Flood Governance Mapping Report

Participatory timeline mapping guide

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1 Executive Summary

What is Living with Water?

Living with Water [LWW] is a four-year project funded by the Pacific Institute for Climate Solutions [PICS], a multi-university centre that supports multi-disciplinary, multi-stakeholder, and evidence-based climate research.

LWW's research is grounded in the project's guiding values:

Foregrounding reconciliation

Embracing multiple ways of knowing and doing

Restoring relationships between land, water, and people

The LWW research team is engaged in numerous projects along the British Columbia [B.C.] south coast related to adopting values-based adaptation approaches, broadening the solutions space for flood risk management, and fostering collaborative governance arrangements.

One of LWW's objectives is to support the development of multi-level governance arrangements for regional flood adaptation. This aligns with the Province of B.C.'s desire to build **province-wide resilience to climate change impacts and, in particular, to flooding**. In 2023, the Province of B.C. granted funds to PICS to support research activities in managed retreat, participatory flood governance mapping, and integrated flood management planning with the express purpose of building long-term resilience. All three research activities are interconnected. LWW led the managed retreat and governance mapping portions. This report covers the participatory flood governance timeline mapping aspect of the research.

Living with Water Goals

The short-term goal of this project was to develop and facilitate participatory flood governance timeline mapping workshops. The project's medium- and long-term objectives are to build a foundation for B.C. flood governance that is resilient in the face of climate change. In this report LWW is providing both an interactive and static timeline that may be used by communities who wish to engage with timeline mapping.

Reasons to use timeline mapping?

The project uses timeline mapping, a method that is based on an underlying understanding of **the world as a complex place with diverse and interacting systems which can lead to unexpected outcomes.** This is an understanding based on relationships and interconnections. As a method:

- timeline mapping is highly accessible,
- hybrid delivery is possible,
- minimal training is necessary,
- inclusive manners are possible and desirable, and,
- the mapping exercises can be either participatory or non-participatory.

To see the reasons why LWW chose to use participatory mapping, please see page 10.

Feedback and response during workshops

Timeline mapping enables participants to explore the longer-term context of a specific topic. Thus, participants have the **opportunity to be exposed to and learn about other perspectives**. In this project, LWW focused on the events and processes that have impacted flood governance in B.C. (see Chapter 5 for more details). Seeing how other individuals perceived flood governance and witnessing the great variation among understandings surprised many people and **sparked lively conversations about what was needed and could be done to improve flood resilience in B.C**. The facilitators concluded that although these were successful workshops with a plethora of excellent data gathered, the participatory flood governance timeline mapping really needed to **happen at a local scale to achieve full benefits for communities.** This inspired LWW to provide the current interactive and static timelines to communities to use as templates for further place-based exploration and dialogue. In addition, LWW has compiled a 'how-to' diagram which eventually will also be accessible on the LWW website.

Structure of the report

This report begins by explaining what the Living with Water project is, its core values, and its purpose (Chapter 2), while highlighting gaps in flood governance in B.C. and how participatory governance timeline mapping offers a solution to address them (Chapter 3). The following section details the short, medium, and long-term goals of the grant, emphasizing how these goals can advance towards a more comprehensive understanding of flood governance (Chapter 4). Additionally, we provide examples of timeline mapping workshops hosted by the project, highlighting key takeaways and points for reflections for future workshops (Chapter 5). Notably, this project emphasizes the importance of considering social acceptance, recognizing it as critical to successful adaptation of flood risk management and governance systems (Chapter 6). Finally, we underscore how participatory governance mapping can enhance multi-level governance structures and create space for diverse knowledge systems (Chapter 7).

2 Background

About Living with Water

Living with Water [LWW] is a four-year project focusing on sea level rise and flood adaptation which is funded by the Pacific Institute for Climate Solutions [PICS]. LWW is an interdisciplinary research group of scholars and solution seekers investigating flood resilience and coastal adaptation in the territories of the Coast Salish Peoples. LWW has three primary objectives:

The first is to **foreground Indigenous and local perspectives and values**. To do so, without continuing the exploitations of the past and present, LWW is focusing on fostering, amplifying, and driving forward equitable and holistic approaches to flood adaptation.

LWW's second primary objective is to **broaden the "solution space"** for flood response, preparation, and management to include cutting edge approaches that take the entire system into consideration, rather than siloed components. This includes, but is not limited to, nature-based approaches, managed retreat, and multi-benefit solutions. The latter refers to solutions that provide additional benefits for community and ecological resilience—such as enhanced biodiversity, restored salmon habitat, or opportunities for cultural revitalization.

Finally, LWW's third objective is to **support the development of multi-level governance arrangements** for regional coastal flood adaptation which are both holistic and equitable. PICS funded this aspect partially to address the adaptation gap between flood governance and the physical realities of flooding. To that effect, LWW supported a PICS grant application to the Province of British Columbia [B.C.] for funding to enable longer-term foundational flood resilience research.

Over the course of the project's first two years, LWW added several case studies involving riverine flooding due to the presence of similar risk management and governance issues as found within coastal flood adaptation. In consequence, LWW's research now encompasses coastal, deltaic, and riverine flood adaptation challenges and solutions. Hereinafter, this report refers to flood governance which covers all three forms.

Check out some case studies in the End Notes!

3 Introduction

Currrent gaps in adaptation efforts

Internationally, the gap between what needs to happen to adapt to climate change and what is actually happening on the ground is referred to as the '**adaptation gap**.' To adequately, and hopefully successfully, adapt to climate-exacerbated flooding, the adaptation gap between flood governance and physical flood realities urgently needs to be addressed. LWW was funded by PICS to begin addressing this adaptation gap along the southern coast of B.C. Similarly, the Province of B.C. is attempting to increase Province-wide resilience by **planning for flood resilience and engaging with and supporting communities** through the development and implementation of the B.C. Flood Strategy.[1] Consequently, PICS received funding through a Province of B.C. Ministry of Water, Lands and Resource Stewardship grant for the express purpose of increasing long-term flood resilience in B.C. LWW led the research on managed retreat and participatory flood governance mapping.

How timeline maps can address these gaps

This is a report for practitioners who are interested in using participatory timeline mapping and for anyone who is interested in a detailed report on the timeline mapping methodology that LWW used. This type of methodology provides an opportunity to bring in diverse knowledge systems, capture multiple perspectives on 'key' events and processes, and can be used for multiple hazards.

