



Understanding Risk

British Columbia

URBC 2023

Cascading Hazards, Multihazard Solutions

Symposium Outcomes

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Suggested citation: Shoubridge, J., Allaby, K., Thigpen, H., & Watterodt, F. (2024). *Understanding Risk British Columbia 2023: Symposium Outcomes*. Understanding Risk British Columbia and Partners for Action, University of Waterloo.

**In an era of cascading hazards, what are the multi-hazard solutions available to us?
How do we collaborate across disciplines and cultures to effectively implement them?**

Intent

Understanding Risk British Columbia (URBC) 2023 brought together actors across the science- policy-action interface to build resilience in the face of natural hazard/ climate/ disaster risks in Southwest British Columbia (BC). The 2023 symposium built upon the efforts of previous years, strengthening the community of practice. Since the initial symposium in 2017, URBC organizers have been working to foster a shared understanding of regional risks, mobilize collaborative action to reduce those risks, and build resilience to the major hazards of concern in the province's most densely populated region. Deliberative, solutions-focused dialogue unlocks the opportunity to learn from one another, so that we can work to protect that which we hold dear in our communities and surrounding ecosystems.

The 2023 URBC Symposium centered around the theme of addressing the cascading challenges of climate and disaster risks by deploying innovative and collaborative multihazard solutions.

Our communities are increasingly being tasked with responding to the growing complexity of a climate-dynamic world. We must now make decisions under conditions of heightened uncertainty, respond to the compounding and cascading pressures of multiple hazards and climatic impacts, and balance finite resources—time, money, capacity—amidst a growing suite of competing demands. Such realities necessitate intentional, adaptive, and coordinated actions across the whole of society.

Critically, this means bridging silos and aligning climate adaptation and risk reduction efforts across disciplines, sectors, and hazard types. To support this effort, URBC 2023 convened knowledge holders and keepers, practitioners, and leaders from private, public and NPO sectors together to build and share these multihazard understandings.

The objectives of the URBC Symposiums are aligned with the priorities for action of the *Sendai Framework for Disaster Risk Reduction* (shown below, Table 2), which was adopted by the BC government in 2018. URBC 2017 produced 'actionable strategies' within the categorical buckets of: Risk Communication and Education; Data, Mapping, Modelling & Risk Assessment Tools; Buildings, Codes & Construction; and Process, Risk, Governance & Funding/Financing. These priorities align directly with the Sendai framework that would be adopted by the province the following year.

The symposiums are also in alignment with the priorities articulated in the *National Emergency Management Strategy for Canada: Toward a Resilient 2030* and its current focus on earthquakes, floods, and wildfires; all of which are major hazards of concern in Southwest BC. The symposium supports the implementation of the *National Adaptation Strategy* (NAS) at the regional scale and is also in alignment with the objectives of the provincial *Climate Preparedness and Adaptation Strategy* (CPAS).

¹ Partners for Action, University of Waterloo

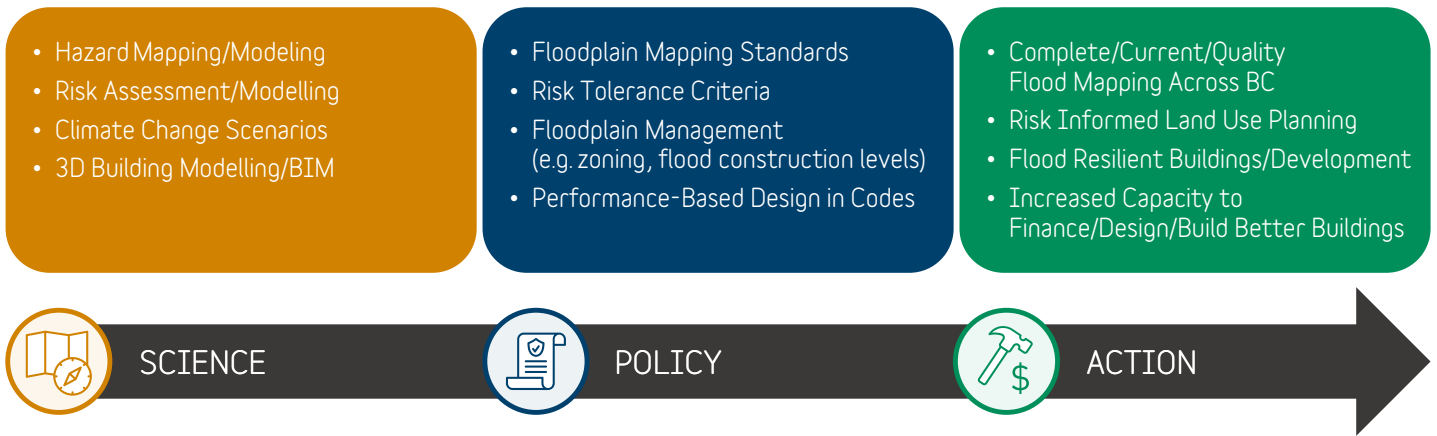


Figure 1: URBC's approach to reducing risk and building resilience in Southwestern BC: Enhancing connections across the science-policy-action interface.

1	Understanding disaster risk	Disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment. Such knowledge can be used for risk assessment, prevention, mitigation, preparedness and response.
2	Strengthening disaster risk governance to manage disaster risk	Disaster risk governance at the national, regional and global levels is very important for prevention, mitigation, preparedness, response, recovery, and rehabilitation. It fosters collaboration and partnership.
3	Investing in disaster risk reduction for resilience	Public and private investment in disaster risk prevention and reduction through structural and non-structural measures are essential to enhance the economic, social, health and cultural resilience of persons, communities, countries and their assets, as well as the environment.
4	Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction	The growth of disaster risk means there is a need to strengthen disaster preparedness for response, take action in anticipation of events, and ensure capacities are in place for effective response and recovery at all levels. The recovery, rehabilitation and reconstruction phase is a critical opportunity to build back better, including through integrating disaster risk reduction into development measures.

Table 2: Priorities for action from the [Sendai Framework](#).²

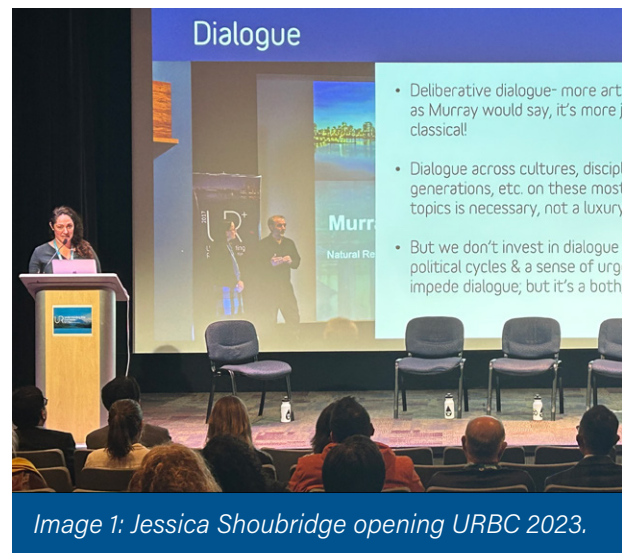
² [United Nations Office for Disaster Risk Reduction](#). (2015). Sendai Framework for Disaster Risk Reduction 2015-2030.

