The post-disaster window:

The 2021 British Columbia atmospheric rivers phenomenon as a focusing event for policy change

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ABOVE: Temporary repairs and ongoing remediation at the site of a major dike breach in Sumas Prairie, Abbotsford, where the Vedder Canal (left) flowed into adjacent agricultural lands (right), still inundated eight months post-flood [July 2022].

COVER: Temporary dike repairs along North Parallel Road in Abbotsford, BC [May 2022].
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Photographs: All photographs were taken by F. Watterodt (May-August 2022), unless otherwise specified.
ABSTRACT

In mid-November 2021, a series of atmospheric river events created a state of emergency for southern and central British Columbia. Flooding and debris flows triggered by extreme rainfall conditions culminated in significant damages, losses, and displacement within the province. The 2021 atmospheric river events highlighted the vulnerability of multiple local communities, economies, and critical infrastructure to withstand the ‘new normal’ of climate change, particularly within Abbotsford’s Sumas Prairie community. Flood-impacted communities currently face the complex challenge of meeting on-going recovery needs, while simultaneously engaging in long-term disaster risk reduction (DRR) and even longer-term climate change adaptation (CCA) within a policy “window of opportunity”.

As communities grapple with increasing flood risks, there is an urgent need to explore proactive flood adaptation strategies that strengthen community resilience and limit hazard exposure. This research analyzes the extent to which the 2021 BC atmospheric rivers phenomenon acted as a focusing event within local, regional, and provincial policymaking. Preliminary findings indicate that the November 2021 disaster has acted as a significant focusing event for collaborative watershed governance, flood risk awareness, and long-term resilience thinking within the primary region of study: Sumas Prairie. This report will summarize the major outcomes of this window of opportunity with respect to changes in governance models, funding mechanisms, and flood management policies emerging within the local, regional, and provincial contexts.

KEYWORDS: disaster risk reduction, climate adaptation, policy change, window of opportunity, resilience, flood recovery, governance, focusing event, atmospheric river

A Window of Opportunity for Policy Change:

“[The atmospheric river] has made us look at a decade’s old issue with an entirely new lens and focus. It has restarted conversations that had been started years ago, but what we’re seeing now is a level of political leadership that feels very, very different than what was there before.”

—Senior provincial government staff member, July 2022
INTRODUCTION

Disaster Overview

In mid-November 2021, British Columbia’s (BC) unprecedented season of climate-related disasters culminated in a series of severe atmospheric river (AR) events, leading to catastrophic flooding, debris flows, and erosion in multiple locations across the province’s southern and central regions. On November 13th, the first atmospheric river began to make landfall, although the precise orientation of the storm was still unable to be determined at that point [1]. By mid-day, November 14th, the Province of BC had issued streamflow warnings and travel advisories, alerting the public that the incoming storm would likely generate heavy rainfall and snowfall conditions [2]. By the following morning, several communities had declared a local state of emergency and evacuations were underway [2]. During the first AR event, the Lower Mainland became isolated from the rest of the country when debris flows and road washouts blocked every major highway leading into the region [3]. Amidst the initial disaster response efforts, two additional AR events compounded the early impacts, creating further challenges for emergency response [4].

Atmospheric rivers are not a new phenomenon, although the term has recently gained traction in the media. Previously and colloquially known as “pineapple expresses,” ARs are large seasonal flows of water vapour that carry moisture from the Pacific Ocean through Earth’s tropospheric layer, resulting in high levels of precipitation on the North American west coast [5]. ARs generate up to 33% of the region’s yearly precipitation and contribute to over 90% of coastal BC’s extreme rainfall conditions [6]. Due to the significant amounts of precipitation discharged, landfalling ARs are closely linked to high watershed runoff, and have contributed to 78% of BC’s flood disasters between 1979 and 2016 [7]. While the November event is commonly referred to as the “BC floods,” it is important to recognize that, although several communities were disproportionately impacted by pluvial (rain) and fluvial (riverine) flooding, other areas of the province experienced a variety of hazards and indirect impacts beyond flooding. For this reason, this paper will use the term ‘atmospheric river’ when referring to the provincial disaster event as a whole.

A Multi-Hazard Disaster:

“We did not experience the ‘BC floods.’ We experienced road washouts, community isolation, landslides, [and] debris flows...This wasn’t a flood. It was three atmospheric rivers causing a number of different impacts. Merritt and Abbotsford certainly faced flooding, but those floods were specifically as a result of other engineered failures and built environment challenges.”