There are several excellent studies[2] examining B.C. flood governance and several smaller case studies within LWW.[3] However, these studies do not delve fully into the barriers and gaps within B.C. flood governance. In particular, none provide a view of the **interrelationships among governmental bodies, private interventions, and community experience whether Indigenous or local**. Neither are the relationships between private entities and municipal authorities nor community experiences of these relationships fully captured, a challenge since coastal and river bank developments impact neighboring businesses and communities. Furthermore, political jurisdictions and entities such as reserves, districts, and municipalities must prepare, manage, and recover from flooding largely on their own—despite the fact that these natural processes do not respect jurisdictional boundaries.

In order to foreground Indigenous and local values without creating unintended consequences or exacerbating current equity issues, LWW proposed participatory flood governance timeline and concept mapping. Based on the amount of funding available, the scope of this work was limited to the pilot workshop and one larger-scale workshop (see Chapter 5 for details). However, this report only includes timeline mapping and LWW will publish a report on concept mapping on the project website at a later date.

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Process of integrating timeline mapping

The immediate short-term goal of the grant was to develop and facilitate participatory flood governance mapping workshops with the intended outcome of producing timeline maps of B.C. flood governance arrangements based on participant perspectives. **The Province of B.C., as a whole, is only as resilient as its communities**; therefore, the project's medium- and long-term objectives are to build a foundation for B.C. flood governance that is resilient in the face of climate change.

These medium- and long-term goals center around the desire to:

- Raise awareness of the gaps and barriers within B.C. flood governance which have been historically or are currently ignored or missed
- Demonstrate the differences in experiences across individuals, organizations, and governing bodies (whether public or private)
- Increase the ability to move towards reconciliation, especially for those who are in power
- Improve participants' abilities to coordinate around flood and water management
- Provide a foundation for actionable policy recommendations
- Increase the 'solution' space – i.e., the diversity of options to address flood and water management challenges
- Increase public awareness and ideally public capacity to engage with high uncertainty and com plex issues that may not have a definitive solution

The analysis portion that follows the workshops will be undertaken during the rest of LWW's project period (through March 2025) with LWW's own project funds. One example of a likely analytical takeaway from the timeline mapping may be the **interconnections between flooding and impacts from other risks or natural hazards**.

Participatory governance timeline mapping is one prospective tool with the promising potential to be used within integrated flood management planning. This method would be particularly useful in the first phase of setting the scope and building relationships as well as in some portions of the second phase when aiming to understand risks. Similarly, **participatory governance timeline mapping is a beneficial tool for communities faced with the potential of a managed retreat scenario due to repeated flooding, politically challenging circumstances, or future climate impacts**.

After the internal pilot and evaluations, LWW realized that many communities would likely benefit from using these or similar methods, but often have **limited access to engage in these types of activities due to limited capacity**. However, **timeline mapping is accessible** to almost anyone with facilitation know-how. Thus, in the spirit of the grant and LWW's objectives, LWW is also delivering a 'how-to' process diagram chart for participatory timeline mapping. This will serve as a starting point for any community wishing to engage with timeline mapping.

4 Methods

Adriaan Bogaard

This project used participatory flood governance timeline mapping. Timeline mapping is a method to approach difficult community challenges. Timeline mapping is based on an underlying understanding of the world as a complex place with many diverse, interacting systems which lead to non-linear responses. This is an understanding of the world based on relationships, interconnections, and the interactions that occur through these relationships and interconnections. This approach is often called **holistic thinking, systems thinking or resilience thinking**.

Benefits to using timeline mapping

Timeline mapping is highly accessible and can be done in-person, virtually, or in a hybrid manner. The mapping process can be delivered with **relatively limited facilitator training** and the participants do not need extensive training either. In addition, timeline mapping can be done in inclusive and participatory manners, such as utilizing storytelling and working in smaller groups to maintain participant comfort level. However, as with all engagement, facilitators must be respectful toward participants and thoughtful about the process to enable equitable, respectful workshops.

LWW uses participatory mapping for multiple reasons:

- To achieve LWW's objective of using equitable research approaches
- To expose participants to a diversity of perspectives and understandings of the system
- To create a space where participants are able to see different experiences other than their own
- To enable participants to see different impactful events and their legacies, as well as understand how these impacts are different for various groups
- To more easily recognize cross-scale interactions
- To witness path dependency
- To recognize past and potential future unintended consequences
- To improve long-term outcomes through the inclusion of diverse perspectives
- To discover potential shared understandings through communal experience
- To begin the process for collaboration and cooperation through communal experience

Timeline mapping can be used for other purposes for example problem identification, creating a shared understanding and developing a single agreed upon timeline to work from. LWW did not use timeline mapping for these purposes. This is an important difference with many timeline mapping exercises to date. If the purpose had been to develop a single shared understanding of the context or of the system, the processes would have been different.

Steps for timeline mapping workshops

Timeline mapping is a qualitative exercise. Participants fill in a timeline, literally, as an individual, small group, and/or large group.

The points on the timeline may be discrete events or a set of discrete events, such as the November 2021 B.C. atmospheric river events or the overtopping of a dike near Abbotsford.

The points on the map may also be processes or events that unfolded over the course of many months, years, or decades, such as the arrival of settlers, the drainage of Semá:th Xo:tsa (Sumas Lake), or the displacement of Indigenous Peoples from their coastal and riverbank settlements.

David Markwei, Intergovernmental Relations Secretariat

Finally, the dates on the map may also be the starting point of a larger social or industrial process, such as climate change or industrialization.

LWW utilized timeline mapping methods to better understand flood governance, both through a pilot exercise and then with a broader set of participants. LWW used the pilot evaluations to inform an in-person large-scale timeline mapping workshop at the Understanding Risk B.C. symposium in October 2023. In addition, there will be in-person participatory flood governance mapping workshops with a single community in 2025. Some of the preparation for these workshops was funded by this grant.

LWW is using, and the Province is funding, these particular methods because they are **accessible to communities**. LWW wants to foreground Indigenous and local perspectives; to do so, LWW must use methods that are accessible. Moreover, if the Province wants to engage with communities, the Province needs to **use methods that are accessible to communities who possess limited resources, capacities, and/or prior knowledge and training in these methods**.

Chapter 5 delves into the participatory flood governance timeline mapping exercises and includes a description of the pilot exercise, pilot evaluations, the broader workshops, and the results from these broader workshops.

5 Timeline Mapping Workshop Examples

LWW conducted two participatory flood governance timeline mapping workshops: a pilot exercise and a large-scale mapping workshop. Both the pilot and the larger timeline mapping workshop were based on the same theoretical and practical base and reasoning. Where there are differences, this report states them.