About

The symposium took place October 11 - October 12th, 2023 at the Science World Theatre and Asia Pacific Hall at the Morris J. Wosk Centre For Dialogue on the shared, unceded, and ancestral lands of the xʷməθkʷəy̓əm (Musqueam), səliłwətał (Tsleil-Waututh), and Sḵw̓xwú7mesh (Squamish) in Vancouver, BC. URBC symposiums are hosted as a local spin-off of the global Understanding Risk (UR) Forum and related community of practice; composed of over 6,500 practitioners interested and active in disaster risk identification, communication and reduction.

A Unique Collaboration

Since their inception in 2016, the URBC symposiums have been an exceptional example of bringing together actors in an 'all of society' approach. This year's symposium saw over 130 participants from a variety of sectors, including but not limited to: architects, engineers, planners, policymakers, emergency managers, academics, and financial sector representatives. The interdisciplinary group of participants generated diverse insights into climate and disaster risk reduction solutions. Participants reported that they were left feeling inspired by new technology, research, and success stories, while feeling committed to tackling the difficult tasks ahead.



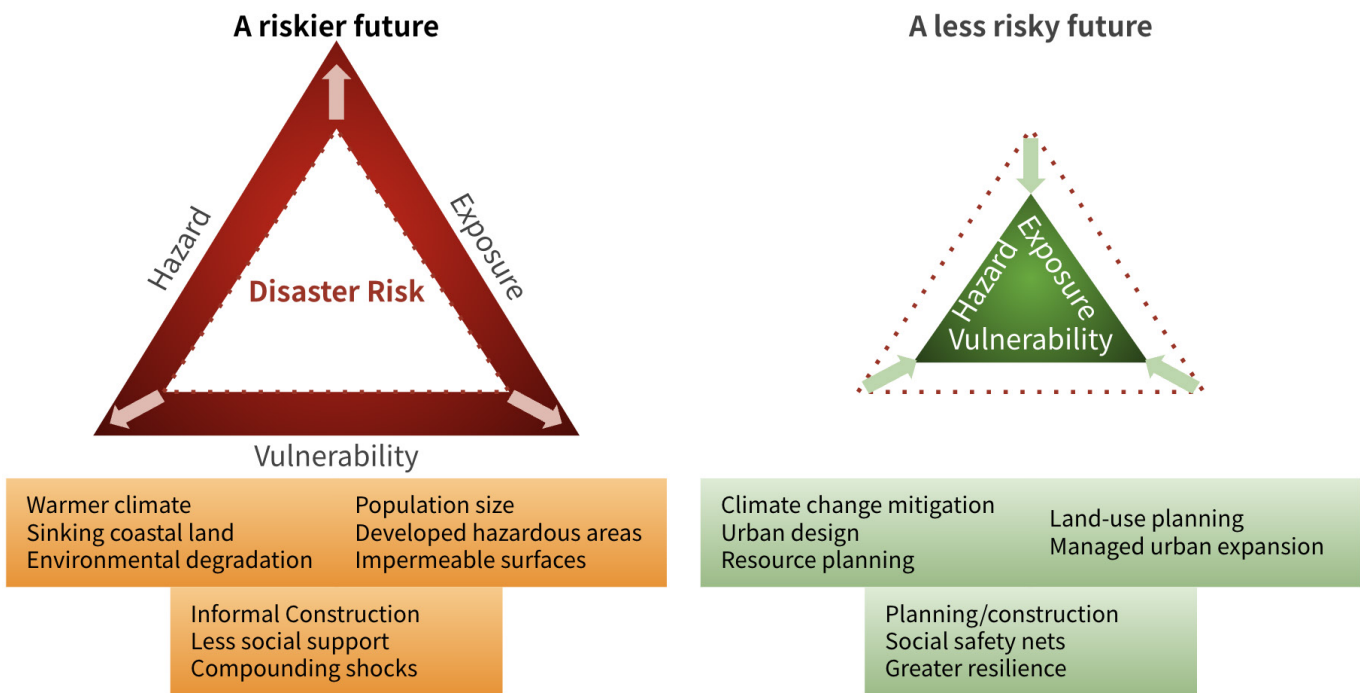
URBC in Review



How do we better manage current and future risk?

To reduce climate and disaster risk, solutions must address all sides of the risk triangle (Image 2). The URBC symposiums center around the ways in which a “less risky future” may be collaboratively worked towards in Southwest BC, and each session throughout the two day event provided insights and facilitated discussions regarding how we can better manage for current and future risk.

Image 2: Disaster risk is increasing around the globe, especially in river deltas with strong population growth. It is essential that we leverage opportunities to reduce risk and build resilience.³



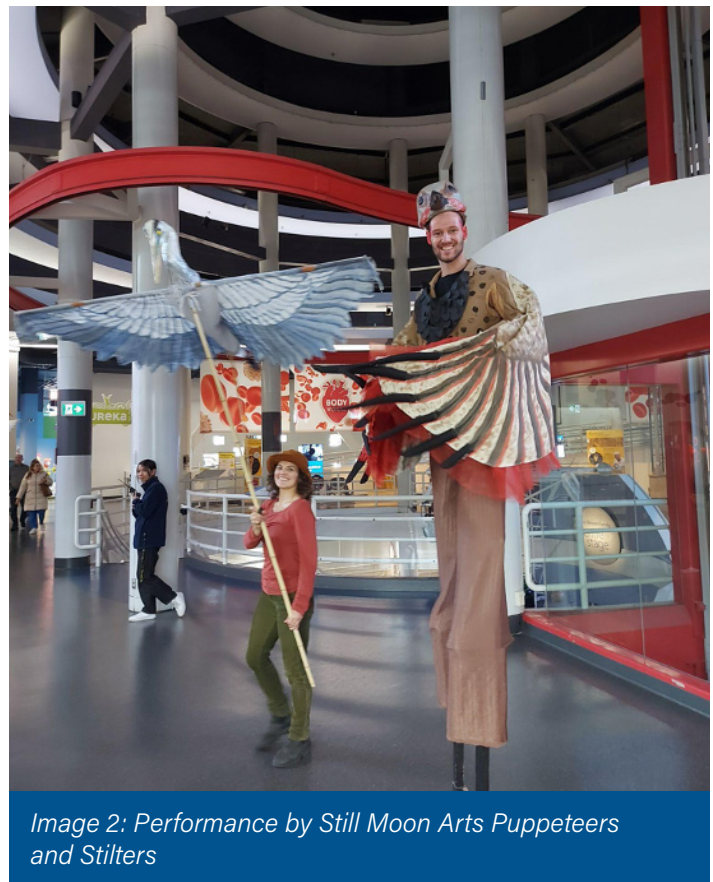
³ Global Facility for Disaster Reduction and Recovery. (2016). The making of a riskier future: How our decisions are shaping future disaster risk..

URBC 2023: The Event

Based on feedback from the community of practice from previous symposiums, the URBC 2023 session followed a format of not having concurrent sessions, but rather, 8 unique panel-style discussions in plenary with additional program elements such as interactive timeline mapping, arts and culture hosted by Still Moon Arts (including puppets and stilts), and a climate risk communications interlude, The Adaptation Mindset: A learning & unlearning journey, with Trevor Murdock of ECCC.