—Local emergency management official, July 2022
Quick Facts:

- **17,775+ people** temporarily displaced or under evacuation order during the event [8]
- **3,300 people** experienced long-term displacement [9]
- **17 regional districts** and **60 First Nations** impacted [10]
- **640,000 livestock deaths** [12]
- **$675 million** in estimated insured losses [13]
- **$1.575 to $4.95 billion** in estimated non-insured losses [14]
- **$897 million to $1.531 billion** in estimated economic losses due to supply chain and labour market disruptions [14]
- **$9 billion** in estimated recovery costs [15]
- **5 deaths** within the province due to landslides [9]
- **1,100 farms** and **15,000 hectares** of farmland impacted in the Abbotsford, Merritt, and Princeton areas [16]
- **62 days** duration of Provincial State of Emergency from November 17, 2021 to January 18, 2022 [17]
- **1,200+ people** stranded in Hope, B.C. as a result of road closures [18]
- **$24 million** provided in Disaster Financial Assistance, as of November 14, 2022 [9]

**ABOVE:** Flooded field at the site of the dike breach along Highway 1 in Sumas Prairie, Abbotsford, still inundated eight months post-flood [July 2022].
RESEARCH OBJECTIVE & QUESTIONS

**Objective**

This study sought to evaluate how the 2021 atmospheric river event has influenced flood adaptation, disaster resilience, and long-term planning policies within British Columbia. Utilizing Kingdon’s Multiple Streams Policymaking research framework, this study analyzes the extent to which this disaster has acted as a focusing event and enabled a policy window to emerge. The intent of this study is to contribute new insights into how extreme weather events and natural disasters may open up a unique policy space to challenge the dominant paradigms of flood management. Furthermore, this study seeks to better understand how to leverage these ‘windows of opportunity’ so that decision-making authorities can transition from short-sighted ‘recovery and return to normal’ cycles towards long-term planning for resilience and future flood risks under climate change. As a case study, this research analyzes the post-disaster landscape of Sumas Prairie, Abbotsford situated within the broader regional and provincial contexts.

**Overarching Research Question**

To what extent did the November 2021 extreme rainfall event and flooding experienced in Sumas Prairie open up a window of opportunity to advance climate change adaptation and holistic methods of flood risk reduction?

**Sub-questions**

| 01 | Is this disaster prompting decision-makers to explore alternative approaches to disaster risk reduction and climate change adaptation, such as managed retreat and nature-based solutions? |
| 02 | How did this disaster influence the public’s perception of the “new normal” of climate change and how has this factored into policy decision-making? |
| 03 | How can municipalities use this historic event to help shift from a reactive to a proactive state of hazard resilience amidst the community’s immediate recovery needs? |
| 04 | In what ways has the November 2021 atmospheric river event acted as a catalyst in prompting institutional or policy changes? |
| 05 | What enabling factors or barriers have influenced the extent to which the policy window has been able to be leveraged by governance actors to pursue transformative change? |
METHODOLOGY

Abbotsford’s Sumas Prairie community was chosen as the primary case study due to the significant losses and damages incurred by this area during the November 2021 atmospheric river event, as well as the region’s long-standing history of flood management challenges. It is important to note that the City of Abbotsford’s recovery efforts are situated within the broader regional (Fraser Valley and Lower Mainland), provincial, federal, and transboundary contexts, as policy and governance actions operate across a variety of scales and jurisdictions.

Fieldwork was undertaken during the spring and summer of 2022 in Abbotsford, BC. Data were collected through semi-structured interviews (N=27), participant observational research (e.g., site visits, public sessions, council meetings), review of archival records, and a review of media coverage and policy documents. Interviewees included: local governance actors and politicians; provincial and federal government staff; transboundary stakeholders; emergency management, disaster recovery, and flood adaptation professionals, and; non-governmental organizations. Field observations included attendance at the Semá:th Xo:tsa: Great Gramma’s Lake museum exhibition, a public engagement session for the City of Abbotsford’s Long-term Flood Mitigation Plan, and the regional Build Back Better Together Forum.

Semi-structured key informant interviews were used to discover perspectives on the recent flood event and how the flooding may have influenced policymaking, adaptation planning, and disaster risk reduction within the region. Participants were identified using a stratified sampling method to include representation from a broad array of decision-making and organizational bodies. Relevant experts and community representatives were identified and recruited through email and internet sources (e.g., public directories, news articles). Additional organizations were identified through snowball sampling as the research unfolded. Criteria included knowledge of flood recovery, water management, flood infrastructure, recovery programs, funding aid, climate change adaptation, or the 2021 BC flood event, as well as some knowledge of the affected case study area (Sumas Prairie, Abbotsford) or the wider regional area (e.g., Fraser Valley/Lower Mainland). Key informants must also have affiliation to an organization with decision-making power or community influence.