Overview

Timeline mapping enables participants to explore the longer-term context of a specific topic. Within this exploration, participants have the opportunity to see other perspectives. These include different views on what were and are impactful events and processes, as well as the legacy of those impactful events and processes.

Events may constitute management decisions, lawsuits, weather events such as a flood or rainstorm, policies, community/reserve/municipal changes, political crises, the construction of infrastructure such as a dike or dam, or anything else that impacts the specific topic. The key is that an event represents a single 'thing,' even if this 'thing' is a set of events such as the atmospheric rivers that hit B.C. in 2021 or the enactment of a series of laws during a specific session.

Processes may constitute any series of actions over time or social processes—such as colonization, industrialization, climate change, and urban development—that impact the specific topic. For processes, it is critical that whatever the actions or social processes over time may be, they have gradual, cumulative, and long-term impacts. It is important to note that an event may precipitate a process and a process may be the partial cause of some events. Processes and events are often interrelated.

In this project, LWW focused on events and processes that impacted flood governance in B.C. starting in 1820, or earlier if desired, and running through to 2023, or longer if desired. This time frame is not a given. The timeframe on a timeline mapping exercise may be much shorter or longer, depending on the goal and participants of the mapping exercise. In this project, one of the goals was to hear and see diverse perspectives; as a result, LWW left the timeframe open to participant interpretation. The results can be seen on the static timeline on pages 16-17 where some participants included time immemorial and events prior to the arrival of European settlers, while others included specific forthcoming flood management approaches, such as at the Iona Wastewater treatment plant in 2041.

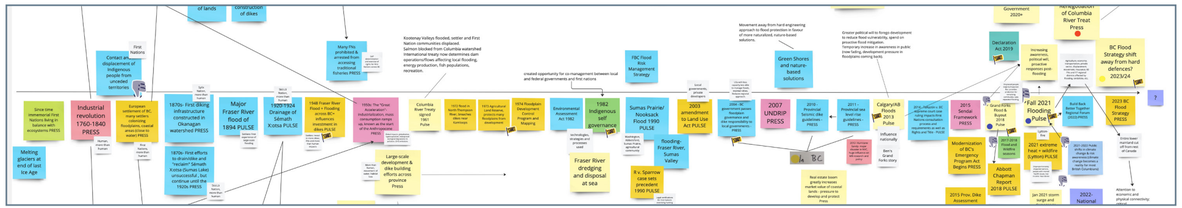
Events and processes are only the start. Timeline mapping also includes consideration of:

- Who was affected? Who was most impacted?
- Were these impacts positive or negative?
- At what scale were the events, processes and impacts? (e.g., local, international)
- Were these impacts minor or severe?
- What types of impacts did the event or process have on people?
- Are there actors who are more regularly or severely impacted over time?

These pieces of information are foundational for understanding people's perspectives, hearing other's experiences, recognizing cross-scale interactions and path dependency, and building a foundation for collaboration.

Due to the goals of the timeline mapping exercise (see Chapter 4), LWW did not attempt to map all relevant events and processes. Instead, LWW sought to elicit the participant's own experiences with, and perceptions of, flood governance. LWW did ask the participants to differentiate between local/B.C. scale and national/international scale. As a result, the static timeline and interactive timeline linked in this report are not comprehensive timelines of all flood governance and flood events in the entirety of B.C. history. Instead, these are compilations of participants' experiences and perceptions which can then be used as a template.

Pilot Workshop



Set-up of workshop

The pilot took place during the LWW yearly hybrid workshop May 10-12, 2023 and had 25 participants composed of LWW project and advisory group members. The workshop consisted of three hours and fifteen minutes of individual, small-group, and large-group timeline mapping. Individuals were divided into groups of three to five members.

Steps taken

After an introduction to timeline mapping, the first exercise consisted of individual timeline mapping. Each individual participant developed their own flood governance timeline based on their own experiences and perspectives. Next, each individual described their map, reasoning, experiences, and perspectives to others within their small group. In particular, the facilitator asked participants to share their understandings of who they thought was most impacted and in what ways. Those listening were encouraged to ask clarifying questions, but the primary focus at this stage was on listening and understanding. Finally, all participants gathered together into one large group. The goal was to form a single large timeline that was compiled using all of the individual timelines and the insights gleaned from the small group discussions.

Key takeaways and lessons learned

The participants considered the individual and small group timeline mapping portions of the workshop to be highly useful. All the participants came from Living with Water with the same values and same decolonization process. Despite this similar foundation individual perceptions and understandings of flood governance varied greatly. This surprised many people and sparked lively conversations about what was needed and could be done to strengthen flood resilience in B.C. One downside was experienced in the virtual environment where participants felt separated from one another, making discussion more challenging to engage in. Finally, people reported that they felt comfortable engaging with timeline mapping in comparison to other methods that LWW experimented with.

A key learning curve of the pilot exercise was the realization that the **large-group mapping process was not successful**. The conversations around the large-group mapping process were insightful with small groups engaging in discussion around the map that was displayed on the wall. However, the actual mapping itself did not deliver any new insights or enable participants to hear one another. These evaluations were carried into the design of the large-scale workshop.

Considerations for future use

It is important to remember that LWW did not aim to develop a single shared understanding. However, if a community or group wishes to develop a single shared understanding it would be possible. A well-trained facilitator could manage this process of forming the large-group integrated timeline map which would avoid the issues which LWW encountered.