“Just remember one thing: this earth we have, this land we have, we are the keepers of it. The signs are there, through the climate change, what Mother Nature [is] doing. We’ve already done the damage, it’s in our hands to reverse it.”

—Musqueam Elder, Gail Sparrow





Sessions

1. AC Ain't the Only Fix! Why BC needs a comprehensive approach to managing extreme heat

Moderated by Tamsin Mills, Adaptation Collaborative

2. How Do We Value That?!: Understanding climate risk and technology in real estate appraisals

Moderated by Peter Sun, Vancouver Economic Commission

3. More Than Just Maps! Applying the latest & greatest in regional seismic microzonation mapping and basin modeling in practice; from land use and emergency management planning to building design and retrofit

Moderated by Allison Chen, Engineers and Geoscientists of BC

4. Mt. Meager: taking an 'all of society' approach to cascading hazards in the Pemberton Valley to foster locally adapted solutions

Moderated by Veronica Woodruff, Clear Course Ltd.

5. Managed vs. Unmanaged Retreat: successes and challenges in the Canadian context

Moderated by Sharmalene Mendis-Millard, Partners for Action

6. Mitigation Saves, BUT WE DON'T DO IT. Can multilateral incentives for earthquake, flood and fire change that?

Moderated by Keith Porter, Institute for Catastrophic Loss Reduction (ICLR)

7. Resilient Buildings in BC: Barriers & Enablers for Adaptation & Risk Reduction

Moderated by Jessica Wolliams, BC Housing & Chris Chopik (ICLR)

8. Putting the Resilience in Disaster Risk Reduction: From assessment to action in B.C.

Facilitated by Sahar Safaie, Sage on Earth Consulting

9. Living with Water Interactive Timeline Mapping Exercise

Facilitated by Vanessa Lueck - Researcher in Residence, PICSSession

Actionable Takeaways from the URBC 2023 Dialogue

Session 1

AC Ain't the Only Fix!

Why BC needs a comprehensive approach to managing extreme heat

Description:

Extreme heat events are projected to increase in frequency and intensity with climate change. Prior to the unprecedented 2021 heat dome, comprehensive planning for extreme heat was limited in B.C. However, the event and subsequent after-action assessments have yielded valuable information about individual and community impacts, heat related vulnerabilities and opportunities for action. Increased awareness and substantial progress in planning since 2021 have yielded positive results. This panel discussion explored advancements in extreme heat preparedness and identified persistent challenges. The focus was on three key areas: people power, buildings and community design.

Moderated by: Tamsin Mills, Adaptation Collaborative
Featuring: David Harrison (Emergency Planning and Response, Squamish Nation), Meghan Straight (Vancouver Coastal Health), Alex Price (Associate Executive Director, Sparc BC), and Ralph Wells (UBC).

Session 1: Key Takeaways

Risk Communication & Education

- » "Plan to Leave" messaging is limited as many individuals struggle to leave, especially unhoused or poorly housed individuals who may be unable to leave their belongings or may have a lack of resources. This is also difficult messaging for many of the most vulnerable, who have mobility challenges, mental health challenges and/or are not connected to mass/social media messaging.
- » Different populations are affected by hazards disproportionately; tailored messaging is necessary.
 - Climate equity knowledge gap: Understanding the impacts of heat on vulnerable populations is critical.
 - Extreme heat response plans must ensure that recommendations are culturally relevant for diverse populations.
- » Transportation and information gaps can hinder effective responses to heat alerts.
- » Collaborating with local organizations (often NPOs) can enhance trust and outreach.
- » Clear and consistent messaging across jurisdictions is vital to avoid confusion.

Data, Mapping, Modelling & Risk Assessment Tools

- » Implementing action plans that include community temperature checks and monitoring can be a helpful approach. Data with regards to actual/observed temperature in top floors of buildings in particular, is key. New tools/sensors are increasingly available to support this data collection.

Buildings, Codes & Construction

- » Implementing passive cooling measures is key:
 - Surrounding greenery and canopy or lack thereof significantly impacts shelter safety and AC energy use.
 - Homes in Canada have been designed to retain heat for a historically colder climate, therefore passive measures such as external shading and advanced glass technology are essential.
 - Passive cooling efforts are harder to achieve in apartment buildings.
 - There is a need for changes in buildings codes and design requirements to promote passive shading.
- » Condo associations forbid window coverings that don't match existing ones, making it challenging for individuals to take preventative measures.
- » Home Deaths: The majority of heat-related deaths occur at home, particularly among older adults who are living alone and those with schizophrenia.
- » Building code changes require political will.
 - A [temporary cooling code](#) was introduced in 2023.⁴

Process, Risk Governance & Funding/Financing

- » AC is limited in its effectiveness, therefore we need multifaceted cooling strategies:
 - Sufficient staffing and reliable transportation are a crucial variable for effective cooling centre operations - consider cooling of buses if using to transport people to cooling centres.
 - Both active (e.g. AC/heat pumps) and passive (e.g. tree canopy, external shading) cooling methods are essential; access to water is also a critical cooling strategy.

Session Summary:

The panel addressed strategies for heat safety amid climate impacts in BC, emphasizing inclusive, community-driven approaches to enhance resilience and reduce risks associated with extreme heat. There are significant equity issues at play with regards to heat adaptation; including tenants (i.e. renters) ability to install and afford cooling via AC and heat pumps. There are some very practical steps that can be taken with regards to the built and blue/green environments, it just requires collaboration and concerted efforts to scale these.

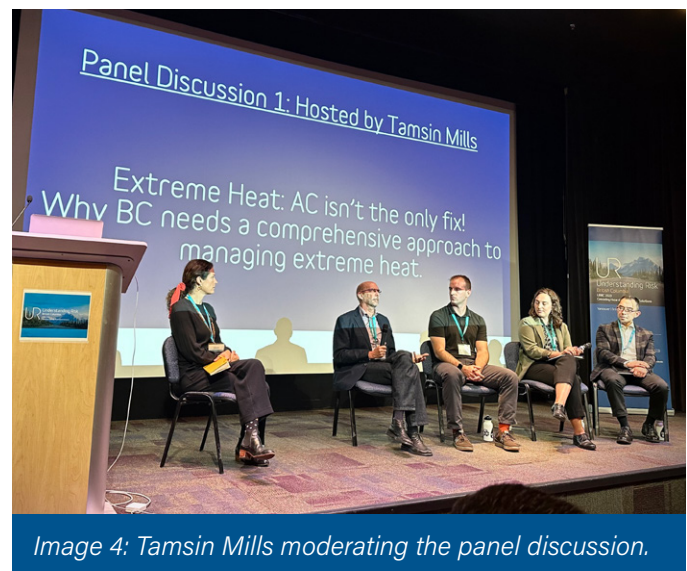


Image 4: Tamsin Mills moderating the panel discussion.

⁴ Updated Building Code 2024 cooling requirements: https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/construction-industry/building-codes-and-standards/bulletins/2024-code/b24-08_overheating.pdf

Session 2

How Do We Value That?:

Understanding climate risk and technology in real estate appraisals

Description:

Real estate property is at risk given the increasing impacts of climate change. Regardless of property type, real estate appraisal plays a critical role for lenders, investors and insurers. With the rapid enhancement in valuation technologies, appraisers can now include more factors, such as climate risk, in their calculations. The goal of the session was to daylight the current discussion of climate risk and related technology in real estate valuation and explore opportunities for enhanced collaboration in risk awareness and value generation for Southwest BC and beyond. This panel shared their expertise in their respective fields, such as the basics of appraisals and assessments, current valuation technologies, market understanding of climate risk, and market adoption and acceptance of climate risk in real estate.

