Meanwhile, engagement processes must pay particular attention to the challenges equity-deserving communities can face in participating (Interview 2), including financial limitations, workloads, and care responsibilities (Respondents; Butler and Adamowski, 2015).



July 23, 2023: Ron Crawford climbs up a ladder onto a washed-out bridge after checking on stranded neighbours near McKay Section, Nova Scotia. A long procession of intense thunderstorms dumped record amounts of rain across a wide swath of Nova Scotia, causing flash flooding, road washouts and power outages. THE CANADIAN PRESS/Darren Calabrese

Collaborative floodplain mapping of Deshkan Zibi

Funded by Crown-Indigenous Relations and Northern Affairs Canada, flood plain maps of the Deshkan Ziibi (Antler River) in the vicinity of Lake St. Clair were co-developed by First Nations, conservation authorities, and community organizations. The maps were created according to community processes and worldviews while also considering Western science, to be used by community members in preparing and adapting to flooding, using a two-eyed seeing approach and Shared Waters Approach (Green Communities Canada 2022; Charles 2022). Two-eyed seeing is a process of co-creating knowledge using both Indigenous and Western sciences. Applied to the Deskkan Ziibi watershed, the resulting Shared Waters Approach centres Indigenous knowledge, values, and participation through the sharing of information, interests, and needs related to flooding included a focus on the impacts of flooding for the wellbeing of the First Nations communities (Leon 2022). Participants in the project included the Chippewas of the Thames First Nation, Oneida Nation of the Thames, Munsee-Delaware First Nation, Delaware Nation at Moraviantown, Conservation Ontario, Lower Thames Conservation, Canadian Environmental Law Association, and Green Communities Canada.

3.2 Impacts of flood risk disclosure for equity-deserving groups

For flood mapping and risk information to support reasonable action that can mitigate risk, the information needs to be disclosed in a timely, complete, accurate, and accessible way. Flood risk disclosure practices with the most direct impacts for equity-deserving groups and individuals relate to real estate, insurance, and rental transactions. The main mechanism for flood risk disclosure during real estate transactions is the Property Disclosure Statement (or equivalent). In addition, buyers who use a mortgage to purchase property are required to acquire **property insurance**, a transaction that includes a verification clause through which the buyer indicates they understand the terms of the agreement, including the hazards and risks the policy covers and excludes. Though landlords in Canada are not currently required to disclose hazard or risk information about their properties during rental transactions, other jurisdictions are beginning to require disclosure (Dundon and Camp 2021; Frazier et al. 2020). We have identified consequences for equity-deserving groups for each of the three aspects of flood risk disclosure in Canada.

i. There are gaps and ambiguities in requirements for flood risk disclosure during real estate transactions that disproportionately impact equity-deserving communities, who are more likely than other Canadians to live in flood prone areas.

Because Canada is a patchwork of Indigenous, municipal, provincial, and federal government jurisdictions, rules for the disclosure of flood risk during real estate transactions vary from region to region. The main mechanism for flood risk disclosure during **real estate transactions** is the *Property Disclosure Statement* (or equivalent), a means for communicating to the buyer "knowledge of the seller" about property related risks. However, definitions of what constitutes "knowledge of the seller" vary across jurisdictions, as does the required timing of disclosure and the means for characterizing risk. Furthermore, nowhere in Canada is the seller or their agent obliged to assemble and disclose knowledge outside their possession. These inconsistencies and ambiguities can result in "inadequate information for buyers to make educated decisions about flood risk," impacting members of equity-deserving groups who may purchase properties based on deficient disclosure statements (Henstra and Thistlethwaite 2018b). Flood risk disclosure practices with the most direct impacts for equitydeserving groups and individuals relate to real estate, insurance, and rental transactions.

ii. Property and tenant insurance transactions have yet to be effectively used to alert prospective buyers and renters about the flood risks associated with the properties they plan to purchase or rent, with impacts for equity-deserving communities who disproportionately live in flood-prone areas.