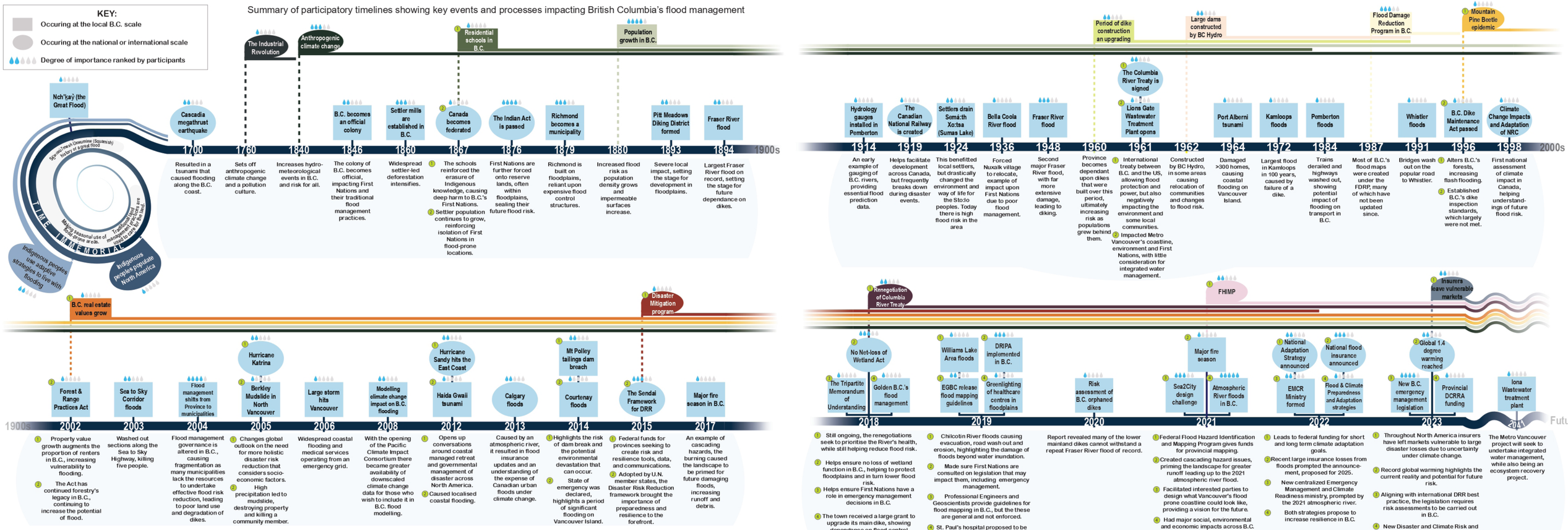
For those seeking to engage in timeline mapping, the following key considerations should be explored in the design and implementation of the exercise:

- Scope of system: Identify the specific issue of focus (e.g., flood governance in a watershed, development of a neighborhood, transportation infrastructure in a municipality), depending on the goal of the mapping exercise and the context.
- Scale of analysis: Identify the primary spatial (e.g., local, provincial) and temporal (e.g., since time immemorial, 1820s onward, a timeperiod of 40 years) scales of focus, depending on the goal of the mapping exercise and the context.
- Diversity of perspectives: There is no set answer of who to include in the exercise, as this depends on the goals and context of the session; however, it is recommended that organizers seek to include a diversity of perspectives and lived and professional experiences whenever feasible for the best results.
- Facilitation capacity: There is no set answer of how many participants to include in the exercise; however, it is important to ensure that there is an adequate ratio of facilitators to participants.
- In-person logistics: Organizers should ensure that there is adequate space in the venue to spread groups out and minimize noise distractions when facilitating an in-person workshop.
- Online logistics: Organizers should ensure that additional time is given to familiarize participants with any online platforms and tools that are being used for the exercise.

See Table 2 for more facilitation information.

Vanessa Lueck, PICS

Maggie Low, University of British Columbia



Created by Charlotte Milne, University of British Columbia

Large-scale flood governance timeline mapping workshop — Understanding Risk B.C. symposium

Adriaan Bogaard

Set-up of workshop

The large-scale timeline mapping workshop took place during the 2023 Understanding Risk B.C. symposium in Vancouver, B.C. on October 12, 2023 and was open to any participant of the conference who signed the consent form. There were two timeline mapping workshops held during this event. The first was flood governance which this report covers. Aligning with the symposium's multi-hazard focus, the second timeline mapping workshop covered seismic, wildfire, extreme heat, and drought risks. These timeline maps will be finished sometime in 2025. In total, there were 70 participants for the flood governance exercise. Participants were spread out across five long tables, each of which had a large paper timeline running down the middle of it.
Each workshop was 50 minutes long.

Steps taken

First, LWW asked participants to individually write down events and processes on post-it notes while sitting in their respective seats. Each post-it note had one event or process. Next, LWW asked the participants to move around the table and place their post-it notes in chronological order on the physical timeline with the other participants, discussing where each post-it note should go and if similar events or processes were indeed the same or not. Then LWW asked each participant to choose what they perceived as the five most important events and/or processes. Participants identified their choices with a sticker and discussed their thought processes with the other participants at the table.

Finally, LWW asked participants to reflect on three to five of their chosen events either alone or in discussion with others. LWW asked participants to write down these reflections on the timeline on large post-it notes or to articulate their reflections by speaking into a recorder which was present at each table. The reflections were to include a description of the event, who initiated the event/process, and who was affected/impacted, whether positively or negatively, and to what degree of severity. The leading questions were:

- Has trying to manage one event created or changed other events, processes and/or risks? Which ones? What happened?
- Who has been repeatedly most impacted by events/processes? Positively or negatively? Can you explain why?

Key takeaways and lessons learned

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Participants reacted positively with many enthusiastic comments to the facilitators. However, both facilitators and participants thought there should have been more time for participants to discuss and, in particular, to reflect. However, due to the symposium's full schedule, the timeline mapping exercise was adapted to a shorter version. One participant suggested sending out the prompt questions beforehand if a similar exercise were to be held in a conference setting again due to the time constraints. Afterwards, the facilitators concluded that although this was a successful workshop with a plethora of excellent data gathered, the participatory flood governance timeline mapping really needed to happen at a local scale to achieve full benefits for communities. Nevertheless, there were many fruitful discussions that arose both during and after the exercise.

Considerations for future use

LWW welcomes communities to use the timeline maps that LWW has produced from participant perceptions and understandings as templates for their own mapping process. One of the most lengthy processes in timeline mapping is generating the first set of events and processes. With a template already "filled-in," the community would be able to focus on local community events—whether administrative, lawsuits, physical events, cultural, spiritual, or otherwise—which need to be included on the timeline to make the map locally relevant. In addition, the community would already have many, but not all, of the provincial, national, and international events and processes which in turn influence local contexts. Finally, many communities possess limited resources, whether that may be time, staff capacity, or finances. The template could serve as a means to enable a single facilitator or local facilitators to conduct this type of workshop, rather than having to bring in more expensive consultants.

It should be noted that these timeline maps can act as a starting template only. This is because **1) every community possesses their own unique lived experiences and local knowledges**, and **2)** this template and interactive timeline only represent two ways of viewing and experiencing time. There are also non-linear manners of experiencing time which are not represented in these templates. LWW aims to provide other non-linear time "line" maps on the project's website in late 2024 or early 2025. As such, communities should adapt these methods to best suit their own place-based, hazard-specific realities and local social and cultural contexts.