Moderated by: Peter Sun, Vancouver Economic Commission.
Featuring: Mark Sakai (BCREA), Hamid Etebarian (Offerland Technologies),
Curtis Cossey (CDC Inc).

Session 2: Key Takeaways

Risk Communication & Education

- » Informed Decision-Making:
 - Clear, accessible information can help homeowners make better decisions.
 - Realtors need to be well-informed to effectively advise clients on climate risk, but have financial incentives not to be well-informed.
- » Ongoing discussions on projects such as a BC Real Estate Climate Risk Index , look to promote increased public awareness and risk disclosures.^{5,6}

Data, Mapping, Modelling & Risk Assessment Tools

- » Inclusion of risk information in assessments ensures public access to critical data.
- » There's a need for more open/accessible and frequently updated risk data.
- » Data availability and accessibility is a key challenge, particularly as there is no national standard and assessment data varies widely between provinces.
- » Data Utilization:
 - Using historical sales data, climate projections and machine learning can help predict future property values.

5 BC Financial Services Authority. (2023). Natural Catastrophes and Climate-Related Risks: Managing Uncertainty and Building Resilience in the B.C. Financial Services Sector (Discussion Paper). Retrieved from <https://www.bcfsa.ca/media/3400/download>

6 Chopik, C., Steward, C. (2022). Designing the Path to Climate Compatibility: Climate Risk and Discourse and Action in the Canadian Housing Context. Prepared by Chis Chopik, M Des. For information about this report contact Craig Stewart ctewart@ibc.ca. Retrieved from <https://a-us.storyblok.com/f/1003207/x/886181a298/designing-the-path-to-climate-compatibility.pdf>

Buildings, Codes & Construction

- » The public can make code change requests via Codes Canada.
- » Property disclosure regulations could enhance value transparency.
- » Realtors and Appraisers are key players when it comes to putting a dollar value on risk and resilience. Property values are determined by the buying and selling of property, so it is important to educate realtors about climate risk and how to communicate this with clients, as well as to figure out how to make risk disclosures more available to homeowners. It was also noted that Appraisers are often missed as a key stakeholder in this space.
- » Programs such as the [BC Virtual Home Energy Rating System \(VHERS\)](#), can support home energy retrofits.
- » Climate Risk in Real Estate:
 - Hazards can shift demand for properties in desirable locations.
 - Natural hazard events significantly affect the rental market short-term.
 - Properties affected by hazard events struggle to regain market value.
 - Flooded homes take 20% longer to sell.

Process, Risk Governance & Funding/Finance

- » Insurance Challenges:
 - Coverage can be expensive or unavailable for at-risk properties.
- » Lender Requirements:
 - Banks are increasingly asking for flood risk information and mitigation measures in the mortgage brokering space.

Session Summary:

The panel explored the complexities of the real estate market amid climate changes, emphasizing the impact of hazards on property values and the necessity for improved data transparency. By addressing these challenges (e.g. open hazard and risk data, realtor education, changed incentives structures), stakeholders can better reduce risks and enhance resilience in Southwestern B.C.



Session 3

More Than Just Maps!

Applying the latest & greatest in regional seismic microzonation mapping and basin modeling in practice; from land use and emergency management planning to building design and retrofit

Description:

This panel was designed to appeal to a wide range of attendees and inspire passionate conversations about the best practice for the implementation and use of microzonation maps in BC. The panel provided a general introduction of microzonation maps then delved into some details of the Metro Vancouver Seismic Microzonation Mapping Project. From there, the multi-disciplinary panel aimed to predict the future as it relates to opportunities and challenges in the application of the map set:

- utilizing microzonation maps as an input to land use planning and municipal risk assessments;
- incorporating microzonation maps into the workflow of structural and geotechnical engineers;
- understanding basin effects and their effect on building design;
- adhering to potentially conflicting expectations between code requirements and best practice.

Moderated by: Allison Chen, Engineers and Geoscientists of BC.

Featuring: John Sherstobitoff (Ausenco), Carlos Molina Hutt (UBC), and Tamsin Mills (Adaptation Collaborative).

Session 3: Key Takeaways

Risk Communication and Education

- » It's important to offer guidance on how to interpret the microzonation maps and to understand their limitations, some of this is accomplished via the related EGBC guidelines.
- » Communicating complex information about seismic hazards in densely populated areas such as the Lower Mainland requires time and investment, investing in the maps themselves is not enough.
- » Emergency Management:
 - Improved data aids in planning for earthquake response but requires clear communication of risks and related solutions.

Data, Mapping, Modelling & Risk Assessment Tools

- » Existing maps mainly address site class (soil) rather than site period or basin depth, the latter two ARE addressed via the microzonation mapping project.
- » Open Data:
 - Increased public availability of data is essential for effective risk management, there were multiple requests for the underlying geodatabase to be stewarded forwarded as a living database as new geodata is acquired.
- » Microzonation (MZ) Maps:
 - [A suite of 29 hazard maps](#) will be released in the fall of 2024, designed to improve earthquake hazard knowledge, including amplification/deamplification, landslides, and liquefaction.

- MZ maps are hazard maps, not risk maps, and will complement existing national and provincial building code seismic provisions that have included amplification since 1965.
- While MZ maps provide significant insights, they do not replace the need for in-situ testing.

Buildings, Codes & Construction

- » Engineers can use MZ maps for preliminary studies and conceptual designs, enhancing project planning. They will also be very helpful for developers and builders, assessing project costs in early phases and understanding development potential at specific sites. MZ maps provide site-specific insights that could lead to variations from standard building codes based on local hazards.
- » MZ maps can inform better land use decisions and promote equitable distribution of exposure to hazards.
- » Need for Code Updates:
 - Canada lags behind the U.S. in integrating basin effects into building codes; a push for code change requests is necessary, the panel requested a task force on this topic.
- » There needs to be an emphasis on retrofitting vulnerable buildings for multiple hazards to maximize safety and cost-effectiveness.

Process, Risk Governance & Funding/Finance

- » MZ maps provide clearer insights for local authorities, promoting effective actions for seismic risk management and improved disaster risk reduction.

Session Summary:

The session focused on the soon-to-be-released Microzonation Maps for Metro Vancouver, which will enhance understanding of seismic hazards in the province's most densely populated region and inform various end-user groups, including engineers and planners. The discussion highlighted the need for clear guidelines and data accessibility to effectively utilize these maps for improving resilience against cascading hazards (e.g. slope stability and landslides, liquefaction, SLR and associated subsidence).

Read more: [Use and Development of Seismic Microzonation Maps in BC](#) (Engineers & Geoscientists of British Columbia).