Regardless of the jurisdiction, when agents sell property insurance, they are required to verify that the purchaser understands the terms of the agreement, including the hazards and risks the policy covers and excludes. Judging by the low levels of awareness among homeowners in Canada about their flood exposures (Partners for Action 2019), the process of verifying the hazards covered and excluded in property insurance policies could likely be used more effectively to educate prospective buyers about the flood hazards and risks affecting properties. This may relate in part to the fact that coastal and riverine flood hazards have not typically been covered by property insurance and pluvial flood coverage has been introduced to the property market relatively recently, with a high degree of variation in pluvial flood and water damage products offered by individual insurers. Thus, insurance agents and brokers may themselves have been less well informed and able to communicate with clients about related risks. However, insurers now offer residential pluvial flood coverage for most homes across Canada (Insurance Bureau of Canada 2019; Insurance Bureau of Canada 2023b). As the flood insurance market continues to grow, insurance agents should be required to inform their clients about the flood hazard and risk profiles of their properties. Local agencies responsible for flood management could also be supplied with flood models used by the insurance industry to underwrite flood coverage and become more active in informing residents of the potential impacts of flood hazards on their property and insurance.

iii. There are no requirements in Canada for landlords to disclose known risks (including those related to flooding) associated with property rentals, with significant impacts for equity-deserving communities who are disproportionately represented among renters.

Landlords have no obligation to disclose hazard or risk information related to rental properties in Canada (Dundon and Camp 2021; Frazier et al. 2020). This means that tenants may be lawfully kept in the dark by landlords about known risks to their belongings, health, and wellbeing. Meanwhile, renting basement suites or in neighbourhoods with inadequate stormwater and wastewater infrastructure may be particularly risky given the higher likelihood of impacts from overland flooding in these As the flood insurance market continues to grow, insurance agents should be required to inform their clients about the flood hazard and risk profiles of their properties.

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situations and the generally increasing likelihood of flooding because of climate change (Bakos et al. 2022; Paganini 2019). Equity-deserving groups, including lower income and racialized Canadians, are overrepresented among renters (Dundon and Camp 2021).

3.3 Impacts of flood risk pricing for equity-deserving groups

Pricing of flood risks can affect real estate, insurance, and rental costs, which can disproportionately impact members of equity-deserving groups located in flood-prone areas.² This section addresses the impacts of flood risk pricing on equity-deserving groups in Canada.

i. Increases in housing prices, rents, financing costs, and insurance premiums could compound historic injustices and equity-deserving groups' access to real estate.

While not as prevalent or deeply researched in Canada as in the United States, the practice of **redlining** dates back in Canada to the early settlement period and continues to undermine the accessibility of mortgages for equity-deserving groups (Claremont and Magill 1999, Mcintosh 2023). Redlining, or the practice of denying equity-deserving groups and individuals fairly priced mortgages and property insurance based on race and location, rather than credit history, has impacted how equity-deserving communities are able to access mortgages and where they are able to live (Harris 2003). Similarly, land covenants, written into property contracts in Canada prohibited people of certain ethnic backgrounds from purchasing in certain areas (Weichel 2022; Baines 2014). Many members of equity-deserving groups still face racism, discrimination, and stereotyping when applying for mortgages (Respondent 4; Harris 2003).

ii. Members of equity-deserving groups in flood risk areas are more likely to face trade-offs between flood insurance and basic necessities because of the high cost of insurance premiums.

Insurers' understanding of risk and competitive pricing shapes the cost of property insurance, which can rise as insurers better understand flood-related

Many members of equitydeserving groups still face racism, discrimination, and stereotyping when applying for mortgages.

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² We acknowledge that concepts of home ownership differ across groups, and that the discussion below does not address the unique circumstances of on-reserve socially controlled housing. While outside the scope of this paper, this is especially important since the creation of the reserve system under the Indian Act of 1876 forcibly relocated many Indigenous communities to areas that were less desirable, oftentimes in flood-prone areas.

risks under worsening climate impacts (Smart 2022). Across Canada, home insurance premiums increased by 20 to 25 per cent between 2015-2019, with more than half of this increase attributable to flood damage (Moudrak and Feltmate 2020). In Ontario, home insurance premiums rose by over 60 per cent over the past decade—three times the rate of inflation—in large part because of more frequent flood damage (Berkow 2021). Absent government intervention, insurance coverage may become unaffordable for members of equity-deserving groups living in flood-prone areas (D'Souza et al. 2021; Frazier et al. 2020; Interview 3). Because many members of equity-deserving groups are less financially secure than other Canadians, rising insurance costs are more likely to prevent them from purchasing flood insurance. Combined with limits on coverage and higher deductibles, these rising costs can leave them disproportionately exposed to flood risk.