Both the static and interactive flood governance timeline maps will be available on the LWW website at livingwithwater.ca. Anyone is welcome to use them as a template or to work on a timeline map which covers all of flood governance events or focuses on a specific time period. LWW only asks that you:

- Do not use it for any commercial purposes and
- Explain how you have changed and/or modified it and
- Acknowledge us for this use, using the citation above and
- Share your work back with us, either to the project's principal investigator, Kees Lokman or through PICS (picscomm@uvic.ca); **for cultural or other mapping that needs to remain with in the community** please let the project's principal investigator or PICS know that you have used this information
- If appropriate make it openly available to others using this same licence

6 Social Acceptance

One of the challenges of flood governance is garnering social acceptance for approaches which are not traditional hard gray infrastructure (e.g., dikes, sea walls, control dams), whether that is engaging with managed retreat, adopting nature-based solutions, or changing entire paradigms. LWW views this aspect—social acceptance—as a crucial element in the successful adaptation of flood risk management and governance systems to meet dynamic climate change realities. Therefore, LWW has several other goals and sub-projects which lay the foundation for the social acceptance of adaptive flood governance approaches within B.C.

1. This project received an extension for use of funds. These funds supplemented the planning of three in-person participatory flood governance mapping workshops with a local community who is a member of the LWW project.

2. This project provides a foundation for necessary work in the area of flood governance. One of the LWW PhD students, who is working on addressing watershed governance challenges, is already using both pilots and workshops to inform their research design and project. Moving toward watershed level planning and risk governance provides the holistic approach preferred by LWW.

3. A LWW Master's student will be pushing social acceptance of managed retreat with her PhD. She is focusing on proactive managed retreat as a potentially equitable, transformative climate adaptation strategy which can provide multi-benefits when done properly.

4. Templates for flood governance timeline and concept mapping will be available as a "starting" point for communities to give context for their own specific place-based and context specific issues. Using timeline mapping as an example, a rural community would be able to adapt the timeline template and fill-in their own experiences during the 2021 atmospheric river events along with the relevant local decisions that occurred within the preceding 40 years. A community which desires to be physically accessible for all could add in events and processes that contribute to accessibility challenges during flood events, as well as the regulations or actions that have influenced these choices. A First Nations community may want to develop a timeline for all territories that includes Supreme Court legal decisions since European settlers arrived, while a specific portion of a reserve which borders on a river may choose to focus on events and processes surrounding a particular dike.

5. In addition to flood governance mapping, LWW also facilitated timeline mapping for four other risks: wildfire, drought, extreme heat, and seismic. In particular, LWW asked participants to start making the connections between flood risk and these four risks. These timeline maps will be made publicly available within the next year, with the timing and location dependant on funding.

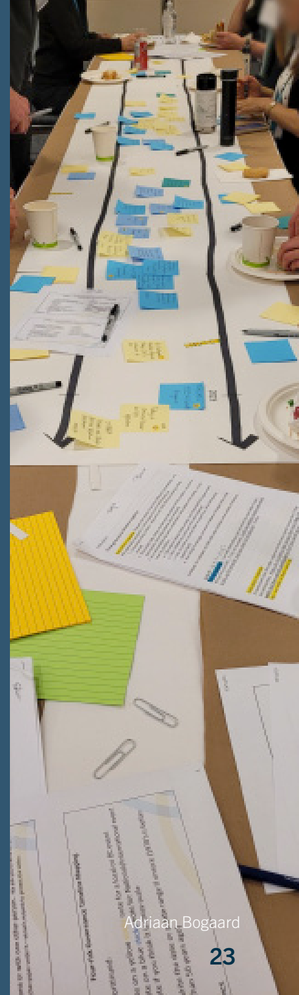
6. Finally, the LWW team aims to empower communities, governmental or business departments, companies, and groups to rise to the challenge of (1) including other ways of knowing, (2) recognizing how social beliefs impact our governance, (3) recognizing diversity within what appear to be homogenous communities, and especially, (4) fostering collaboration in highly political and often painful processes, such as within flood mitigation, recovery, management and preparation. Thus, LWW has compiled a simplified 'how-to' step-by-step document that serves as a template, which eventually will be accessible on the LWW website. At this time, it is depicted as a diagram in Appendix 1. Other more detailed facilitation guides are available.

Adriaan Bogaard

Conclusion

LWW theme project represents a robust, multi-year initiative funded by PICS, designed to foster resilient flood governance in B.C. by integrating values-based approaches and promoting inclusive, multi-level governance structures. This report highlights the importance of participatory flood governance timeline mapping as a central method to recognize the complexity of systems and interactions involved in flood management. Through the facilitated workshops, participants engaged with diverse perspectives, leading to enriched dialogues on flood resilience.

While the workshops yielded valuable data and insights, the findings emphasized that for greater impact, participatory flood governance must occur at the local level. As a result, LWW developed interactive and static timelines, enabling communities to continue exploring flood governance in an accessible and inclusive manner. The accompanying "how-to" resource serves as a tool for further timeline mapping engagement, supporting long-term resilience planning across B.C.



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End Notes

1. In addition, the Province of B.C. is developing several other strategies, programs and initiatives which are related. These include the Watershed Security Strategy, the Climate Preparedness and Adaptation Strategy implementation, which includes provincial flood hazard mapping, the B.C. First Nations Climate Strategy and Action Plan, the B.C. First Nations Regional Action Plan for Disaster Risk Reduction, B.C.'s Emergency and Disaster Management Act statute and regulations, the B.C. Coastal Marine Strategy, the B.C. Biodiversity and Ecosystem Health Framework, provincial and regional Disaster and Climate Risk and Resilience Assessments, and provincial and regional Disaster and Climate Risk Reduction Plans. More information about these initiatives can be found at https://climatereadybc.gov.bc.ca/.
2. Examples of excellent studies examining B.C. flood governance:

   Brandes, O.M., O'Riordan, J., O'Riordan, T., & Brandes, L. (2014, January). A blueprint for watershed governance in British Columbia. POLIS Project on Ecological Governance, University of Victoria.

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   Fraser Basin Council (2023). Pathways to Action for Flood Risk Reduction and Resilience. Prepared as part of the Lower Mainland Flood Management Strategy (LMFMS) Initiative. https://www.fraserbasin.bc.ca/_Library/Water_Flood_Strategy/Pathways_to_Action_Summer_2023.pdf

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   Ishaq, S., Nahiduzzaman, K., Sultana, S., Rana, A., Mohammadiun, S., Yousefi, P., Hewage, K., & Sadiq, R. (2023). Flood-resilient governance in Okanagan valley of British Columbia: current practices and future directives. Environmental Reviews 31(2): 327-347.