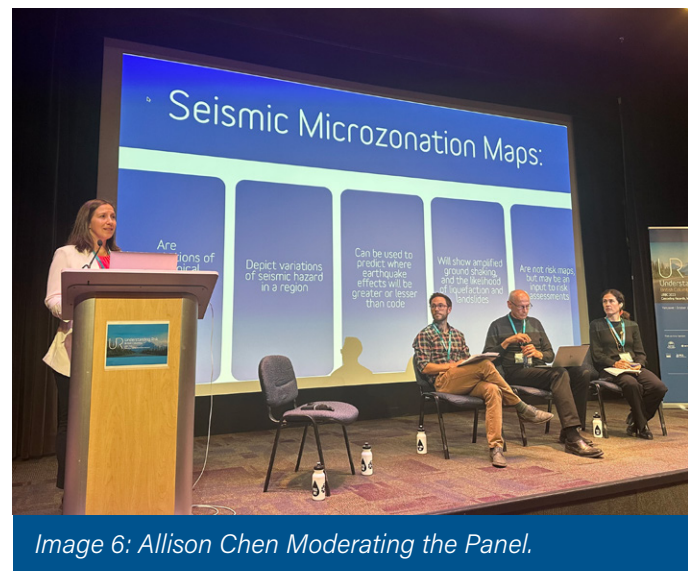


Image 6: Allison Chen Moderating the Panel.

Session 4

Mt. Meager: taking an 'all of society' approach to cascading hazards in the Pemberton Valley to foster locally-adapted solutions

Description:

The rapidly growing rural community of Pemberton, BC is located within Lil'wat Nation Traditional Territory, ~2.5 hours north of Vancouver. Pemberton lies next to Mt. Meager, Canada's most active volcano and the site of the largest landslide in Canada in 2010. The landslide debris has significantly increased flood risk through the populated areas of the valley; threatening property, infrastructure, a provincial transportation corridor, and utilities. The community is accordingly faced with a range of cascading threats, and local governments, including Lil'wat Nation, have been developing a collaborative network to address these risks. A collaborative, all-of-society approach is heralded as best practice for reducing risk by international United Nations guidance, federal and provincial policy, and local emergency planning. However, there are multiple barriers to implementing locally relevant solutions across the siloed nature of the vertically separated areas of authority. There is a significant lack of opportunity to be adaptive in mitigative measures for local protection when considering policy, permitting, and logistical barriers established at these multiple levels of authority. This session explored: how a collaborative approach has been initiated within the Pemberton Valley Emergency Management Committee, the benefits and barriers to collaboration, and the ways in which we can stop letting perfection get in the way of progress in terms of reducing disaster risk.

Moderated by: Veronica Woodruff, Clear Course Ltd.
Featuring: Jordan Sturdy (Resident & MLA West Vancouver-sea to sky), Kevin Clark (Pemberton Valley Dyking District, Operations Manager), and David Ward (Lil'wat Nation Engineer).

Session 4: Key Takeaways

Data, Mapping, Modeling & Risk Assessment Tools

- » Increased data availability and better distribution of it are essential for effective flood management.
- » Cautious Modeling:
 - Excessively cautious hazard modeling, conducted by consultants and not always informed by local knowledge, restricts progress on necessary improvements.

Buildings, Codes & Construction

- » High Costs:
 - Upgrading flood protection infrastructure is a massive project, with estimated costs between \$30-60 million.
 - Major cost barriers to upgrading flood defenses due to seismic provisions.
 - Infrastructure Limitations:
 - ♦ Flood protection infrastructure ends at the Lil'wat Nation reserve, leaving it vulnerable to flooding.

Process, Risk Governance & Funding/Finance

- » The Historical Context of Flood Risk:
 - Population growth began in Pemberton Valley after the railway was established in 1910, leading to increased flood risks managed historically through individual initiatives (e.g. farmers building their own dikes).
 - Flood management evolved to be overseen by local governments by 2003, but responsibilities remain unclear and siloed to this day.
- » Jurisdictional Complexity:
 - The dyking district connects multiple local/regional governments, addressing the flooding from six rivers.
- » Challenges with Relocation:
 - Most of the Lil'wat Nation's reserve is situated on a flood plain, making relocation difficult.
- » Incremental Approaches:
 - We need to focus on achievable improvements rather than unrealistic ambitions.
- » Funding Limitations:
 - A small tax base constrains financial resources, with major projects (e.g., Pemberton Creek) estimated at \$120 million.
 - Local governments lack adequate funding to fully address flood protection needs in Pemberton Valley.

Session Summary:

This session effectively highlighted the multi-hazard risks faced in the Pemberton region, which is influenced by a variety of cascading hazards; riverine and pluvial flooding, volcanoes and landslides, extreme heat and wildfire. It illustrated how Pemberton is a great case study for many smaller towns in BC, and a great case study for how to manage growth and development in a challenging multi-hazard context given the many challenges associated with siloed risk governance. The panel focused on addressing barriers to implementing effective flood protection on the Lil'wat reserve and the wider community, including for homes and farms.

“This is one of the first times I’ve had to be cognitive of the big-picture of it [when managing flood protection].”

—Kevin Clark (Pemberton Valley Dyking District, Operations Manager)

Session 5

Managed vs. un-managed retreat: success and challenges in the Canadian context

Description:

As climate impacts intensify, communities will require transformative adaptation strategies that reduce risk and address vulnerabilities. One such strategy is managed retreat, where people, property, and critical infrastructure are strategically relocated out of areas prone to recurrent natural and climatic hazards. We are already at the whims of 'unmanaged retreat' in the form of emergency evacuations, extended relocations and emerging private sector policies that shape real estate and financial markets toward or away from settlements in high hazard areas (e.g. property-level climate risk ratings, areas/buildings that are insurable vs not, and loans unavailable for rebuilds in hazard-prone areas). To proactively reduce acute and chronic physical climate risks, we need long-term planning that does not include a) costly and frequent government bailouts (e.g. disaster aid) and b) infrastructure rebuilds to prior conditions instead of designing for a new climate reality.

How can we be intentional about where people and critical infrastructure are spatially located, and about how to move them out of high climate hazard areas in an equitable way? Practitioners discussed on-the-ground challenges and opportunities to break the cycle of increasing climate risks and damages, including why managed retreat has few examples to date in Canada.

Moderated by: Sharmalene Mendis-Millard, Partners for Action.
Featuring: Tribal Chief Tyrone McNeil (Stó:lō Nation, a member of Seabird Island Band, and Chair of the Emergency Planning Secretariat (EPS), Sean Strang, (Director of Flood Recovery and Mitigation, City of Merritt), and Brent Doberstein (University of Waterloo).

Session 5: Key Takeaways

Risk Communication and Education

- » First Nations stories help to provide long term flood of records.
 - Settlers tend to have really short term memories about environmental and natural hazards, as they have not been connected to the land for a long time. Indigenous people often have oral histories of catastrophic events through time, and seem to be less surprised by them occurring as a result.

Data, Mapping, Modelling & Risk Assessment Tools

- » Need for Data Sharing:
 - Effective communication and data sharing between governmental and non-governmental organizations is crucial for informed decision-making.

Process, Risk Governance & Funding/Finance

- » Cost-Benefit Analysis: Most managed retreat scenarios show a positive return on investment, though standardized analyses are lacking across municipalities.