The federal government has committed to create a low-cost national public flood insurance program by 2026 for households at high risk of flooding and without access to adequate insurance (Government of Canada 2023a). However, experience in other countries such as the United States suggests that even the costs of government-backed public insurance are unaffordable for many people who live in areas of high flood risk, especially as the costs of climate change are priced into premiums (Allen 2021). Therefore, a national public program will not necessarily ensure that equity-deserving groups have fair access to flood insurance.

iii. Flood risk pricing can impact the value of properties, potentially affecting borrowing and retirement interventions for members of equity-deserving groups who are disproportionately represented among homeowners in flood-prone areas.

For those who already own properties, flood risk disclosure can trigger changes in property values. The influence of flood risk disclosure on residential real estate values depends on prior loss and damage from flooding, the frequency and severity of past flood events, publicity of past flooding, property location relative to mapped floodplains, and the character of flood risk disclosure requirements (Yeo 2003; Henstra and Thistlethwaite 2018; Hino et al. 2021). Studies on the impact of flood events on real estate values document significant (8 to 60 per cent) dips in property values; however, in Canada, the effect has been "marginal and temporary" to date (Henstra and Thistlethwaite 2018b).

Reduced home values can undermine borrowing and retirement options, and, coupled with rising carrying costs (see insurance premiums above), can reduce savings and home equity. Yet, home ownership often represents a large portion of lifetime wealth for equity-deserving groups and individuals, contributes to intergenerational wealth and security, and provides an asset against which to borrow in times of need (Dundon and Camp 2021).

iv. Flood risk pricing can increase the cost of renting, disproportionately affecting equity-deserving groups and individuals who are more likely to rent than others in Canadian society.

Research in the United States raises concerns about increased flood insurance premiums and flood riskadjusted mortgage rates being passed onto tenants through rent increases (Frazier et al. 2020). This knock-on effect can reduce the number of affordable rental units and lead to more evictions in regions with flood prone areas (Taylor and Aalbers 2022). The overall size of affordable rental markets can also diminish if landlords in flood-prone areas begin to accept buyouts or participate in programs for managed retreat (Dundon and Camp 2021). Renters could be forced to either relocate away from their current communities or pay substantially higher rents (Dundon and Camp 2021; Haider and Moranis 2022).

v. By reducing the relative cost of housing in flood-prone areas and increasing the relative cost in less flood-prone areas, flood risk pricing may lead to a cycle that disproportionately traps equity-seeking groups in higher-risk, degentrifying neighbourhoods.

Though the influence of flood risk disclosure on housing values can be useful for spurring investments in resilience in residential development and housing, this positive effect may be limited to buyers or owners who are financially flexible and able to prioritize the long-term appreciation of their investments (Henstra and Thistlethwaite 2018b; Canadian Coastal Resilience Forum 2018). Meanwhile, in areas with high housing demand, or in overheated markets, prospective buyers may have little choice but to consider properties despite their flood exposure, specifically because of their lower purchase cost, and may not be able to afford property-level measures for flood risk management (Ratnadiwakara and Venugopal 2020). Similarly, lower-income owners and renters may be generally less able to move away from highly flood-prone areas (O'Hare and White 2017; Dundon and Camp 2021; Olivotto and Herreros-Cantis 2019). This dynamic, coupled with the potential divestiture by outside investors from flood-exposed businesses and real estate—a process sometimes referred to as **bluelining**—can drive the **degentrification** of neighbourhoods at higher risk of flooding (Ratnadiwakara and Venugopal 2020; Kaufman 2020; McDonnell 2020; Berman 2019).