   Lower Frasin Basin Council (2022). Building Back Better, Together. Actions towards integrated flood recovery in British Columbia. https://www.ourcommons.ca/Content/Committee/441/FOPO/Brief/BR11659788/br-external/Jointly1-e.pdf

   McElroy, J. (2021). Flood management in B.C. is left up to municipalities. Should it be? CBC. Nov.24th, 2021. https://www.cbc.ca/news/canada/british-columbia/flood-management-province-bc-jurisdiction-1.6261541

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   Yumagulova, L. (2018). Towards urban and regional resilience: A case study of Metro Vancouver region, Canada (Doctoral dissertation, University of British Columbia).

3. Living With Water case studies:

   Bohnert, S., Doberstein, B., (2022) Enhancing the acceptability of buyouts for climate change adaptation: Exploring a social license approach for Erie Shore Drive, Ontario. ICLR. https://www.researchgate.net/publication/356674127_Enhancing_the_Acceptability_of_Buyouts_for_Climate_Change_Adaptation_Exploring_a_Social_License_Approach_for_Erie_Shore_Drive_Ontario

   Jones, D. (2023). Growing pains: Overcoming barriers to nature-based coastal adaptation projects through collaboration. https://uwspace.uwaterloo.ca/items/a0549b75-7eb1-4a4a-8782-989691d8c319

   Jones, D., Doyon, A., Doberstein, B., Burch, S., (2024). Understanding Actors' Collaborative Roles in a Nature-Based Coastal Adaptation Project: The Boundary Bay Living Dike in Surrey, Bc. Available at SSRN: https://ssrn.com/abstract=4952719 or http://dx.doi.org/10.2139/ssrn.4952719

   Watterodt, F., Doberstein, B., (2023). The post-disaster window: The 2021 British Columbia atmospheric rivers phenomenon as a focusing event for policy change. ICLR. https://www.iclr.org/wp-content/uploads/2023/05/Watterodt-Doberstein-2023-ICLR-Summary-2-pager.pdf

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Oulahen, G., & Ventura, J. (2023). Planning use values or values-based planning? "Rolling with" neoliberal flood risk governance in Vancouver, Canada. Environment and Planning E: Nature and Space 6 (4): 2700-2720.

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Table 1. Example prompts and reflection questions for participatory workshops.

Please note these prompts and questions are suggestions and should be adjusted to suit your workshop topic and should be re-written to match your desired goals. In these examples 'XYZ' stands for whatever topic it is that you are making the timeline map for (e.g. flood governance in a watershed, development of a neighborhood, transportation infrastructure in a municipality).

Example Prompts for Each Step of the Workshop	
Step Number	Prompts:
1.1 Identification of events and processes	"As you write events and processes down onto your sticky notes consider: What events have influenced XYZ in the past? • Are there any ongoing processes that are impacting XYZ? • What events or processes represent a concern or impacting factor, including potential future events and processes?"
1.2 Group placement of events and processes along a timeline	"As you place your sticky notes chronologically along the timeline, discuss with your group members: • Are the events and processes you are putting down the same or different? • Why do you think you chose different events/processes? • If there are any repeated events/processes, were there any differences between how you wrote these down and what dates you assigned?"
1.3 Noting down the impacts of different events and processes	"As you write down the impacts of each sticky note please consider: • How have your identified events and processes impacted XYZ? • Have any of the events and processes fundamentally altered XYZ? • As you consider different impacts, have they been positive or negative or something in between? • As you consider different impacts, how severe were they? • Who initiated the event or process? • Who was most impacted by a certain event or process? • Is there any one or any group that has been repeatedly impacted by events and/or processes on the timeline?"
1.5 Ranking of the importance of different event/ processes	"As you identify the events and processes you consider to be important, consider these questions: • Which events and processes have had the greatest impact upon XYZ? • Which events and processes are responsible for any of the major issues you think exist in respect to XYZ? • Which events and processes have helped XYZ reach its current state?"

Table 1. continued

Reflection Questions for the End of the Workshop	
Step Number:	Prompts:
1.6 Reflecting on the final time-line	"Take some time to reflect on the timeline now, you can discuss this with the group or write down answers yourself: • Do you see any relationships between events? processes? What are the relationships? • Has trying to manage one event or process created or changed other events, processes and/or risks? Which ones? What happened? • Who has been repeatedly most impacted by events/processes? Positively or negatively? Can you explain why?"

Table 2. Things to Consider

Set-up

- If your workshop is in person, make sure you have the correct table configuration to meet your goals.
- Prepare the paper/ online boards ahead of time. For groups draw the timeline line so it is easier for participants to place their sticky notes directly onto it. For individual timelines, ask the participants to draw their own line.
- Make sure there are lots of pens and sticky notes of the required colours.
- Attempt to organise groups based on the goals of your timeline mapping exercise.
- If you have multiple groups, try to create enough space between them to ensure any audio recordings are clear.
- Prep all facilitators so everyone is on the same page and is aware of their role.

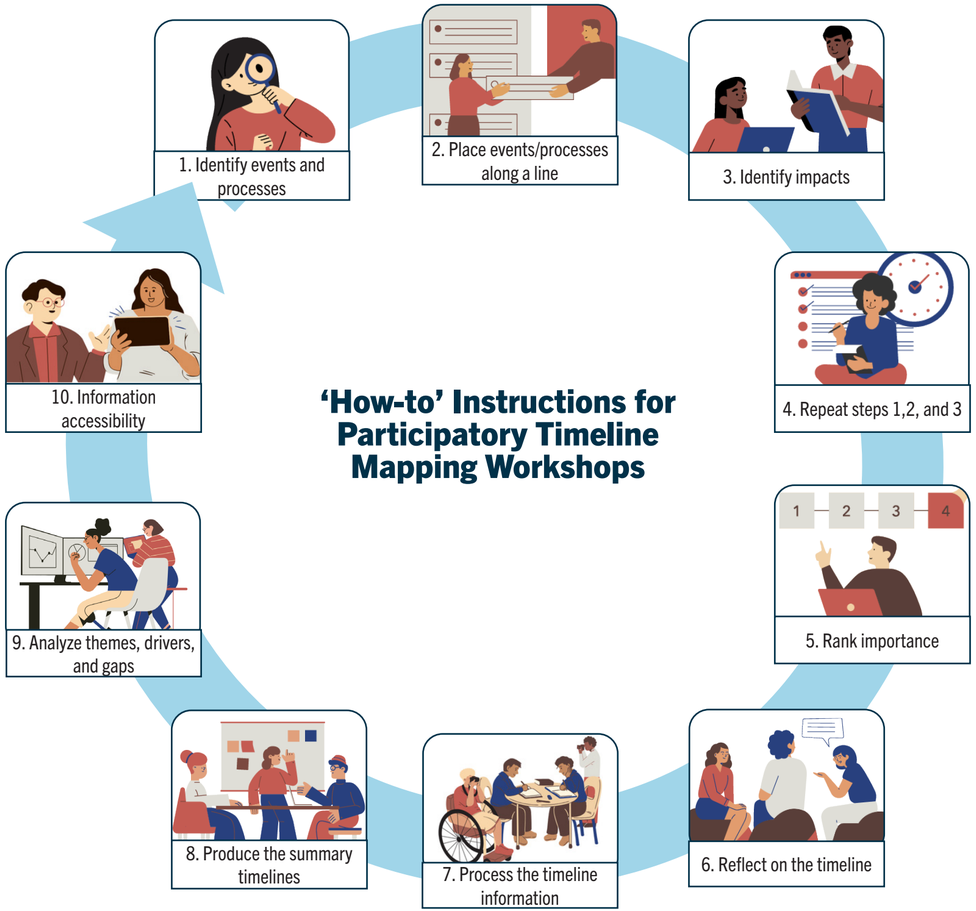
Facilitation

- Try to keep all prompts and questions the same between facilitators to avoid issues surrounding 'leading questions'.
- Participants will likely ask for examples, try to offer examples that are not directly on the topic of interest to the workshop, to avoid influencing their thinking.
- Focus on clearly distinguishing the different steps of the workshop, this will help keep participants to time.
- Have a dedicated timekeeper who can issue time warnings throughout.
- Try to keep the conversation going during the steps that require it. If participants are hesitant or shy, try directly asking each participant different questions, and use encouraging prompts (e.g., 'could you tell me more about that?') where deemed necessary.
- Reassure participants that their unique knowledge, experiences, and opinions are important and exactly what is of interest, discourage perfectionism or uniformity.
- While side-discussions can introduce useful and important ideas, wherever necessary guide participants back to the current step.

Data and Analysis

- Consider where your data is being stored, make sure all analyst team members can access it and are familiar with the template. If oral histories or other forms of sensitive data were recorded you may wish to speak to participants about the storage of this data or chose to only keep the raw data for a brief period of time. In particular, because some stories should not be shared outside of the community, find a secure manner to store this data.
- Create a team of multiple analysts to work on the transcription and analysis of the data to lessen the risk of interpretation bias.
- Summarise your transcribed data in a separate area/ spreadsheet, ensuring you keep a copy of all original data to refer back to when needed.
- Consider what the best final output format is. If the timeline maps are forming a part of a report, a static figure may be best. If you wish to share results quickly with participants and community members, an online summary of the workshops may work best.

Appendix 1 - ‘How-to’ Instructions



1.

- Explain the whole process to participants
- Ask each participant to identify important events (e.g., a specific disaster, law or community loss) and processes (e.g., ongoing climate change)
- Encourage participants to write an exact date when known, otherwise the approximate decade/timing
- If you wish participants to identify different scales (e.g., local neighborhood, Canada-wide) in their events/processes, ask participants to use different colored sticky notes to identity these scales

2.

- Ask participants to place their sticky notes along the previously drawn line, working alone, in small groups or in a large group to organize the event/processes chronologically
- Wherever there is a double up of a certain event/process ask participants to group these together
- Depending on the goal of the exercise you may need a facilitator to ensure that all voices are heard and on the map
- Make sure to encourage discussion at this stage. If appropriate use note-takers and audio recorders to capture information

3.

- For each sticky note, ask particiapnts to identify the impacts the event/process has had on the topic of interest in your workshop (e.g., flood management)
- Participants can either write on the note itself or on the paper surrounding it

4.

- Ask participants to consider any gaps they might now see on the timeline, and to add, move or remove any sticky notes where they feel it is needed
- Ask participants to continue to identify impacts, and to try and note these for every single event/process on the timeline
- If necessary, ask participants to explain certain events/processes and impact relationships. Record their responses for added detail

5.

- Give each participant a limited number (e.g., 3-5) of ‘importance’ markers, these could be stickers or emojis if working online. The number will vary by group size and goals
- Instruct participants to place a sticker on the events/processes that they believe have the greatest importance relative to the topic of the workshop
- What is important will depend on the goals of the workshop

6.

- Use a series of prompts (see examples in Table 1) to help facilitate a reflection discussion. In addition, participants can write on new large sticky notes, or onto the paper directly

7.

- Store all sections of completed timelines. Make back-up copies either with photographs or digital copies if online
- Go through the timeline photos and copy all data over into a table or spreadsheet to allow for easy sorting and analysis
- Depending on the goal of the exercise you may need to verify the dates given by participants
- For the reflection notes, record this information separately
- Record the number of ‘importance markers’ participants gave each event/process
- In the same table or spreadhseet, correlate any audio recording statements and facilitator notes to their relevant event/process

8.

- If summarizing timelines, this should be done by a team (minimum of two) of analysts to ensure interpretations and exclusions are not influenced by the opinions of only one person
- In the summary timeline(s) you may wish to include everything that was captured during the workshop, however, if a larger group was involved, with lots of repetition and diverse interests this may not be possible
- You may choose to summarize into multiple timelines, split by time period, scale, or chosen themes, this is up to you and what outputs would best suit the goals of your project
- If there are events/processes recorded that feel inappropriate for inclusion (either due to being off topic or perhaps insensitive), these can be exlcuded, but this should be discussed between the team of analysts and should be justified, as unexpected events/process may be exactly what needs to be captured
- For any events where impact notes have been missed, the analyst team may wish to research the event/process and supplement the information if required
- Your final timelines may be a static figure or an interactive online timeline

9.

- Using the summarized timelines, along with recorded information, assess the timelines for repeating themes, patterns, drives, gaps and any other information that you need for your goals
- Pay close attention to areas where there are high numbers of ‘importance markers’
- Use the responses to the reflection discussion to also help identify areas of importance

10.

- Provide digital or physical access, ownership or ability to use the timeline. Another option is to simply give the timeline to the community
- The appropriate access, ownership or use should be discussed before the entire process begins

Appendix 2 - Timeline mapping tools and resources

This is not a comprehensive list of tools and resources. For those wishing to make a timeline map, we encourage folks to further look at other tools available.