- » Insurance Dynamics:
 - Homeowners in hazardous areas are increasingly willing to accept insurance buyouts for relocation, although many initially resist selling.
- » Indigenous Perspectives:
 - 90% of Indigenous residents in BC live in high-hazard areas; managed retreat strategies must align with their needs, wants, and values.
 - 81% of Indigenous reserves in Canada (as of 2022) are flood-prone, highlighting the urgency of anticipating risks and preparing for managed retreat.
 - Increasing sovereignty of First Nations is and will continue to increase the need for collaboration across disciplines and cultures.
- » Proactive vs. Reactive Approach:
 - Managed retreat in Canada is largely reactive, with very little proactive buyout of homes and communities before disasters occur.
- » Community-Specific Solutions:
 - Each community's context and needs differ significantly, requiring tailored approaches to managed retreat.
- » Funding Challenges:
 - Provincial funding is necessary for buyouts and long-term recovery efforts, especially in communities like Merritt, BC.
- » Community-Centered Approaches:
 - Future strategies should prioritize community input and equity, considering where people want to live in relation to hazards and risks.
 - These strategies should also require some shared analysis/understanding of where safer land is.
- » There is a need to accommodate the growing population - a growth in population leads to a "riskier future" ([Image 2](#)), and therefore it is not sufficient to look at what has occurred in the past, we must look to the future to what is needed.

Session Summary:

This session addressed the complexities of managed retreat in the context of natural hazards, focusing on the 2021 flooding in Merritt, B.C. The discussion emphasized the unique challenges faced by Indigenous communities and the need for proactive, tailored solutions that respect Indigenous rights and promote community resilience. As climate risks escalate, creative approaches to managed retreat will be essential for reducing vulnerability and enhancing safety in Southwestern B.C.

Read More: [*Economic Assessment and Decision-Making for Community-led Managed Retreat in British Columbia: Approaches, Challenges, and Case Studies of Cost-Benefit Analysis and Multi-Criteria Decision Analysis*](#) (The Ministry of Water, Land and Resources Stewardship, PICS, and Living with Water).



Image 7: Jessica Shoubridge Introducing the Managed Retreat Panel, reading a passage from the book 'Sand Talk' by Tyson Yunkaporta.

Session 6

Mitigation Saves, BUT WE DON'T DO IT.

Can multilateral incentives for earthquake, flood and fire change that?

Description:

Since at least 2005, it has been clear that natural hazard mitigation saves society more than it costs, with benefit-cost ratios of 13:1 or more. Despite the big-picture value of mitigation, society invests far less in mitigation than makes economic sense. Partly as a result, Canadian and US catastrophe losses continue to grow unsustainably, 10 times faster than the population and several times the growth in gross domestic product. The ICLR and its colleagues suspect that the reason for the investment gap is that the societal interests do not align: owners and developers pay for resilience while others benefit. We have designed multilateral, coordinated incentives whereby municipalities, insurers, real estate agents, and others encourage and help owners and developers pay for standardized resilience measures. But how and where can we test the idea? In this discussion, we reviewed the concept of incentivization, and then discussed where and how to launch a pilot study: how to recruit participants and allies.

Moderated by: Keith Porter, Institute for Catastrophic Loss Reduction (ICLR).
Featuring: Andrew Pape-Salmon (EMCR), Don Iveson (The Cooperators), Becky Denlinger (Deputy Minister, EMBC, ret.), and Chris Chopik (ICLR).

Session 6: Key Takeaways

Risk Communication & Education

- » Disclosure and Transparency:
 - There is a moral hazard in the lack of mandatory risk disclosures for homeowners; leading to uninformed decision on long-term mortgages. Some of these mortgages are federally backed via the Canadian Mortgage and Housing Corporation (CMHC).
- » Emotional Decision-Making:
 - Homeowners often make financial decisions based on emotions rather than logic; educating them on hazard exposure can encourage proactive moves away from high-risk areas, but education alone will not suffice, incentives are also needed.
 - We need price signals and incentives to transform the system.

Data, Mapping, Modelling & Risk Assessment Tools

- » Community-Specific Risk Assessment:
 - Understanding community-specific risks through localized assessments is crucial for engaging homeowners and promoting acceptance and uptake of mitigation strategies.

Buildings, Codes & Construction

- » [Climate Resilience Districts](#) is a tool that is missing from the Canadian context.
 - A resilience [STEP code](#) for new builds is necessary to work alongside this tool.

Process, Risk Governance & Funding/Finance

- » Identifying pilot communities for incentivization requires understanding their unique characteristics and readiness to engage.
- » Investing in mitigation can yield savings of over \$10 for every \$1 spent, but the benefits are not equitably shared among stakeholders.
- » Resilience Investment Gap:
 - Natural catastrophe losses are growing significantly faster than population growth and GDP.
 - Canada needs to invest an additional \$8 billion CAD annually in disaster preparedness and mitigation to close the resilience gap.
 - Role of Financial Institutions: Banks and other lenders are increasingly pressured to address climate risks in their portfolios, highlighting the need for mortgage products that consider climate-related risks and incentives for property owners of all types to undertake mitigative measures.
- » Collective Action for Mitigation:
 - Collaborative efforts among various stakeholders, including non-profits and local governments, can enhance disaster risk management and climate adaptation strategies.
 - Current incentives for disaster risk reduction are uncoordinated among co-beneficiaries (e.g., insurers, real estate agents, property owners, banks), which diminishes their effectiveness.
 - How do we change this? We need to create and sustain regional resilience roundtables to foster ongoing collaboration in advancing the resilience incentivization agenda.⁷⁸

Session Summary:

The session highlighted the critical need for increased investment in disaster resilience in Canada, with a focus on incentivizing effective mitigation strategies. Discussions centered around the emotional and rational barriers property owners face in understanding their risks and taking actions to reduce them, the necessity for coordinated incentives, and the role of financial institutions in fostering a more resilient property market. By promoting transparency and collaborative efforts, we can collectively prepare for and mitigate the impacts of climate-amplified natural hazard events.

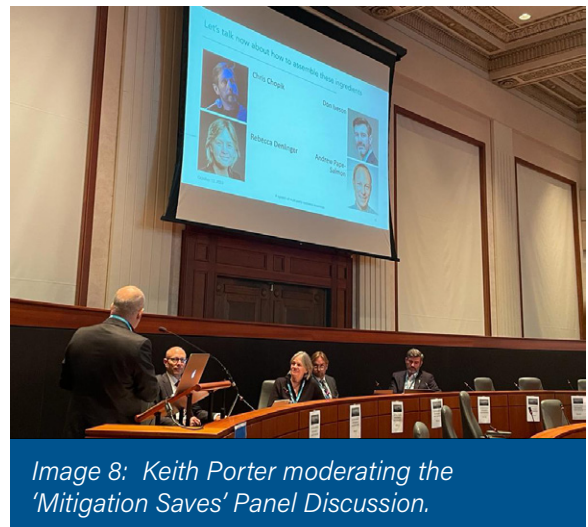


Image 8: Keith Porter moderating the 'Mitigation Saves' Panel Discussion.