Due to research limitations related to the rapid response timing and scope of this study, and because the researchers did not have pre-established relationships, the researchers did not seek to interview First Nations communities directly. Instead, staff of organizations that work closely with Coast Salish communities on emergency management and flood adaptation were interviewed. As well, City of Abbotsford staff declined to participate in this research due to the ongoing nature of a class action lawsuit related to the event.
CASE STUDY: SUMAS PraIRIE, ABBOTSFORD

Community Context

Bordered by the City of Chilliwack and Washington State, Sumas Prairie is a predominantly rural community within the municipal boundaries of the City of Abbotsford [Figure 1]. Land use in the area consists primarily of agriculture (86.7%) and residential dwellings (12.6%) [19]. Sumas Prairie is home to ~3,300 people living in approximately 1,100 households [20].

Sumas Prairie is located within the Fraser River Basin, BC’s largest watershed spanning nearly a quarter of the province’s total landmass [21]. The Fraser River Basin encompasses twelve major sub-basins and is home to a population of three million people [22]. Within the Lower Fraser River watershed, an estimated 315,000 people live within the floodplain and are directly at risk from a major flood event [23].

While the Fraser Valley Regional District (FVRD) only accounts for 2.3% of BC’s farmland, the region encompasses 14.7% of the province’s total agricultural operations and employs nearly a quarter of all farm workers in BC [24]. Abbotsford acts as the Fraser Valley’s hub for agri-businesses, generating $3.83 billion in economic activity and supporting 16,670 full-time equivalent jobs [24]. Over the past fifteen years, Abbotsford’s agricultural sector has expanded rapidly, with an annual growth rate (3.49%) that is surpassing population growth (1.26%) [24]. Abbotsford’s 1,307 farms include a diverse variety of crops, such as hay and fodder, fruits and berries, corn, vegetables, and alfalfa, as well as approximately ten million livestock [19].
**Engineering a Flood Hazard: The Loss of Semá:th Xó:tsa**

The present-day settlement of Sumas Prairie is located on the traditional unceded territory of the Semá:th (Stó:lō) people, governed by Sumas First Nation. Since time immemorial, the Semá:th adapted to living with the seasonal flooding of Semá:th Xó:tsa\(^1\) and the valley’s adjoining rivers [26]. Drained primarily by the Sumas River and Chilliwack River watersheds, Semá:th Xó:tsa was a shallow fertile lake surrounded by seasonally inundated wetlands [27]. Spring and autumn high-water conditions resulted in fluctuations in the lake’s area and depth, which typically ranged between 9,000 and 16,000 acres, and between nine to eighteen feet in depth [27]. During severe flood years, such as in 1903, Semá:th Xó:tsa could expand to 30,000 acres and a depth of thirty-one feet, acting as a critical temporary flood water repository for the Fraser and Nooksack Rivers as the lake was able to store excess water and lessen the impacts of downstream flooding [27]. Furthermore, Semá:th Xó:tsa supported a diverse assemblage of wildlife, including salmon and sturgeon fisheries, as well as migratory waterfowl [27].

Despite the ecological and cultural significance of Semá:th Xó:tsa, settler efforts to drain the lake date back to the 1870s [27]. For over fifty years, the settler community engaged in various failed engineering schemes to ‘reclaim’ the land for agricultural use, as they perceived the seasonally flooded wetlands as an “unproductive wasteland” that did not conform with their perceived values of the land [27]. Between 1920-1924, construction of a complex system of dikes, canals, ditches, and diversions took place, “reclaiming” 33,000 acres of former lakebed land for settlement and agricultural use [27]. The drainage project resulted in the loss of a natural flood mitigation system for the Fraser River, as Semá:th Xó:tsa had previously acted as a vital water storage mechanism for the basin [27].

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**Trade-offs in Values:**

“It’s an absolutely essential area for food production, but to keep it the way it is, you have lots of engineering solutions to prevent the lake from doing what nature wants to do. So you get into some really tricky conversations and ultimately difficult government decisions. Should we keep everybody where they are, which is living on a floodplain, and engineer our way out of it? That’s one extreme. The other extreme is, should we just move everybody away? Basically let the lake fill up on a seasonal basis. Certain types of farming would cease.”

—**Senior provincial government staff member, July 2022**

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\(^1\)Semá:th Xo:tsa means **Sumas Lake** in the Stó:lō language, Halq’eméylem.
Today, Sumas Prairie relies on 17 kilometers of dike infrastructure to mitigate flooding [28]. However, a 2015 provincial dike assessment report characterized several portions of the Sumas diking system as “unacceptable,” since the infrastructure was deemed to be susceptible to overtopping and lacked the structural integrity to withstand a major flood event [29]. No repairs or upgrades were completed following this assessment. In addition to dike infrastructure, the Barrowtown Pump Station serves as a crucial flood control mechanism, pumping up to 2.3 million litres of water per minute from a drainage area of 95 km² [30]. The Barrowtown Pump Station prevents the lakebed from naturally refilling under non-flood conditions; however, if the pumps failed (e.g. due to inundation of the pumping station, or an extended power failure), it is projected that the lakebed would refill within a period of two to seven days [30]. Since the 1920s, the Barrowtown Pump Station has been the only thing stopping Sumas Prairie from becoming Sumas Lake again.

During the atmospheric river event, dike overtopping and breaches inundated 150 km² of low-lying land in the former lakebed [Figures 2 & 3] [31]. Because the storm created high water conditions simultaneously in the Fraser and Nooksack Rivers, the floodgates at the Barrowtown Pump Station could not be opened to release the water that was overflowing from the Nooksack River in Washington State into the Fraser River. An emergency sandbag dam was constructed to prevent the Barrowtown Pump Station from failing due to heavy overflow from the Nooksack [32]. This intervention was critical in preventing an additional three metres of water from the Fraser River from exacerbating the existing flooding [32]. During the event, 1,100 households were placed under evacuation order and 184 residents were rescued from their properties [32].

The Lake Returns:

“This particular weather event was so severe that both the Fraser and the Nooksack were high at the same time. That’s virtually unheard of and this complicated things. The Nooksack River did breach its banks...and flooded into the western portion of the old lakebed. There are canals that are designed to flow [the Nooksack] River to Barrowtown, where there are both pumps and gates that can be opened. The issue was that the gates could not be opened. The Barrowtown pumps were never designed for this kind of waterflow... In this particular case, both happened at the same time, so they had to keep the floodgates closed. That reduced the ability of the pumping station. It was only able to move 1/7 of the amount of water that could be done if the gates were allowed to be open...The water was now left to build up and pool in the Sumas diking area just not far from the [Barrowtown] Pump Station. It started backing up. The excessive rains had also weakened the dike. On the eastern portion of the Sumas lakebed, at approximately 4:30 in the afternoon on Tuesday, the dike let go and breached, and it opened up by about 100 metres... Right around dusk, a twenty-foot wall of water went across the eastern portion.”

—Local governance actor, June 2022
Figure 2: Map showing the extent of flood impacts in Sumas Prairie during the first atmospheric river event (McClearn & Hunter, 2021)

Figure 3: Map of Semá:th Xó:tsa superimposed upon a present-day map of Sumas Prairie. The light blue outline shows the average size of the lake, while the black dotted outline denotes the lake boundaries during a major flood year, using the 1894 flood as a reference (Chan, 2021)
FLOOD MANAGEMENT IN BRITISH COLUMBIA

The Status Quo

Traditionally, flood management in the region has relied on protective structures and strategies to reduce flood impacts. This protective approach often involves the use of hard engineered infrastructure, such as dikes, levees, and seawalls, to act as a barrier against floodwaters [34]. While dikes often mitigate short-term risk for low-intensity, high-frequency flood events, such as the average spring freshet, these systems are not designed to withstand extreme flood events or the complex challenges of climate change, notably the increasing frequency and severity of extreme weather events [35]. Rather, the over-reliance on hard infrastructure solutions tends to elevate long-term risk by enabling more people to inhabit at-risk areas within the floodplain, thus increasing overall hazard exposure [35]. Protective infrastructure often provides floodplain occupants with a false sense of security, and invites additional development investment; however, when these systems fail under rare high-intensity flood events, the resulting losses and damages may be catastrophic [36].

According to provincial dike assessments, BC’s existing network of flood protection infrastructure only assures “limited protection” against flood risks, as 71% of dikes are expected to fail under extreme weather conditions and as of 2015, only 4% of dikes meet the height requirements to withstand a 1-in-200-year flood [29]. It is estimated that investments of between $7 to $9 billion would be needed in order to sufficiently repair and upgrade BC’s current diking infrastructure [39]. In Sumas Prairie alone, it is estimated that maintaining the ‘status quo’ diking system will cost over $4.5 billion, without factoring in future losses and damages under climate change [40]. It is becoming increasingly evident that the ‘status quo’ of BC flood management is insufficient in safeguarding communities against the increasing impacts of climate change. It is essential that governments explore alternative and complementary flood adaptation strategies that reduce hazard exposure, create co-benefits, and strengthen community resilience. Adaptation strategies will vary by local context and increasingly will require a hybrid approach that involves a broad suite of solutions—such as accommodating floodwaters, relocating from high-risk areas, avoiding further development in floodplains, and incorporating nature-based solutions [34].

An Outdated Model:

“So what is the new paradigm? What is the new model? The way we thought of and planned for 19th and 20th century emergencies has not caught up with the changing reality of 21st century emergency hazards.”

—Senior provincial government staff member, July 2022
**Fragmented Governance**

Flood management within the province is currently fragmented across local, regional, and provincial governance scales, presenting significant challenges for local authorities to adapt to changing flood risks. In 2003 and 2004, legislative changes resulted in the downloading of certain flood management responsibilities from the provincial government to local authorities [41]. However, as key informants noted, many small, remote, and rural municipalities and First Nations communities are resource-constrained, often possessing limited technical, financial, and organizational capacity to maintain flood infrastructure, understand the implications of climate change on flood risks, or invest in costly adaptation measures. Additionally, interviewees described how traditional BC funding and governance models have perpetuated a system where local authorities must compete for oversubscribed resources for individual projects, rather than capitalizing upon collective capacities through regional scale collaboration.