Interactive timeline platform: https://www.timetoast.com/
Interactive timeline platform: https://timeline.knightlab.com/
Interactive timeline platform: https://www.cs.ubc.ca/group/infovis/software/TimeLineCurator/
Interactive timeline platform: https://www.tiki-toki.com/

Interactive timeline resource: https://flourish.studio/ (PAID)

Digital timeline maker: https://www.preceden.com/ (PAID)
Digital timeline maker: https://www.smartdraw.com/timeline/timeline-maker.htm (PAID)
Digital timeline maker: https://www.visme.co/timeline-maker/ (PAID)

Examples of timeline maps
https://www.sutori.com/en/story/timeline-of-events-and-processes-that-have-impacted-flood-management-in-british--HGDQySJVU9kq6h-dAqccbeSeJ

http://education.historicacanada.ca/files/426/Key_Moments_in_Indigenous_History_Timeline.pdf
https://www.tiki-toki.com/timeline/entry/1852004/Colonization-Road-Ontario-A-Timeline/#vars!date=0051_BC-04-30_00:25:56!

Appendix 3 - Academic examples of timeline mapping

This is not an exhaustive list of academic examples of timeline mapping. We encourage folks to continue looking at academic examples from diverse disciplines to further understand the diverse ways timeline mapping can be utilized and understood.

Canadian Contexts
Dion, S. D. (2022). Braided Learning : Illuminating Indigenous Presence through Art and Story : [book supplement] [O]. doi:http://dx.doi.org/10.14288/1.0407066
Link to watch her "Historical timeline lesson" : https://open.library.ubc.ca/cIRcle/collections/ubcpress/641/items/1.0407066

Gagnon, J., Desbiens, C., & Kanapé, É. (2021). " Where You Have to Bypass": History, Memory, and Multiple Temporalities of Innu Cultural Landscapes. The American Indian Quarterly, 45(4), 361-399.

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Vilá, O., Finnis, J., Koitnurm, M., Stoddart, M. C., & Sarkar, A. (2022). Climate Autobiography Timeline: Adapting Timeline Research Methods to the Study of Climate Perceptions. Weather, Climate, and Society, 14(3), 893-904.

International Contexts

Belisle-Toler, R., Hodbod, J., & Wentworth, C. (2021). A mixed methods approach to exploring values that inform desirable food-systems futures. Sustainability: Science, Practice and Policy, 17(1), 362-376.

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Jackson, K. F. (2013). Participatory diagramming in social work research: Utilizing visual timelines to interpret the complexities of the lived multiracial experience. Qualitative social work, 12(4), 414-432.

Kolar, K., Ahmad, F., Chan, L., & Erickson, P. G. (2015). Timeline mapping in qualitative interviews: A study of resilience with marginalized groups. International journal of qualitative methods, 14(3), 13-32.

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Mackenzie, K., Pirker, J., & Reitsma, F. (2020). Towards a spatiotemporal data model for traditional ecological knowledge/Indigenous knowledge. Cartographica: The International Journal for Geographic Information and Geovisualization, 55(1), 29-41.

Manathunga, C., Qi, J., Bunda, T., & Singh, M. (2021). Time mapping: charting transcultural and First Nations histories and geographies in doctoral education. Discourse: studies in the cultural politics of Education, 42(2), 215-233.

Morrison, T. H. (2017). Evolving polycentric governance of the Great Barrier Reef. Proceedings of the National Academy of Sciences, 114(15), E3013-E3021.

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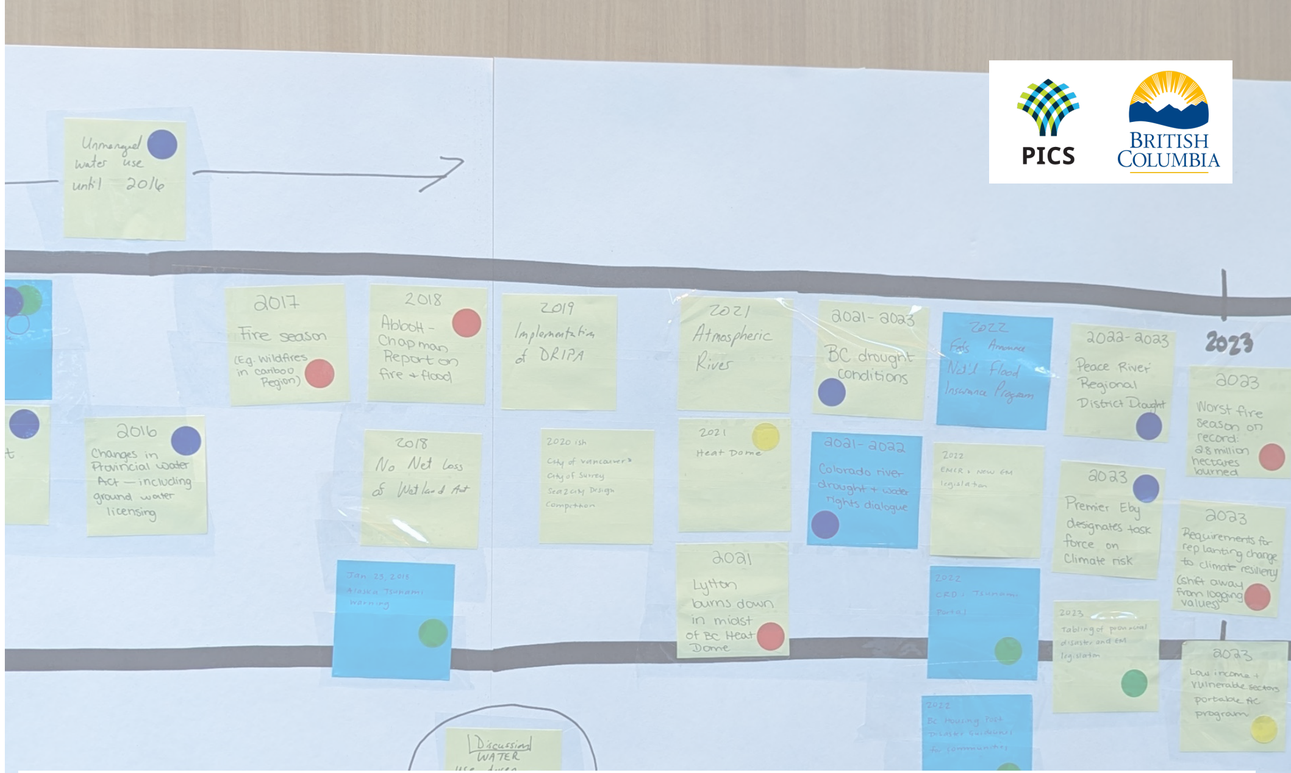

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