7 Brende, B. & Sternfels, B. (2023). Seizing the momentum to build resilience for a future of sustainable inclusive growth. <https://www.mckinsey.com/capabilities/risk-and-resilience/our-insights/seizing-the-momentum-to-build-resilience-for-a-future-of-sustainable-inclusive-growth>

8 Committee on Finance, Insurance and Real Estate Multi-Hazard Mitigation Council National Institute of Building Sciences. (2023). Resilience Incentivization Roadmap 2.0. https://www.nibs.org/files/pdfs/NIBS_MMC_resilience-incentivization-roadmap2_2023.pdf

Session 7

Resilient Buildings in BC: Barriers & Enablers for Adaptation & Risk Reduction

Description:

Climate change adaptation and disaster risk reduction (DRR) within the context of buildings is a topic of interest to governments, regulators, academics, professional and non-profit organizations working to protect the public interest. Even though a range of tools and guidance have been developed in the last few years to deal with multiple and cascading hazards, implementation remains challenging for several reasons including: lack of knowledge and capacity at the grass-roots level, funding and governance structures to manage risk, information overload and siloed approaches to decision-making. Despite these challenges, there has been progress in integrating disaster risk reduction (DRR) and resilience-building measures in both new and existing buildings and efforts are underway to deal with this in a more holistic manner. This session provided an overview of efforts by private and public sector actors in addressing climate and disaster risks for both new and existing buildings.

Moderated by: Jessica Wolliams (BC Housing) and Chris Chopik (ICLR).
Featuring: Harshan Radhakrishnan (Engineers and Geoscientists of BC), Daniel Clarke (Daniel Clarke Architect, AIBC), Tina Neale (EMCR) and Wilma Leung (BC Housing).

Session 7: Key Takeaways

Risk Communication & Education

- » There is a significant need for professional development and training to equip practitioners with the skills necessary for implementing climate resilience measures within both existing and new building stock.
- » There's a need for education and knowledge mobilization across sectors—a whole of society solution.

Buildings, Codes & Construction

- » There is a need to incorporate future climate change scenarios and projected climate parameters into building designs to effectively mitigate relevant risks.
- » A comprehensive toolkit is required to facilitate easier understanding and implementation of climate resilience strategies within the building sector.
- » Engineers and Geoscientists of BC: Addressing Overheating Risk.

Data, Mapping, Modelling & Risk Assessment Tools

- » Open, regional, multi hazard risk assessment that is stewarded/updated in an ongoing way provides the evidence base needed to advance resilient building design and redevelopment and in equitable and more efficient way.

Process, Risk Governance & Funding/Finance

- » More Resilient Buildings and Homes Quicker:
 - How do we scale up for more buildings that are also resilient? We need a lab approach that combines knowledge of best practices in design and costing, and training for trades, etc.
- » A missing piece that needs to be focused on to ensure efficient uptake of resilient building regulations, knowledges, and codes is capacity building (i.e. professional development in climate risk management).
- » Human inertia and a lack of approachable regulations hinder the adoption of climate resilience measures; continuous innovation is necessary for industry transformation.
- » Breaking Down Silos:
 - Cross-disciplinary collaboration is essential to enhance knowledge sharing and develop holistic solutions for climate resilience.
 - We need to support and encourage the “in-betweeners” who can stretch silos and connect dots, helping to seize opportunities.

Session Summary:

The session focused on the challenges and opportunities in integrating climate resilience and disaster risk reduction measures into the building sector in British Columbia. It highlighted the need for effective knowledge sharing, the development of practical toolkits, and the importance of a collaborative approach across disciplines. The discussions emphasized the necessity for continuous innovation and capacity building to support the industry's adaptation and transformation.

Session 8

Putting the Resilience in Disaster Risk Reduction: From assessment to action in B.C.

Description:

The Ministry of Emergency Management and Climate Readiness and Ministry of Environment and Climate Change Strategy have a mandate to develop a Disaster and Climate Risk and Resilience Assessment for the province, followed by a Risk Reduction Strategy. This innovative project will bring together an assessment of disaster and climate risk, and will take a strengths-based approach to understanding our collective and diverse resilience across the province. Join us for a brief overview followed by an interactive discussion – we want to hear from you! What does success look like as we develop a provincial and subsequent regional assessments? What does a resilient future look like in B.C. and where do you think we need to focus our efforts?

Moderated by: Sahar Safaie (Sage on Earth Consulting).

Featuring: Tina Neale (Executive Director, Disaster Mitigation and Adaptation, EMCR), Dominique Sigg (Manager, Disaster Risk Assessment, EMCR), and Andrew Pape-Salmon (Executive Director, Strategic Initiatives, EMCR).

Session 8: Key Takeaways

Risk Communication & Education

- » Results of the assessments will be made publicly available through ClimateReadyBC, promoting transparency and community engagement.

Data, Mapping, Modelling & Risk Assessment Tools

- » Values-Based Assessment:
 - The assessments will not only focus on risks but also on resilience, mapping community values through qualitative and quantitative methods.

Buildings, Codes & Construction

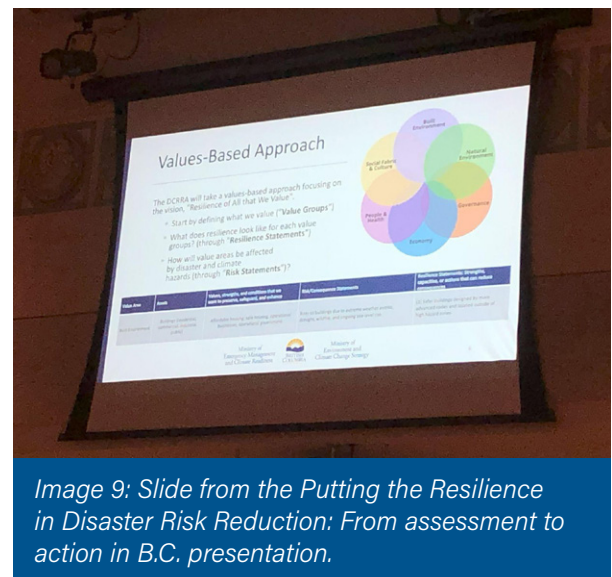
- » The plan will include prioritizing green and natural infrastructure solutions alongside traditional engineering approaches to disaster risk reduction.

Process, Risk Governance & Funding/Finance

- » New Legislative Framework:
 - The province of BC is developing a province-wide Disaster and Climate Risk and Resilience Assessment (DCRRA), supported by the Climate Change Accountability Act and new mandates under Bill 31.
 - The DCRRA will facilitate cooperation among local governments, critical infrastructure owners, and Indigenous communities, requiring collaborative risk assessment and planning.

Session Summary:

This session highlighted the province's commitment to restructuring disaster risk governance by integrating local and Indigenous perspectives into the DCRRA. By shifting towards a co-development model, the province aims to enhance climate resilience while addressing the limitations of traditional risk assessments. Participants emphasized the need for genuine community empowerment and the implementation of locally relevant solutions, as well as not reproducing work that has already been done.



Session 9: Living with Water Interactive Timeline Mapping Exercise

The [governance timeline mapping exercise](#), hosted during the URBC 2023 symposium by the PICS-funded *Living with Water* project, provided an example of how we may conceptualize the breakdown of information silos:

Timeline mapping allows participants to examine how **various interactions between events, processes, and people manifest over time** within complex systems. Timeline mapping can allow us to identify path dependencies, understand the legacies and harmful impacts of different events on various groups, and develop shared understandings of risk through collaborative exchange.

