

ENHANCING FIRESMART AND CLIMATESMART

Neighbourhood Resilience through Community Mapping and Data Visualization

EXECUTIVE SUMMARY

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Disclaimer

This report is a product of the UVic Sustainability Scholars Program, a partnership between UVic and various on- and off-campus organizations offering internship opportunities to graduate students working on sustainability-focused research projects that advance sustainability in the region. This project was conducted under the mentorship of Anne-Marie Daniel (NatuR&D, and partners) staff.

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I acknowledge and respect the ləkʷəŋən peoples on whose territory the university stands and the Songhees, Esquimalt and W̱SÁNEĆ peoples whose historical relationships with the land continue to this day. This project, which focuses on the stewardship of land in the face of climate change, was conducted on these territories. It seeks to integrate ecological knowledge that honours the long history of fire-keeping and landscape management practiced by Indigenous Nations, whose wisdom is essential for building a truly resilient future.

Introduction

As the risk of wildfire in urban and peri-urban areas intensifies due to climate change, a critical need has emerged to bridge the gap between conventional fire safety protocols and holistic climate adaptation strategies. This project was pursued to address this challenge by enhancing neighbourhood resilience to wildfires through the development of actionable, data-driven tools for the Resilient Urban Systems & Habitat (RUSH) platform ([What's the RUSH?](#)).

The primary goal was to synthesize and analyze FireSmart and ClimateSmart strategies, engage with a diverse range of stakeholders, and integrate key datasets into a user-friendly "Protect From Fire" mapping tool ([What's the RUSH?](#)). The ultimate purpose is to empower non-technical audiences, including community members, municipal planners, and advocacy groups, to make informed decisions that promote both fire safety and ecological health, ensuring that the urgent need for housing does not compromise long-term community resilience. This work culminated in the development of a preliminary, high-resolution fire risk model that improves upon existing provincial data, providing a more accurate tool for local decision-making.

Background

For over a century, fire management in British Columbia has been dominated by a policy of suppression. This approach, known as the "Fire Suppression Paradox," has led to an unnatural buildup of fuel in our landscapes, transforming what would have been small, manageable fires into the catastrophic mega-fires we see today. Compounding this issue is the application of rural-focused programs, like FireSmart, in dense urban environments, where guidelines for creating "defensible space" are often impractical (due to lot size and the loss of cooling capacity provided by vegetation) and conflict with municipal bylaws aimed at preserving vital tree canopy.

Simultaneously, communities face immense pressure to increase housing density, often leading to development practices that strip away green space, create heat islands, and increase vulnerability. This project operates within this complex nexus of competing priorities, seeking to re-integrate ecological principles and Traditional Ecological Knowledge (TEK) into modern urban planning to create communities that are not just fire-wise, but not climate ready.

Research Approach [Methodology]

The project was executed in four distinct phases to ensure a comprehensive and stakeholder-informed outcome:

1. **Context Setting and Background Research:** An initial review of existing literature on FireSmart principles, ClimateSmart initiatives, urban resilience, and local ecology was conducted. The existing RUSH platform and datasets provided were analyzed to identify capabilities and integration points.
2. **Data Acquisition and Stakeholder Engagement:** A series of in-depth interviews were conducted with a diverse range of experts, including municipal planners, ecologists, insurance industry representatives (e.g., Pablo Melo), and fire resilience specialists (e.g., Ryan Senechal). This primary research was crucial for identifying key data needs, systemic disconnects, and expert-driven solutions.
3. **Data Integration and Tool Development:** In collaboration with the RUSH technical team, relevant datasets were acquired, organized, and structured. This work formed the foundation for the "Protect from Fire" interactive map layer, designed to visualize complex fire and climate data in an accessible format for a non-technical audience.
4. **Synthesis, Refinement, and Reporting:** The findings from the literature review and stakeholder interviews were synthesized into key themes and actionable recommendations. This synthesis directly informed the creation of public-facing content for the RUSH website and the final deliverables of this project, including this summary report.
5. **Quantitative Risk Modeling:** Building on the stakeholder findings, a preliminary composite fire risk model was developed to quantify local risk. This process, led by project contributor Sarah Smith-Tripp, improved upon the Provincial Strategic Threat Analysis (PSTA) by integrating high-resolution topography and a more accurate, satellite-derived assessment of flammable conifer tree distribution. This created a more nuanced and reliable map of on-the-ground fire risk for Southern Vancouver Island.

Summary

The research and stakeholder interviews revealed several powerful, recurring themes that represent critical challenges and opportunities for urban fire resilience:

- **FireSmart Guidelines are Ill-Suited for Urban Contexts:** A near-unanimous view among interviewed experts is that FireSmart's guidelines, particularly regarding defensible space (across sectors and touchpoints), are impractical, confusing, and often conflict directly with municipal tree protection bylaws on smaller urban lots and don't account for much needed canopy connection for cooling capacity. This creates a confusing and often counter-productive message for homeowners.
- **The Insurance Industry is a Critical, Untapped Lever for Change:** The insurance industry was identified as the most powerful potential driver for proactive homeowner action. Experts believe that meaningful premium reductions for fire-resilient homes would be a far more effective incentive than government grants, sparking widespread change at the property level. Some FireSmart programs are available at the urban rural interface and can result in an insurance premium.
- **Green Infrastructure is a Key, Underutilized Solution:** Experts consistently recommended the strategic use of green and blue infrastructure. This includes preserving moisture-retentive ecosystems (e.g., Garry Oak meadows), strategically planting deciduous trees over flammable conifers, and identifying and incorporating water storage and filtration features such as raingardens, wetlands, and bioswale.
- **Conflicting Planning Priorities Undermine Resilience:** The urgent need for housing is often "blinding" planners to fire resilience, leading to densification and development practices that strip away plantable space, increase impervious surfaces, and exacerbate fire vulnerability. A fundamental disconnect exists between urban planning, fire departments, and ecologists.
- **Provincial Risk Models Underestimate Local Risk:** The quantitative modeling confirmed a key stakeholder concern: the official Provincial Strategic Threat Analysis (PSTA) is insufficient for local planning due to flawed ecosystem data and its exclusion of private lands. Our new model demonstrates that by correcting factors like topography and the actual proportion of conifer trees, the calculated fire risk in many areas is significantly different, highlighting the need for localized data in municipal ecologists to inform municipal planning.

References

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Appendices

Appendix A: Summary of Stakeholder Interview Findings

Interviews with experts from insurance, municipal government, fire services, and ecology revealed a consensus on several key points: FireSmart guidelines are ill-suited for urban areas; the insurance industry holds the most significant power to incentivize homeowner action; green and blue infrastructure are critical for building resilience; and there is a systemic disconnect between housing development priorities and fire safety planning.

Appendix B: Consolidated Data Layers for "Protect From Fire" Tool

The following key data layers were identified and recommended for integration into a comprehensive urban fire risk assessment tool:

- **Vegetation & Fuel:** High-Resolution Tree Canopy Cover (1m), Canopy Species & Health, Invasive Species Locations (e.g., Scotch Broom), Landfire Fuel Values.
- **Environmental & Climate:** Land Surface Temperature, Regional Heat Maps, Soil Moisture.
- **Infrastructure & Fire-Specific:** Historical Burned Area Polygons, Canadian Fire Weather Index (FWI), Distance to Nearest Fire Department/Hydrant.
- **What's the RUSH:** <https://whatstherush.ca/app>