Prior to the 2021 event, the Province of BC recognized the need for an overarching flood strategy; however, participants noted that the strategy has been significantly informed by it. The Province began public engagement on the proposed strategic framework of the *BC Flood Strategy* in October 2022 [42]. The provincial government intends to launch the *BC Flood Strategy* in 2023 with implementation beginning in 2024 [42]. It is still unclear if and how this strategy will align with other ongoing regional flood planning efforts. Development of the *Lower Mainland Flood Management Strategy*, facilitated by the Fraser Basin Council, has been underway since 2014 with a strategy yet to be released [43]. Simultaneously, the Emergency Planning Secretariat is currently developing *Hílekw Sq’eq’o*, a Mainland Coast Salish *Disaster Resilience Regional Action Plan* which is based on the Sendai Framework and grounded in the values and knowledge systems of thirty-one Coast Salish nations [44].

*Rethinking Governance:*

“It makes it difficult to build out the proper solutions that are required when the systems aren’t in place to encourage regional collaboration.”
—Local governance actor, July 2022

“There needs to be a mechanism to create more regional collaboration and that regional collaboration needs to be respectful of Indigenous Nations and their territories. Focusing on addressing risk from a community-based lens really ignores the larger picture around all the different interactions that are happening... Only focusing on infrastructure fails to recognize the damaging impacts that climate change and floods will have on language, culture, values, and identity.”
—Senior provincial government staff member, July 2022

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2 *Hílekw Sq’eq’o* means ‘get ready together’ in Hal’qeméylem [44].
INITIAL RESULTS

The 2021 Atmospheric Rivers as a Focusing Event

The disaster risk reduction (DRR) literature suggests that major disasters can function as focusing events, often prompting fundamental shifts in the relationships between humans, natural ecosystems, and the built environment, and acting as “catalysts for change” [45]. A focusing event typically involves a rare or sudden disaster with harmful consequences that are highly concentrated or occur at a large-scale [46]. When major disasters occur, these events present a unique window of opportunity to align policy objectives, public pressure, political action, and funding in order to urgently solve the perceived problem [47]. Focusing events have the potential to lead to shifts in existing knowledge systems and practices [47]. Therefore, it is important to understand how these disasters can be leveraged to advance flood adaptation policies and reduce path dependency, namely BC’s entrenchment in structural mitigation.

Not every flood will be impactful enough to be considered a focusing event. However, while flood management systems in BC are designed to withstand small-scale annual flooding, the November 2021 AR event far exceeded the system’s capacity to absorb the shock. The province experienced impacts on an unprecedented scale, including large-scale displacement, supply chain disruptions, transportation and communication breakdowns, human and animal causalities, and extensive agricultural, economic, and household losses. Because of the scale of these impacts and the high-profile nature of the event, as well as the conditions leading up to it, many participants have classified the November 2021 AR disaster as a focusing event [Figure 4].

Figure 4: The November 2021 Atmospheric Rivers as a Focusing Event.
Adapted from John Kingdon’s (2003/1984) Multiple Streams Framework
Preliminary Research Findings

Preliminary findings show that the November 2021 AR was a significant focusing event that has amplified the public attention and political pressure surrounding BC’s existing flood policies and has created new opportunities to advance resilience-building objectives. Several preliminary themes have been identified as either contributing factors to the extent of the policy window or direct outcomes that are emerging within the post-disaster landscape.

1) Scale of Disaster:

Although previous flood events within the province resulted in significant damages within the affected communities (e.g., Grand Forks, 2018; Okanagan, 2017-2018), the impacts remained localized in comparison to the 2021 AR event, which occurred over a vast temporal and geographical scale, and significantly affected the economy and normal functioning of BC as a whole. The disaster prompted both local and provincial states of emergencies which lasted several months and affected BC’s most densely populated region, the Lower Mainland. Due to the widespread nature of the event, emergency response resources were stretched between several communities, exceeding local and regional response capacities.

**Provincial State of Emergency:**

“That particular incident affected two-thirds of southern British Columbia and also some other regions. So even normal concepts of calling for mutual aid and asking for assistance from other communities just wasn’t an option.”

—Local emergency management official, July 2022

2) Unprecedented Nature:

B.C. government officials described the situation as the “worst weather storm in a century” [48] and a “1-in-500-year” [49] flood event. Entire communities, such as Sumas Prairie and Merritt, were displaced by evacuation orders, while others, such as the Nooaitch First Nation, became isolated when road access points were washed out [50]. As of November 2022, one year post-disaster, approximately 5% of Merritt’s 7,100 residents are still displaced from their homes [53].

What further added to the unprecedented nature of the disaster was that the province experienced three successive AR events, as well as the simultaneous flooding of the Nooksack and Fraser rivers, which led to more extensive damages over a longer period of time in comparison to previous events. Although the Sumas Prairie region experienced a major flood event in 1990 from the Nooksack River, key informants noted that the duration of flooding and
extent of damages was lesser due to the fact that floodwaters were able to be released through flood gates into the Fraser River, which did not also have high water levels at the same time.

**An Unprecedented Scale:**

“Flooding is nothing new on the Fraser River. Flooding is not new on the Nooksack River. You can go back to 1990, 1948, and 1894. But there was *something about the combination of the fact that [BC] had these other terrible disasters last year before the atmospheric river* and then the really bad one was the atmospheric river, which didn’t just hit the Fraser Valley. It hit multiple parts of the province including the Northwest, including Vancouver Island. *There was damage everywhere.*”

—Senior provincial government staff member, July 2022

3) **Economic Impact:**

The event been described as the most severe and costly ‘natural’ disaster in Canadian history, resulting in an estimated $9-13 billion in damages [10]. When assessing the cumulative impact of BC’s climate-related disasters experienced in 2021, it is estimated that the heat dome, wildfires, and atmospheric rivers resulted in between $10.6 and $17.1 billion in economic losses, or 3-5% of the province’s GDP [14]. In Abbotsford alone, flood damages are estimated to have cost $2 billion [54].

**The Scale of Loss:**

“2021 was massive compared to [previous flood] events. I think the response has been different because of that. There is definitely this building momentum and awareness now. In the last five years, we’ve had these three major events in different parts of our province. **But the thing about 2021 was just the scale of destruction that happened. The scale of loss was just incredible.** The damage to the highways that cut off the Lower Mainland from vehicle traffic and disrupted supply chains in many ways. Now all of a sudden, it’s not just a little town of 3,000 people that is affected. **It’s the entire 4 million people who live in the Lower Mainland who are suddenly affected by this event.**”

—Senior provincial government staff member, June 2022

**Infrastructure Vulnerabilities:**

“It was the fragility or the vulnerability of supply chain on infrastructure. The interconnectivity of it all was a great example to show that it could happen anywhere... **I’m wondering if there’s ever been an incident where it was so clearly shown how much public infrastructure plays in the fabric of a community.**”

—Federal government staff member, August 2022

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3 Disasters are not solely driven by hazards, such as floods, but also by human factors that increase exposure and vulnerability; therefore, the framing of disasters as “natural” tends to minimize anthropocentric influences on both climate change and risk, such as land-use planning, the built environment, and socio-economic vulnerabilities [55].
4) Climate Context:

Participants noted how BC is often characterized as “ground zero” for climate change in Canada due to the increasing frequency and severity of extreme weather, wildfire, and flood events that have occurred in recent years. In 2021, within the span of six months, British Columbia experienced three major climate disasters. The first, the heat dome, claimed the lives of 619 British Columbians, many of whom were at-risk populations, and has been classified as a “1-in-1,000” year event [56] and deemed to be Canada’s most deadly weather event ever recorded [57]. The second climate disaster, multiple wildfires, occurred amidst record high temperatures. The province experienced over 1,600 wildfires [58], which included the evacuation of 1,000 residents and destruction of 140 properties within the Village of Lytton and Lytton First Nation [59]. Over a five year period (2017-2021), BC experienced the three most severe wildfire seasons on record [60], with cascading impacts for forest ecology and natural flood mitigation properties [61]. Key informants noted the increasing awareness of the interconnectedness of these hazards and the need for multi-hazard policies that create adaptive and resilient communities.

Changing Perceptions:

“It was the extent and the realization that the world is changing, and that we could have a day or two of intense rainfall that can precipitate a major disaster. I think that broke some psychological view of the world.... I don’t think anyone ever anticipated seeing that scope and scale of impact from an extreme rainfall event.”
—Senior provincial government staff member, July 2022

5) Disaster Memory:

Key informants noted that the compounding and cascading disasters of 2021, as well as BC’s recent history of flood and wildfire events, may have extended the ‘disaster memory’ of both residents and decision-makers. As extreme weather events become more frequent due to climate change and more communities experience these impacts firsthand, political leaders have faced elevated public pressure to advance adaptation and risk reduction policies within current election cycles.

Localizing Climate Change

“[It was] a concrete demonstration of climate change. The images of [Sumas Prairie] being flooded burned into the memory of people within BC... It’s not happening in another place. It’s happening right here in the Lower Mainland. So for public perception...it might really look like a turning point. With our legislation and some of these larger strategic initiatives, I think this more accelerated it, then changed it fundamentally. [The disaster] reinforced the importance of [climate action].”
—Senior provincial government staff member, July 2022
6) **Flood Risk Awareness:**

Key informants noted a significant increase in public awareness and media coverage of flood risk, as well as the influence of climate change on extreme weather events, such as atmospheric rivers. Participants noted that there has been substantial media coverage and public interest in understanding the land use and watershed management decisions that have created or exacerbated flood risk. Examples of this include the drainage of Sumas Lake and the governance challenges associated with downloading flood management responsibilities to local authorities.

**Unpacking the Underlying Problems:**

“We’re a year into it, and people are still really engaged in it and wanting to be able to understand what the problems are, what some of the solutions are, and understanding the systemic nature of it all. So I think that is a super big win in terms of potential for a policy change, because we need the public on our side to be able to push decision makers to make different choices.”

— Subject matter expert, September 2022

7) **Policy Learning & Institutional Environment:**

In recent years, the implementation of several key legislative and policy items at the provincial and federal scales has created an institutional environment that is substantially more receptive to shifting the current flood management paradigm and advancing holistic adaptation solutions compared to the past. Key informants identified several important milestones and ongoing policy focuses including: the Declaration Act on the Rights of Indigenous Peoples, the Modernization of the Emergency Management Act, the Interim Provincial Disaster Recovery Framework, Canada’s adoption of the Sendai Framework for Disaster Risk Reduction, Climate Preparedness and Adaptation Plan, the National Adaptation Strategy, and the BC Flood Strategy. Consistent with the Province’s existing strategic objectives, the November 2021 disaster has reinforced the need to streamline emergency management and climate action policies, and to integrate these perspectives across sectors and government agencies in order to bridge existing silos.

The research revealed tangible evidence of policy learning and change linked to the AR event. Following the AR event, the Province created the Recovery and Resiliency Secretariat, led by EMBC, to ensure that urgent policy work was being coordinated in a cross-governmental manner. Although the Secretariat was short-term in nature, the newly created Ministry of Emergency Management and Climate Readiness (EMCR) presents a promising opportunity to continue to explore whole-of-society methods of DRR and CCA within the province. Among EMCR’s proposed mandate is the commitment to “lead cross-ministry coordination...to enhance BC’s resilience,”
including ongoing policy work (e.g., BC Flood Strategy, Climate Preparedness and Adaptation Plan) and efforts to “build back better from recent disasters” [62].

While the ongoing policy learning occurring within the provincial government has influenced the growing paradigm shift, the November 2021 event has also helped to solidify political, funding, and public support for adaptation. Participants noted that the disaster has spurred a number of conversations at the senior levels of government around concepts of build back better, managed retreat, funding, and governance mechanisms, and incorporating more hybrid and nature-based solutions. However, time will tell if these conversations mobilize into transformative actions with tangible funding commitments.

**Political Will:**

“Without this event to gel things, it seems less likely that some of these policy changes would have a fighting chance... The [BC] Flood Strategy was proceeding anyway, but I think this event is really generating the political will to give that a real chance to make some real governance changes.”

— Senior provincial government staff member, July 2022

**New Directions:**

“The BC Flood Strategy was already sort of underway, but definitely boosted by this. The dikes conversation... was not really on the table until this [event] really moved it forward. Build back better and managed retreat, I would say, were not really on the table. Even though we did managed retreat for Grand Forks, it was kind of a one off. I think without these events, most of these things would not be being discussed, or not in this way.”

— Senior provincial government staff member, July 2022

**A Changing Hazard Profile:**

“I would say there is now a significant focus on those three hazards that we experienced last year... A changing profile for those types of hazards is definitely part of the conversation. [The atmospheric river] has brought the emergency management perspectives together with the climate adaptation perspectives more. The opportunity to advance climate adaptation is now very much part of these discussions.”

— Senior provincial government staff member, June 2022

8) **Organizational Capacity**

Although many key informants have indicated that momentum is building within senior levels of government to implement policy changes, the Province of BC, similarly to local authorities, is resource constrained, limited by short-term budget cycles, and lacks the organizational capacity to adequately take back responsibility for flood management infrastructure. In recent decades, staff downsizing, budget cuts, and gaps in knowledge translation have resulted in an absence of overarching provincial leadership on watershed management. Within emergency management,
the current reliance on seconding members of the public service to serve during a disaster has proven to be an inadequate tool for responding to increasingly frequent climate extremes, leaving staff burnt out from successive disasters and unable to complete the duties of their primary role within government.

Since the November atmospheric rivers, there has been an unprecedented flow of resources into various provincial branches, including Emergency Management BC, the Ministry of Agriculture and Food, the Ministry of Environment and Climate Change Strategy, and the Ministry of Forests, to help address these capacity gaps within the risk reduction and adaptation spheres. This prioritization of funding has enabled several government branches to expand their staff, create new policy teams, and secure funding to engage in longer term strategic directions.

**Institutional Infrastructure:**

“During the event itself, we were hearing, especially from the provincial government, that they were going to take more responsibility and authority [for flood management], and provide more resources... *The Province has none of the infrastructure in place to actually take back that responsibility.*”

— Subject matter expert, September 2022

**Building Internal Capacity:**

“Coming out of that event... *we were able to more than double the amount of capacity* [in terms of funding and staffing]... *We wouldn't have seen that without that event. That very much secured that funding and strategic direction*, and it was in a very short, quick response from [the AR event].”

— Senior provincial government staff, July 2022

**9) Funding**

Key informants pointed to the need for long-term sustainable funding mechanisms that incentivize collaborative, watershed-scale investments and prioritize principles of ‘Building Back Better Together’ to reduce future risk. In July 2022, the Build Back Better Together Regional Forum was hosted in Abbotsford, BC, creating the space for local leaders, First Nations, and provincial and federal representatives to begin to collectively envision how to recover in a more resilient way, build collective capacities, and address the current funding and governance gaps. One key focus of the Forum was to try to influence how the Province chooses to spend the $5 billion in recovery funding from the Federal government.

The post-disaster period has seen several new funding streams (e.g., Disaster Risk Reduction-Climate Adaptation fund), increased funding to support First Nations emergency management operations, and changes to the cost-sharing agreements and eligibility requirements of Disaster Financial Assistance Arrangements. Despite this flow of financial capital, many communities and
individuals affected by the disaster still face many challenges in accessing funding and navigating the bureaucratic red-tape. Additionally, many funding mechanisms are short-term focused, often preclude options for improving infrastructure standards beyond what was lost, and provide very few opportunities for regional-scale investments in resilience.

10) Opportunities for Collaboration

Finally, collaboration has been a major theme emerging from the research. Many key informants note that the 2021 AR event has acted as a catalyst for bringing together ‘the right people’ to the policy table to engage on BC’s flood management issues. Key informants noted that there has been a renewed momentum for developing a new collaborative watershed governance model, grounded in relationship-building between local governments, First Nations, non-governmental organizations, and provincial and federal partners. Inter-governmental and collaborative partnerships have emerged in the post-disaster landscape, such as the Committee of British Columbia and Federal Ministers on Disaster Response and Climate Resilience, and the Build Back Better Together Collective.

Additionally, there has been a resurgence of transboundary governance initiatives between British Columbia and Washington State. Although the Nooksack River International Task Force, a technical working group, formed following the 1990 flood to address cross-border flood challenges, it lost momentum over the years leading up to the November 2021 AR. Key informants noted that the International Task Force lacked decision-making authority, political leadership, knowledge translation, and meaningful inclusion of Indigenous leadership. Following the November event, interviewees have described an unprecedented level of commitment from the State and Provincial governments to collaborate on long-term policy solutions with local governments and First Nations. It is still undetermined if this will result in a new policy initiative or a restructuring of the pre-existing task force to include a stronger decision-making focus.

Advancing the Conversation:

“[I have colleagues] who have seen more movement on this in the last eight months...than they have seen in their entire 20 years of working [in the field]. At the very policy level, they’re seeing more openness from the Province and more willingness than they’ve ever seen before to engage in the question, and are even saying some of the things that would suggest that they’re ready to move away from the status quo.”

—Non-governmental organization staff, September 2022
CONCLUDING REMARKS

Focusing events often disrupt the normative policymaking agenda by redirecting the flow of resources and public attention [47]. As policy windows emerge, opportunities for political mobilization and systematic change may become presented [64]. It is essential for decision-makers and solution seekers to leverage the opportunities presented in the post-disaster period, such as increases in public awareness and funding prioritizations, to advance transformative change. Our preliminary research findings indicate that there has been substantial momentum surrounding the November 2021 focusing event. The challenge now is to ensure that this momentum is capitalized upon before the policy window closes and disaster memory fades. The next steps of this research is to identify the contributing factors and barriers that have either enabled or prevented transformative change to occur in BC’s post-disaster recovery landscape.

Above: Signage (left) from one of three information sessions on the City of Abbotsford’s Long-term Flood Mitigation Plan where the City presented four proposed options to residents and business owners in Sumas Prairie. The public were invited to ask questions and provide feedback (right) on the proposed options. In June 2022, Council approved a ‘hybrid’ fifth option and is currently seeking higher-level funding to implement the strategy [May 2022].
REFERENCES


FIGURES


Figure 2: McClearn, M., & Hunter, J. (2021, December 2). Were B.C.’s dikes ever up to the job of stopping floods like these? Globe and Mail. Retrieved December 2021 from https://www.theglobeandmail.com/canada/article-were-bcs-dikes-ever-up-to-the-job-of-stopping-floods-like-these/