In one exercise for **floods and another for seismic, extreme heat, wildfire, and drought hazards**, participants wrote down events and processes on post-it notes. Each post-it note contained the event (e.g., Atmospheric River Flood) or process (e.g., colonization) and a date (e.g., 2021, 1860s-onward). Colored post-it notes were used to distinguish between processes and events occurring at the local/provincial and the national/international scales.

Participants collaborated on **placing notes in chronological order, and then they identified five events or processes** that they believed to be the most important, denoting this significance by placing a sticker on these. Delegates then reflected as a group and then articulated their thoughts to the facilitators. Attendees were encouraged to reflect upon their own lived experiences and unique insights (e.g., location, profession) to encourage a diversity of answers.

Reflection prompts centered around the following:

- Description of the event.
- Who initiated the event/process?
- Who was affected or impacted by the event/process?
- Were these impacts positive/negative?
- To what degree of severity?
- Has trying to avoid one event influenced other events/processes/risks? (e.g., unintended consequences, cascading, compounding).
- Who has been repeatedly impacted?

Image 10: Community of practice members gather around the timeline for the PICS-led mapping event. Image credit: Adriaan Bogaard.



Concluding Remarks

URBC 2023 continued to build on the themes and knowledge base that have continued to evolve since the first symposium in 2017.

Overarching takeaways from URBC 2023

1. Risk reduction is limited by not communicating with the public in plain language and in ways that matter to them.
2. Many of the issues surrounding resilient, equitable, and effective risk management is a product of not managing risk with an eye to intergenerational and cross-cultural equity.
3. More localized and flexible building codes are needed.
 - ♦ The transition from national codes to BC building codes takes a long time, and while these codes do adjust over time, they do not keep pace with reality and the needs of society.
4. There is a need for an all of society approach to creating and fixing the present system of incentives and disincentives that prevent effective risk management.
5. Since its inception, URBC has been advocating for an open, living risk model that captures the major hazards of concern for Southwest BC; one that is stewarded in an ongoing way by a community of practice that is made up of scientific and research expertise, academia, and practitioners from public/private and NPO sectors.
 - ♦ These are the collaborative, ongoing partnerships needed to address cascading and compounding hazards in Southwest BC.

“I’m here because I’m an in-between, but also because I want to better understand the scope of the challenges and the scale of the multi-stakeholder awakening required to get to an all of society approach. If the past was predictable and incremental, the future is uncertain and dynamic.”

—Julie Wright, Director P4A, Closing Reflections

Related Updates from the Community of Practice

Immediately after the symposium, leaders from the community of practice convened to discuss the future of URBC and its role in supporting work like the Provincial Disaster and Climate Risk Reduction Plan (DCRRP). Convened parties outlined [a concept for a multi-year URBC program](#) that can tie in with the ongoing work to develop the provincial DCRRP and other related work; continuing to build the community of practice for CCA and DRR in Southwest BC.

Ontario Updates

- Scholars in Ontario are moving to create a network and annual event series inspired by the URBC model, but focusing on Ontario-specific hazards and risks. URBC provides an excellent, innovative framework for how this could be done. Their [inaugural workshop](#) was hosted October 30-31st, 2024.



- Since URBC 2023, sponsor Partners for Action has worked with University of Waterloo professor Dr. Brent Doberstein and have successfully obtained multi-million dollar funding to continue work on managed retreat.



- The Institute for Catastrophic Loss is working on pilot projects in Edmonton and Calgary for incentivization, a direct result from the URBC 2023 dialogue and community of practice built since 2016.



- The Pacific Institute for Climate Solutions (PICS) will publish the results from the symposium timeline mapping exercises.
- In June 2024, PICS held a Wildfire Coexistence in BC: Solutions Symposium as well as an extreme heat hazard workshop. Workshops for drought and flooding/sea-level rise will take place in the fall of 2024.
- The Pacific Institute for Climate Solutions (PICS) is convening researchers, Knowledge Holders, and practitioners to identify pressing information and knowledge gaps for flood, wildfire, drought and extreme heat and to inform best practices for climate risk assessments. Insights from these workshops will feed into a multi-hazard research and knowledge mobilization agenda for climate risks in B.C.

- The Realizing Resilient Buildings in B.C.: A toolkit for local governments emphasizes strategies and tools for local governments. It acknowledges that effective implementation of resilient building policies and regulations relies on support from the provincial government and all stakeholders in the sector.
- In 2024, a Flood Risk and Resilience workshop was hosted in the Pemberton Valley by URBC session leads/contributors: Veronica Woodruff and Kevin Clark. The following image provides a synopsis of the themes and key takeaways.



FLOOD RISK & RESILIENCE
2024 Workshop Highlights
www.pvdd.ca

Emergency Preparedness
Emergency preparedness is essential in addressing risk—e.g., emergency alert notifications, to-go bags, and evacuation plans.
Identify community resources before emergencies occur, practise for events.
Ensure clear communications.
Improve early warning systems.
Ensure infrastructure is flood resilient, especially in designated evacuation routes.
Develop training and response programs that leverage local organizations, e.g., SAR.

Governance
Flood management responsibility is spread across multiple agencies and there are limits to what any agency can accomplish alone. Flood management requires partnerships.
Improve decision-making, funding, and collaboration among all levels of government.
Address permitting challenges and advocate for updates to policies.
Explore new partnerships and secure more funding.

Emergency Response
Broad community involvement before and during emergencies is essential and should be supported by transparent and informative communications, emergency alerts, and evacuation route planning/execution.
Work with cross-jurisdiction partners to develop clear emergency communications and implement community-wide preparedness campaigns prior to disasters.

Cascading & Compounding Risk
Climate change is increasing the risk of floods, fires, and landslides. Risks cannot be eliminated and mitigation funding is limited, but risks can be reduced.
Explore ways to improve sediment management, river restoration, and green infrastructure for flood prevention while exploring innovative funding arrangements.

Data-informed Decision Making
Data is essential for making informed decisions about flood management.
Improve floodplain mapping, real-time monitoring, and collaboration between government agencies to improve data collection and access that can increase preparedness and response.
Use plain language to communicate data during high water events.

Flood Protection & Infrastructure
Flood protection efforts are impacted by regulations, permitting, land constraints, and one-size-fits-all "best" management practices.
Advocate for improved accuracy in flood modeling and infrastructure standards to ensure a phased approach is an option for increasing protection.
Consider managed retreat, floodplain development regulations (building locations), and policy changes.

Land-use Policy
Discussions centered around flood construction levels, managed retreat policies, and real estate risk disclosure.
Enforce setbacks, regulate floodplain development, and preserve and restore wetlands and other habitats that can mitigate flood water (e.g., flood attenuation).
Ensure risk is properly communicated in real estate transfers.

Focus of Discussion
Shared Observations

PEMBERTON VALLEY DYKING DISTRICT

BC | Climate Resilience Summit 2025

Vancouver, Robson Square • March 3rd/4th

Continuing in the proud tradition of past URBC Symposiums, the inaugural *BC Resilience Summit* will be held in Vancouver, BC in March 2025, in partnership with Sauder's Centre for Climate and Business Solutions (CCBS) and the Cooperators.

Interested in hosting a session or sponsoring?

Contact Jessica Shoubridge at jessica@thriveconsulting.me

Interested in attending/participating?

Visit the Summit information page for updates at urbc.ca, and register at [Eventbrite](https://www.eventbrite.com).

Special thanks to our URBC 2023 sponsors:

