WORKSHOP SUMMARY

Empowering Communities:
Extreme Heat Mapping Workshop & Knowledge Exchange

January 24, 2024

Prepared by the Fraser Basin Council

Fraser Basin Council

BRITISH COLUMBIA

Ministry of Emergency Management and Climate Readiness

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WORKSHOP SUMMARY REPORT

Workshop Background

Through the Climate Preparedness and Adaptation Strategy (CPAS), the Province of BC is working to support communities to plan for current and future extreme heat events. Under CPAS, the Community Emergency Preparedness Fund (CEPF) was revised in 2022 to include funding for communities to undertake extreme heat mapping. This work provides the foundation for policy and program development and for the implementation of measures to enhance community-level resilience.

In BC, extreme heat mapping is a relatively new practice, and there are currently no set standards or guidelines for undertaking extreme heat hazard mapping. As a response, the *Developing Best Practices and Guidance for Extreme Heat Mapping* project was launched in April 2023, led by the Fraser Basin Council (FBC) and supported by the Ministry of Emergency Management and Climate Readiness (EMCR) and GeoBC. This project is developing a public guidance framework and best practices case study report for extreme heat mapping and aims to enhance collaboration and peer learning between communities, public sector organizations, and other key actors in this field. The framework and best practices case study report will be available on ClimateReadyBC, the Province's one-stop platform where First Nations and local governments can find a diverse range of materials related to disaster and climate risk reduction and resilience in their communities.

On January 24, 2024, FBC hosted the *Extreme Heat Mapping Workshop and Knowledge Exchange* in Vancouver, with facilitation support from EMCR and GeoBC. The workshop convened 52 participants representing a wide array of entities, including technical representatives from First Nations and local governments, mapping consultants, emergency management and climate adaptation experts, public health professionals, and academics and researchers.

We acknowledge, with gratitude and respect, that the Extreme Heat Mapping Workshop & Knowledge Exchange took place on the unceded and ancestral territories of the xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), and səlilwətaɬ (Tsleil-Waututh) Nations. We recognize and honor the enduring presence and stewardship of these Nations over these lands for Millennia. We express our gratitude for the opportunity to convene on this land and commit ourselves to ongoing learning, collaboration, and reconciliation with First Nation communities.

The key **workshop objectives** were to:

1. Share stories and lessons learned from various community approaches to heat mapping.
2. Gather input from key actors for an Extreme Heat Mapping Guidance Framework.
3. Present findings from case study research of best practices from around BC and the globe.
4. Provide space for peer learning and networking.

This report serves as a comprehensive summary, encapsulating the presentations, discussions, and insights gained during the workshop.

Presentations

Panel 1: What goes into a heat map? A closer look at the process.
The first presentation shared stories on how North Shore Emergency Management and səlilwətaɬ (Tsleil-Waututh Nation) are growing their relationship and building the trust needed to develop extreme heat maps and adapt to B.C.'s changing climate in partnership. The Capital Regional District then shared their approach for developing their extreme heat map portal. Both presentations focused on what they learned from their process. Key themes emerged on the importance of meaningful partnerships, cultural safety, community collaboration, accessibility, and the use of holistic data.

North Shore Emergency Management and səlilwətaɬ (Tsleil-Waututh Nation)
***Speakers: Emily Dicken – Director, NSEM | Andrew Van Eden – Community Safety Manager,* Tsleil-Waututh Nation**

Key Theme: Meaningful Partnerships

- NSEM's partnerships with Sḵwx̱wú7mesh Úxwumixw (Squamish Nation) and Tsleil-Waututh Nation proved instrumental in project success, with a consolidated approach facilitating Tsleil-Waututh's participation despite capacity constraints. Squamish provided valuable in-kind support to the project.
- Squamish Nation's reserve lands are located in two different areas, making it difficult to fit within the parameters of the funding application process. These historical colonial impacts, combined with the UBCM funding program's structure, restricted Squamish's ability to apply as a funding partner. This highlights the ongoing impacts of colonization on First Nations, as well as the need for flexibility and adaptability in contemporary funding mechanisms to foster genuine collaboration and partnership between First Nations and government entities.
- The foundation of trust established through deep, foundational work paved the way for open dialogue and course corrections when necessary, emphasizing the importance of moving at the "speed of trust." For example, the safe space between partners made it possible for Tsleil-Waututh to speak up about their process concerns, leading to a pause and rework of the project structure when it was not serving the communities in a meaningful way.

Key Theme: Cultural Safety

- Traditional approaches employed by mapping consultants often fell short in fostering inclusive participation, with Tsleil-Waututh Nation expressing concerns over short timelines and a lack of mutual conversations that hindered their engagement.
- The value of *UBCM's Cultural Safety and Humility Grant* was underscored, emphasizing the prioritization of cultural safety training for consultants engaged in projects with First Nation communities.
- Statistical data sourced from entities like Statistics Canada often overlooked the nuanced realities of First Nation communities, underscoring the need for culturally sensitive methodologies like Story Mapping to capture the resilience embedded within their cultures. For example, Tsleil-Waututh Nation's 300 on-reserve members and 3000 lease holders are considered the same population by Statistics Canada, so indicators of vulnerability and income become skewed.

Capital Regional District
Speaker: Tara Stott – Climate Action Coordinator, Environmental Protection
Presentation slides

Key Theme: Community Collaboration & Accessibility

- CRD secured $150,000 in funding to support the project's objectives, thanks to a joint application with several communities in the region.
- Furthermore, a collaboration with Island Health allowed them to include health data in their analysis as well as validate the accuracy of their results using mortality and hospitalization data, ensuring the reliability of the heat mapping outcomes.
- An interactive Regional Heat Map was developed, and a story map is in development, allowing public exploration of heat vulnerability indices and the narrative of extreme heat risk. This choice promotes transparency and accessibility of information for community members and other key partners.

Key Theme: Holistic Data

- CRD developed three comprehensive indices to assess extreme heat vulnerability in the region, focusing on different aspects of vulnerability:
    - Locations of Extreme Heat: analyzed land-based surface temperature, air temperature, and heat exposure predictions to identify areas prone to extreme heat.
    - Demographic Vulnerability: utilized an analytical hierarchy process to identify and prioritize 50 sociodemographic determinants, reflecting a holistic approach to understanding vulnerability.
    - Building Vulnerability: considered a range of factors such as building height, solar reach, reflectivity, age, and presence of heat pumps to assess building vulnerability to extreme heat. Using Technical Safety BC's installation records, a subset of heat pump data was included, although probability cooling data was not able to be obtained from BC Hydro.
- Additional data, such as schizophrenia and indoor air temperature, would enhance future iterations of the heat map.
- An important gap identified was that First Nations did not have the same demographic data and building information to include in the map for on reserve.

Panel 2: How can we use our heat maps?
In this panel session, we showcased two unique approaches that the Township of Langley and the City of Nanaimo took for their extreme heat mapping projects. Langley used their heat maps and community engagement process to inform their Cool Park Guidelines, recognizing the significance of park spaces being a cool refuge during extreme heat events and helping to cool the surrounding neighbourhood. Nanaimo took a broader approach to their heat map, examining the social conditions of heat risk and used a spatial approach to identify neighbourhoods at higher risk and potential locations for connecting with priority groups.

Township of Langley
Speakers: Sarah Maleska – Sustainability Programs Specialist | Jacqueline Lowe – Project Manager, Parks, Design & Development
Presentation slides

Key Theme: Leveraging Parks for Community Resilience

- Langley's project focused on utilizing parks as key resources for reducing extreme heat effects and providing a cool refuge for many residents during heat waves, selecting six parks across diverse neighborhoods.
- The assessment included analyzing the availability of shade and other cooling features (i.e., water fountains, misters, etc.), considering the materials of play structures, and addressing heat in sports fields and spectator areas.
- Parks were identified as an equitable resource for social connection and dissemination of information during heat events, emphasizing their role in community resilience. For example, most people who passed away during the 2021 heat dome were isolated, so they found that creating spaces for social connection is essential to addressing extreme heat.

Key Theme: Inclusivity

- Langley's approach involved extensive community engagement via in-person surveys to inform their Cool Park Guidelines, ensuring inclusivity and responsiveness to community needs.
- They considered factors such as age, health conditions, income levels, and languages, to name a few, to cater to the needs of various demographics and neighborhoods.

City of Nanaimo
Speaker: Christy Wood – Manager of Social Planning
Presentation slides

Key Theme: Social Equity

- Nanaimo's project aimed to address social inequities in heat risk by mapping neighborhoods disproportionately affected by extreme heat. For example, community members reported barriers to support such as: perceptions of trust and safety, discrimination in accessing public spaces, tenant-landlord-strata relationships, public transit safety perceptions, feeling uncomfortable outside their homes, and financial barriers.
- The spatial approach enabled the identification of areas with limited access to resources and services, informing targeted heat relief strategies to reduce risk to life and to promote social equity.
- A collaboration with Snuneymuxw First Nation supported culturally safe heat relief measures, highlighting the importance of inclusive strategies in addressing heat risk.
- In the future, they would want to expand the map to include social indicators that are supportive rather than just risk factors. For example, a measure of social connection could ask, “Do you have 4+ people you are comfortable calling for help in an emergency?”

Key Theme: Comprehensive Heat Relief Planning

- Nanaimo's heat relief planning extended beyond physical infrastructure improvements, incorporating a holistic approach to address social and environmental factors contributing to heat risk.
- Recommendations include updates to building codes, investments in nature-based solutions, and initiatives to allow people to cool in place especially overnight, to enhance accessibility to cooling centers and transportation during heat events.

FBC Presentation: Case Study Report + Guidance Framework
Fraser Basin Council presented an update on the draft deliverables for this project, including a best practices case study report and a guidance framework, as well as an overview of engagement to validate with participants. The presentation was followed by a Q+A session for participants to provide feedback and input.

Speakers: Eliana Chia, Program Manager, Climate Change | Rebeka MacDonald, Program Lead, Climate Resilience
Presentation slides

Key Takeaways from Q+A:

- **Data Accessibility and Sharing:** Participants raised concerns about challenges in accessing health data and suggested advocating for increased data sharing with the province to facilitate heat mapping efforts. They emphasized the importance of organizational efforts to ensure data accessibility for communities.
- **Integration of Emergency Response:** The discussion highlighted the necessity of integrating heat-response plans into existing emergency response frameworks. Participants stressed the need to account for emergency response management in long-term resilience planning, suggesting the incorporation of real-time data into emergency operations centers during heat events.
- **Model Maintenance and Updates:** Attendees discussed the importance of planning for regular updates to heat mapping models. They emphasized the need to identify responsible parties for model maintenance and suggested exploring dynamic data solutions to accommodate changes in vulnerabilities over time.
- **Evaluation and Validation:** Concerns were raised regarding the evaluation and validation of heat mapping data. Participants noted the importance of including sections in the reporting that highlight areas where mistakes were made to avoid repeating them in the future. Attendees were encouraged to provide suggestions for incorporating evaluation and validation processes into the report.
- **Interplay with Government Policies:** The discussion underscored the importance of considering the interplay between heat mapping initiatives and other government policies, such as housing mandates. This involves integrating heat mapping data into existing emergency response plans, updating data regularly to account for changing vulnerabilities, and addressing compounding factors such as heat mortality and extended drought within broader policy frameworks. Additionally, there is a need to explore collaborative approaches, particularly regarding data stewardship and the development of dynamic data platforms, to ensure effective coordination and response across different levels of government.

Breakout Discussions

After lunch, attendees participated in guided breakout discussions using a World Café format. Five topics were explored, centered on key recommendations for the guidance framework. Below are the main points that were discussed.

Community and Key Partner Engagement

- The project team should include critical members such as health authorities, emergency managers, planning departments, GIS departments, consultants, public education & school districts, climate staff, first responders, and neighboring communities, including First Nations and local governments.
- Ensure representation of individuals who will be directly impacted by the outcomes, such as Elders, Knowledge Keepers, youth, and local businesses.
- Emphasize long-term relationship building between communities, consultants, and the project team, incorporating principles of cultural safety and intelligence, shared values, accountability, consistency, and trust.
- Identify synergies between different mapping and hazard projects to maximize effectiveness.
- Allow for a minimum timeframe of 2 years for mapping projects to facilitate successful partnerships and engagement, as a one-year timeframe is considered insufficient and will lead to poor engagement outcomes.
- Leverage Equity, Diversity, and Inclusion learnings from the heat risk mapping project internally and externally to identify barriers, biases, and areas requiring support. Use this information to plan for short- and long-term needs, including funding.

Sources of Data and Accessibility

- There are many potential data sources for extreme heat mapping, ranging from large-scale datasets to local and context-specific data, such as: Statistics Canada, Union of BC Municipalities, local health authorities, BC Hydro, Technical Safety BC, Pacific Climate Impacts Consortium, Climatedata.ca, Healthyplan.city, Canadian Urban Environmental Health Research Consortium (CANUE), Municipal Natural Assets Initiative (MNAI), housing assessments data, municipal building data, fire inspection reports, emergency shelter numbers, weather stations, temperature sensors, air quality monitoring devices, and satellite and remote sensing.
- Consider methods for gathering data from the public, such as crowd-sourced data, interactive mapping, and surveys. Encourage creativity in leveraging unexpected sources of data, such as snow angel programs for information on populations with reduced mobility.
- Address challenges related to data availability, accuracy, and scalability, emphasizing the need for more ground-truth data, including information about plant life and other natural elements.

- Recognize privacy concerns and the importance of obtaining consent to share data to mitigate potential privacy issues.
- Acknowledge the limitations of surveys and census data in accurately representing First Nations, due to issues of trust and participation.
- Respect First Nations data sovereignty principles of Ownership, Control, Access, Possession (OCAP®) when accessing specific data.

Mapping Methodology

- Advocate for a standard set of indicators for extreme heat mapping and a foundation map to streamline the mapping process and facilitate comparisons across different maps created by various communities. This standardization would reduce reliance on individual consultants' expertise and enable clearer understanding during RFP development.
- Emphasize the importance of providing communities with knowledge about the data requirements and mapping process in advance, to facilitate the writing of RFPs, selection of consultants, and project planning.
- Acknowledge the significance of cultural and social connections in adaptive capacity, which may not be translatable into a heat map. Adaptive capacity goes beyond proximity to community amenities (e.g., cooling centers). Resilience and vulnerability are distinct concepts that require community-specific and specialist expertise.
- Acknowledge that weighing the factors contributing to vulnerability can be a complex and time-consuming process, necessitating community-specific engagement and specialized expertise. Avoid using a generic model of vulnerability across all communities, as the factors influencing vulnerability can vary depending on the context.

Extreme Heat and Future Climate

- Highlight the importance of localized, real-time data collection in communities to address the significant temperature variations observed within local neighborhoods, which may not be accurately captured by regional models. Suggestions for real-time data collection methods include sensors on bus stops, bicycles, and vehicles, which could also benefit other climate-related issues such as drought.
- Acknowledge the diverse thresholds for extreme heat events among communities and the need to consider different data terms (near, medium, long-term) based on professional roles and cultural perspectives. Immediate-term data can enhance community awareness and engagement, while mid-term data strikes a balance between prediction and accessibility. Long-term data aids in planning and identifying vulnerabilities and inequities.
- Recognize the importance of leadership in considering long-term climate impacts, while emergency managers focus on short-term protection measures and planning for future resilience.
- Emphasize the need to account for compound impacts such as wildfires, droughts, and air quality issues in heat mapping and planning efforts.
- Stress the importance of regular updates and re-evaluation of maps and plans to adapt to changing projections and future climate conditions.

Moving Forward (Implementation and Map Sharing)

- Acknowledge the consensus on the usefulness of a provincial-level data platform for heat mapping initiatives.
- Highlight the need for data accessibility at both community/local and regional levels to cater to the diverse cultural and geographic distinctions and specific needs of different communities. This entails a balance between standardized data at the provincial level and nuanced data at the local level.
- Emphasize the interest among participants in sharing best practices and experiences from various regions, communities, and projects at national and international levels to facilitate effective data collection and sharing for future initiatives.
- Address the debate surrounding data accessibility, including concerns about data privacy and the potential implications of making heat mapping data public. Considerations include whether and how to make data public, who should have access, and the potential impacts of public access on community awareness and planning.
- Pose additional questions regarding the most efficient allocation of funding for data collection and analysis, as well as the optimal representation of data to ensure practical use and accessibility for users and partners.

Conclusion

In conclusion, the Extreme Heat Mapping Workshop & Knowledge Exchange provided a valuable platform for key actors across various sectors to come together and exchange insights on addressing the challenges of extreme heat mapping. The diverse perspectives shared during the discussions have contributed to a deeper understanding of the issues and opportunities surrounding extreme heat mapping initiatives in BC.

The commitments made by the Ministry of Emergency Management and Climate Readiness's Disaster Risk Management Collaboration team ensure that the valuable feedback received during the workshop will be integrated into future initiatives at the Province of BC. With the Case Study Report and Guidance Framework scheduled for completion in Spring 2024, participants can anticipate the dissemination of these resources to support communities in enhancing resilience to extreme heat.

The Fraser Basin Council team extended their gratitude to all participants for their contributions and engagement throughout the workshop. Their dedication was instrumental in shaping the direction of the project. For any further inquiries or feedback, participants were encouraged to contact Eliana Chia, Program Manager for Climate Change (echia@fraserbasin.ca), Rebeka MacDonald, Program Lead for Climate Resilience (rmacdonald@fraserbasin.ca), or Amanda Broad, Manager for Disaster Risk Collaboration (ClimateReadyBC@gv.bc.ca).