Meanwhile, individuals and households who *are* able to leave or avoid more flood-prone areas will do so, potentially contributing to the **gentrification** of less risky areas in the same region (Ratnadiwakara and Venugopal 2020; Keenan et al. 2018). This can elevate the cost of purchasing and renting, making these areas less accessible to equity-deserving groups and individuals who on average have fewer financial means. Access to these more expensive, less flood-prone areas may be further impeded by the terms of most residential home insurance policies in Canada; namely, that any settlement following a loss be used to return the affected property to its original state in its original location (Insurance Bureau of Canada 2023c; Government of Canada 2022). Insurance settlements may not generally be used to pay for adaptation measures when rebuilding or for the policy holder to leave the at-risk area, meaning these settlements are, perversely, impeding both the increased resilience and the strategic relocation of at-risk homeowners (Government of Canada 2022; Insurance Bureau of Canada 2023c).

Climate-related disasters ultimately reflect societal choices about what climate-related risks are acceptable, and how much to invest in mitigating or adapting to those risks (Council of Canadian Academies 2022).

Towards transformational flood risk transparency in Canada

Since governments are responsible for creating public policies that meet the changing needs of society, policy makers can support more just and equitable adaptation outcomes by creating space for equity-deserving groups in the implementation of flood risk transparency practices. This section discusses potential types of interventions governments and regulators can use to help ensure flood risk transparency practices result in socially equitable outcomes. For a summary of flood risk transparency impacts, types of interventions, and example policy responses, see Table 2.

4.1 Policy responses for transformative adaptation of flood mapping

Actions to address procedural and distributive injustices related to flood mapping include; i) accelerating federal, provincial, territorial, and Indigenous flood mapping initiatives and programs and engaging equitydeserving groups; ii) making maps more accessible and providing them in plain language with summary products designed for public consumption, with a cultural sensitivity and trauma-informed lens; and iii) developing professional flood mapping practice guidelines that incorporate equity, diversity, inclusion, and reconciliation.

i. Accelerate federal, provincial, and territorial flood mapping programs and strategies that engage equitydeserving groups and reflect social vulnerability.

The federal government, as well as many provincial, territorial, and Indigenous governments, are investing in flood mapping programs to help fill gaps in characterizing and communicating flood hazards and risks across the country.

August 30, 2019: Wrecked furniture sits by the curb of a home on Erie Shore Drive near Chatham, Ontario. The area flooded during a storm causing severe damage to several homes. THE CANADIAN PRESS/Geoff Robins

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TURNING THE TIDE: How flood risk transparency can drive equitable outcomes in Canada
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Table 2:

Summary of flood risk transparency impacts, types of interventions, and policy responses

| Impacts | Types of interventions | Policy responses |
|---|---|---|
| Availability and accuracy of flood maps is poor where equity-deserving groups are overrepresented | Federal, provincial, and territorial flood mapping programs and strategies that engage equity-deserving groups and reflect social vulnerability | Establish knowledge-sharing committees that provide diverse perspectives related to the flood risk mapping process and move towards co-development of mapping programs |
| Flood maps remain poorly accessible for many equity-deserving communities | Accessible, plain language and summary maps designed for public use, with a cultural sensitivity and trauma-informed lens | Expand accessibility standards for flood maps to reflect the capabilities and needs of the general public and specific equity-deserving groups |
| Current flood risk maps are not generally informed by equity considerations | Training and professional flood mapping practice guidelines that incorporates equity, diversity, inclusion, and reconciliation with Indigenous Nations | Fund training programs for professionals and requiring cultural safety and Gender-based Analysis Plus+ training in order to work on government flood mapping contracts |
| Ambiguities in requirements for flood risk disclosure during real estate transactions that impact equity- deserving communities Property and tenant insurance transactions do not alert prospective buyers and renters about the flood risks associated with the properties Flood risk pricing can increase the cost of renting, disproportionately affecting equity-deserving groups | Strengthened real estate and rental disclosure requirements and guidance | Leverage existing legislation and regulations to ensure flood disclosure information is effectively shared with potential buyers and tenants |
| Price and cost increases could further reduce equity-deserving groups' access to real estate, compounding historic injustices Equity-deserving groups may face trade-offs between the purchase of flood insurance and basic necessities Reductions in property values related to flood risk may affect borrowing and retirement options for equity- deserving groups | Cost-effective private or public flood insurance premiums that make flood insurance affordable in flood-prone areas | Mandate maximum private or public insurance premiums based on socio-economic factors, and include an affordability assessment within Canada's first national flood insurance program |
| Reductions in the relative cost of housing in flood-prone areas may trap equity-seeking groups in higher risk, "degentrifying" neighbourhoods | Adjusting flood insurance policies to support strategic retreat and post-disaster relocation | Avoid or mandate removal of same site rebuilding conditions from all flood insurance policies to allow for relocation after a disaster while still receiving the insurance payout |
| | Using land-use and development management planning mechanisms to create affordable housing options outside flood-prone areas | Incent the development of affordable housing in flood-safe areas through the transfer of development rights from areas targeted for managed retreat |

However, major gaps remain and work through these programs needs to be accelerated as much as possible. Many of these programs, including the federal program, emphasize the importance of stakeholder engagement; however, very little if any specific guidance is provided for how governments and mapping practitioners should engage with equity-deserving groups and incorporate their perspectives and experiences into the development of maps.

A short-term step could be to create knowledge-sharing committees to help incorporate diverse perspectives in mapping initiatives, including perspectives on the impacts of flooding on specific equity-deserving people and communities. Governments should engage equity-deserving groups and individuals in the development and communication of flood maps, using inclusive and diverse approaches to knowledge sharing. These processes should be grounded in trauma-informed practice and include a cultural sensitivity lens, considering the potential impacts of place-based attachment and related experiences of cultural loss associated with flooding. By reflecting community values and priorities in the mapping process, and emphasizing the participation of equity-deserving groups and individuals, governments can help ensure mapping products are relevant and culturally sensitive, trusted and useful. In some rare cases, knowledge-sharing committees already exist or have been used in the past for flood mapping initiatives (see Box 2, above). By evaluating the performance of these committees, it may be possible to identify transferable lessons for broader use.

In the longer term, governments should move towards *co-development* of flood mapping programs. For example, processes for the prioritization of areas for updated mapping could include equity-deserving groups. Meaningfully including members of equity-deserving groups in the design and implementation of flood mapping programs can help ensure that the values, concerns, and priorities advanced in these programs reflect the diversity of the communities they seek to map.



ii. Produce accessible, plain-language, and summary maps designed for public use, with a cultural sensitivity and trauma-informed lens.

Flood maps in Canada are not yet consistently designed for and provided through the web and do not consider the capabilities and needs of non-specialist audiences. Moving forward, governments should expand accessibility standards for flood maps to reflect the capabilities and needs of the general public and of specific equity-deserving groups. More accessible flood maps will better serve equity-deserving groups by enabling both their basic connection to the products and by helping them interpret and use the maps to prepare for and be more resilient to the impacts of flooding.

iii. Provide training for flood mapping professionals to incorporate equity, diversity, inclusion, and reconciliation with Indigenous Nations.

As noted, funding for flood mapping programs has often been targeted to areas based on economic value at risk, with little consideration for the unique priorities and vulnerabilities of equity-deserving communities.

The flood-mapping professionals responsible for these flood mapping processes have typically adopted a similar lens. To support them new training on justice, equity, and gender-based analysis plus could be offered to better consider the broader social, cultural, and environmental contexts within which they practice. Integrating this training into government flood mapping programs and standards could help advance flood mapping processes and products that better consider the needs and perspectives of equity-deserving groups and individuals and advance reconciliation with Indigenous Nations.

4.2 Policy responses for transformative adaptation of flood disclosure practices

To address equity and social justice in flood disclosure practice, governments should; i) strengthen and standardize real estate and rental disclosure requirements and guidance across Canada; and ii) develop guidance for local governments and insurers to work together to provide flood hazard and risk information to the purchasers of residential property and tenant insurance.

i. Strengthen and standardize real estate and rental disclosure requirements and guidance.

The lack of common and robust flood risk disclosure requirements across Canada linked to real estate and rental transactions results in incomplete and patchy information for purchasers and renters to use in their decision making. Strengthening and standardizing flood-related real estate and rental disclosure requirements and guidelines could help address some of the disproportionate burden placed on equitydeserving communities, who are overrepresented in flood-prone areas and often experience difficulty accessing flood risk information. Since both real estate and rental markets are regulated at the provincial or territorial level, provinces and territories could consider leveraging existing legislation to ensure flood disclosure information is being passed along to potential buyers and tenants. While this intervention does not address the root causes of the overrepresentation of equity-deserving groups in flood-prone areas, it will provide necessary information for those who are likely to be the most impacted by flooding. This will give them a better understanding of the risks associated with a particular property, and help to inform purchasing, rental, and flood resilience-related decisions.

ii. Develop guidance for governments and insurers to work together to share flood hazard and risk information with purchasers of residential property and tenant insurance.

As the flood insurance market continues to grow in Canada, insurers should be increasingly well positioned to share information about the flood hazard and risk profiles of the residential properties their clients seek to insure as owners or tenants. At the same time, governments in Canada are working to update and further develop hazard and risk maps for various types of flooding. Governments and insurers should seek ways to better work together to ensure flood hazard and risk information is more effectively shared with prospective purchasers of property and tenant insurers. Specific attention could be placed on aligning approaches with the particular needs and challenges of equity-deserving groups and individuals.

4.3 Policy responses for transformative adaptation of flood risk pricing

Addressing equity and justice in response to flood risk pricing could include; i) providing affordable and cost-effective flood insurance that reflects ability-to-pay; ii) adjusting flood insurance policies to help support post-disaster relocation and **strategic retreat**; and iii) using land-use and development planning measures to create a more enabling environment for the inclusion of equity-deserving groups in post-disaster relocation and strategic retreat.

i. Provide affordable and cost-effective flood insurance that reflects ability-to-pay.

Equity-deserving communities are less likely to be able to afford flood insurance (Government of Canada 2022). Creating affordable flood insurance

Provinces and territories could consider leveraging existing legislation to ensure flood disclosure information is being passed along to potential buyers and tenants.

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can help eliminate the forced choice between other necessities of life and flood insurance for low-income households. The high-risk residential flood insurance program is an opportunity to offset distributive injustices related to the accessibility of insurance (Public Safety Canada 2022). The federal government could leverage this opportunity by including a flood insurance affordability or ability-to-pay assessment within Canada's forthcoming national public flood insurance program. Implementing affordability measures to make the cost of insurance proportional to household income and expenditures could considerably reduce the financial burden of flood insurance premiums for equity-deserving groups.

ii. Adjust flood insurance policies to support strategic retreat and post-disaster relocation.

The announcement of Canada's first national flood insurance plan creates a significant opportunity to support relocation as part of a policy of **strategic retreat**, instead of requiring recipients of insurance payouts to rebuild in the same location. Creating space within all flood insurance policies to allow for strategic retreat or planned relocation after a disaster *while still receiving the insurance payout* would better allow members of equity-deserving groups options to rebuild or purchase in safer locations, rather than having to remain in the same vulnerable location in order to receive financial compensation.

iii. Use land-use and development planning measures to create an enabling environment for the participation of equity-deserving groups in post-disaster relocation and strategic retreat.

In regions and communities with residential areas that experience high flood risk or where such risk is reasonably foreseeable, governments can consider leveraging land-use plans and related tools to help ensure both the immediate and long-term availability of safe, affordable, and climate-resilient housing options. Provincial, territorial, municipal, and Indigenous governments in Canada already have the foundational legislation and tools to pursue these objectives but may need to use them in new ways, such as through planning for managed retreat. Drawing upon examples from other jurisdictions (Spidalieri 2020), Canadian governments could:

- Establish longer-term (e.g. 100-year) land-use and development plans that classify neighbourhoods based on flood risk level, specify requirements for strategic retreat over time, and identify receiving areas, where new housing options and services can be established for people permanently displaced from other areas by flooding;
- Zone receiving areas in ways that ensure adequate supplies of affordable housing for lower-income people and households;
- ► Implement transfer-of-development-rights measures that facilitate the sale of development rights by landowners with properties in high-flood-risk areas to parties who may use the rights to increase the density (and hence value) of developments planned for elsewhere in the jurisdiction.

These or other analogous measures could help ensure equity-deserving groups and individuals living in high-flood-risk areas can find affordable housing elsewhere and, as relevant, recoup the value of the property that flood risk has forced them to leave.

Conclusions

Building resilience to flood risk is an important step in protecting people in Canada from the consequences of accelerating climate change. Particularly, much greater flood risk transparency is essential to help provide information for decision-making and send the market signals that can ultimately help reduce flood-related risk. However, flood risk transparency practices may have negative effects on equity-deserving communities, necessitating policies and programs that integrate social justice principles and equity considerations to counteract this tendency.

ENTER

This report has identified several policy responses that could address some of the equity-related challenges and potential undesired outcomes of flood risk transparency, including:

- Ensuring federal, provincial, and territorial flood mapping programs and strategies further accelerate mapping, engage equity-deserving groups, and produce maps that are easily accessible with plain language summaries designed for public consumption.
- Strengthening or introducing real estate and rental disclosure requirements for flood risk, as well as policies that support strategic retreat and post-disaster relocation.
- Improving how governments and insurers work together to more effectively inform the purchasers of property or tenant insurance of flood hazards and risks in their area and to their property.
- Creating flood insurance regimes that provide cost-effective premiums for those already living in certain flood-prone areas, coupled with needs-based support for relocation in uninsurable situations.
- Using specific land use and development planning measures to create an enabling environment for the participation of equitydeserving groups in post-disaster relocation and strategic retreat.

January 3, 2021: Flooding on Cowichan Tribes land triggered an evacuation order for local residents as heavy rain caused the Koksilah River to swell near Duncan, British Columbia. THE CANADIAN PRESS/ Chad Hipolito

Glossary

Adaptation: The ways in which human and natural systems adjust to reduce the harmful effects of climate-related changes while maximizing the benefits.

Bluelining: A pricing phenomenon arising from flood risk transparency driving divestment from communities with higher flood risk.

Climate change risk: Risk that results from the interaction of hazard, exposure, and vulnerability.

Climate change vulnerability: The degree to which a system is susceptible to negative effects of climate change.

Degentrification: The reverse process of gentrification—where residential property previously only affordable to affluent people becomes affordable to those who are poorer.

Equity-deserving groups: Those that face significant challenges in participating in society because of social and environmental barriers based on race, age, ethnicity, disability, economic status, gender, sexual orientation, or nationality.

Fluvial flooding: Often referred to as riverine or river flooding, occurs when the water levels of a river, stream, or other watercourse overflow the banks onto the surrounding land. Extreme precipitation events, rapid snow melts, and ice jams are common causes of fluvial flooding.

Flood risk disclosure: Requires flood risk mapping, timely information, and documentation of risks associated with the physical impacts of flooding to support informed public and private investment decisions and otherwise empower governments, businesses, and individuals to make informed decisions about property and land use.

Flood risk mapping: The foundation for communication, disclosure, and pricing of flood risk; helps to identify geographic areas of current or potential future flood risk through observation and calculation.

Flood risk transparency: The practice of communicating flood risk through flood risk mapping, flood risk disclosure, and flood risk pricing.

Flood plain: An area of low-lying ground adjacent to a river, formed mainly of river sediments, which is subject to regular flooding

Flood risk pricing: Uses flood risk disclosure as an input and involves changes in prices reflective of understood risk levels, signaling the potential need for protective investments or shifts in activities.

Gentrification: The process whereby the character of a poor urban area is changed by more affluent people moving in, improving housing, and attracting new business, displacing current inhabitants in the process.

Marine flooding: Results from a large body of water, such as a lake or ocean, overflowing onto the surrounding land. Common causes of coastal flooding are high winds and tides, storm surges, and sea level rise.

Pluvial flooding: Occurs when an extreme precipitation event causes an accumulation of surface water owing to the overwhelmed surface draining capacity, whether natural or a storm drainage system.

Property insurance: Broad term for a series of policies that provide property protection coverage for owners.

Redlining: A discriminatory and illegal practice that puts services (financial and otherwise) out of reach for residents of certain areas, based on race or ethnicity.

Real estate transactions: The process whereby the rights in a unit of property are transferred between two or more parties.

Receiving areas: Locations where new housing options and services can be established for people permanently displaced from other areas by flooding.

Rental transactions: The process of creating a rental agreement between landlord and tenant.

Resilience: The capacity to withstand or recover from difficulties or challenges.

Spatial inequity: The unequal distribution of resources and services across different areas or locations.

Strategic retreat: Aims to proactively move people, structures, and infrastructure out of harm's way before disasters or other threats occur, to avoid damage, maximize benefits, and minimize costs for communities and ecosystems.

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