

Stay, Leave or Wait and See: Determinants of Residents' Evacuation Behaviours and Protective Actions
During the 2023 Bush Creek East Wildfire in British Columbia

by

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COMMITTEE APPROVAL

The members of Alana L. Hicik's Thesis Committee certify they have read the thesis titled Stay, Leave or Wait and See: Determinants of Residents Evacuation Behaviors and Protective Actions During the 2023 Bush Creek East Wildfire and recommend that it be accepted as fulfilling the thesis requirements for the degree of Master of Arts in Disaster and Emergency Management:

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CREATIVE COMMONS STATEMENT



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DEDICATION

The 2023 wildfire season will always be remembered for the tragic loss of six members of B.C.'s wildland firefighting community. "These individuals exhibited remarkable courage, dedication and selflessness, and their memory will continue to be honoured. Thank you, Devyn Gale, Zak Muise, Kenneth Patrick, Jaxon Billyboy, Blain Sonnenberg, and Damian Dyson for serving and protecting the lands and people of British Columbia" (Government of British Columbia, 2023). I also dedicate this to the one hundred and seventy-six North Shuswap residents and the thirty-one Skw̓lāx teSecwepemcúlecw First Nations residents who lost their homes during the 2023 Bush Creek East Wildfire. Fortunately, no lives were lost.

ACKNOWLEDGMENTS

I am deeply grateful to the residents of North Shuswap for their participation in this research and for generously sharing their remarkable stories, insights, and recommendations for future events. During wildfires, the public and media attention tends to focus on the negative impacts, such as property loss, resident displacement, and environmental damage. However, amidst these challenges, there are remarkable efforts from emergent community groups who selflessly come together to help others. Their positive impact is often overlooked. In response to the devastating Bush Creek East Wildfire, unsung local heroes played a crucial role in providing shelter, delivering essential supplies to those in need, and fundraising for wildfire relief. These individuals exemplified the essence of 'Shuswap Strong,' inspiring hope and unity during adversity.

I would also like to thank my supervisor, Dr. Hertelendy, and my supervisory committee member, Dr. Phillips, for their invaluable support, guidance, and mentorship throughout this journey. Your unwavering belief in my potential and the significance of this research has been a constant source of motivation and inspiration.

Thank you to my colleagues, friends, and family for their support and understanding throughout this project. Whether through discussions, emotional support, or simply offering a listening ear, each of you contributed meaningfully to completing this thesis. And finally, to my cherished daughters, Jaden and Lauren, this achievement is for you. Thank you for your patience and understanding as I juggled the demands of research with being present in your lives. I am blessed to be your mother, and I hope this work serves as a reminder that you can accomplish anything you set your mind to with determination and focus.

ABSTRACT

Wildfires in Canada are increasingly destructive, driven by urban expansion, population growth, and climate change. The steady rise in evacuation orders presents significant challenges for residents and communities. Using an Exploratory Sequential Mixed Methods design, this study identified factors influencing residents' evacuation behaviours and protective actions during the 2023 Bush Creek East Wildfire in British Columbia. Among 213 participants, evacuation behaviours were shaped by perceived risk, prior experience, personal circumstances, available information, and trust in authorities. The findings call for evacuation policies (and alternatives) that balance public safety with residents' welfare. Future research should explore how demographics, household composition, and residency tenure affect evacuation behaviours across various communities. Policymakers must develop sustainable solutions that embrace local capacities to help mitigate wildfire risks.

Key Words:

Evacuation, Evacuation Alternatives, Decision-Making, Behaviour, WUI, Wildfire.

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CHAPTER 1: INTRODUCTION

Evacuation is widely regarded as the safest course of action for populations at risk from wildfires. However, early and safe evacuation is unfeasible in some situations due to rapid fire spread or limited egress, which may result in injuries and fatalities (Handmer et al., 2019; Haynes et al., 2020; Tibbits et al., 2008). Evacuation intentions, including alternatives such as "stay and defend" (SD) and "shelter in place" (SIP), require varying levels of individual preparation to be effective and safe. Recent and historical wildfires underscore the complexity of evacuation decision-making and the challenges of executing intended behaviours (Lindell & Perry, 2012). Authorities must balance the risk of loss of life if evacuation is delayed or ignored against the public backlash that can follow a successful but precautionary evacuation where no fatalities occur. Poorly timed or overly broad evacuation orders can lead to accusations of government overreach, eroding public trust and future compliance. A salient yet underexamined consideration in the Canadian context is that delaying evacuation may be deliberate rather than a sign of indecision or non-compliance (Strahan, 2020). Shifting the mindset from viewing delays as defiance to recognizing them as purposeful will refocus official efforts on public safety and protecting life rather than enforcement. While most residents in fire-prone areas recognize wildfire risk and have an evacuation or alternative plan in place (McCaffery et al., 2018; McLennan et al., 2013; Whittaker et al., 2016), critiques of evacuation policies in Canada, the U.S. (e.g., Ready, Set, Go!), and Australia (e.g., Stay and Defend or Leave Early) reveal gaps in guidance regarding necessary preparatory actions, skills, and equipment (Stasiewicz & Paveglio, 2021). Furthermore, reliance on blanket evacuation orders, such as "evacuate immediately," overlooks residents' diverse needs, situational factors, and communication limitations. As wildfires intensify, enhancing individual and community preparedness for these extreme events is critical.

This thesis is organized into six chapters: an Introduction, a Literature Review, Methodology, Results, a Discussion (which explores considerations for future research, policy, and practice), and a Conclusion.

Wildfires and the Canadian Wildland Urban Interface

Wildfires play a vital ecological role in Canada's forests (Bénichou et al., 2021; Erni et al., 2023; Hoffman et al., 2021). Indigenous Nations have used controlled fires for millennia to enhance biodiversity, protect communities, and support cultural practices (Lake & Christianson, 2020; Hoffman et al., 2021). Wildfires become a concern when they threaten populations, communities, and critical forest-related values such as infrastructure, timber supply, and culturally significant areas (Canadian Council of Forest Ministers, 2020; Tymstra et al., 2020). Over the past decade, an average of 5,533 wildfires occurred annually, affecting 2.9 million hectares (CIFFC, 2024). The risk of unintentional wildfires has grown as the interface between communities, infrastructure, and forests expands, increasing human exposure to disastrous fires (Johnston & Flannigan, 2017). The Wildland-Urban Interface (WUI), where human development meets or is interspersed with wildland vegetation, presents a particularly complex fire risk due to natural and human-made fuels (Cova, 2005; Bénichou et al., 2021). Approximately 12.3% of Canada's population, including 32.1% of the on-reserve First Nations population, resides in the WUI (Erni et al., 2021).

Wildfire management agencies in Canada are at a tipping point (Tymstra, 2020; Sankey, 2018). Climate change and increased urbanization make it increasingly difficult for officials to balance the benefits and risks of wildland fire management (McCaffrey, 2018; McLennan et al., 2019; Sankey, 2018; Tymstra, 2020). As wildfires spread into the WUI, the consequences can be severe, leading to substantial losses and large-scale evacuations (Bénichou et al., 2021).

Canada's Changing Landscape

Canada is only one of many countries that have experienced climate-related increases in WUI fire risk; recent disasters have occurred on almost every continent (Manzello et al., 2018). Warmer temperatures, reduced snowpack levels, low soil moisture, and elevated drought conditions indicate climate change's influence on Canadian wildland fires (Government of Canada [NRC], 2024). Additionally, decades of wildland fire suppression have inadvertently led to the accumulation of flammable vegetation, exacerbating the wildfire risk to communities (Canadian Council of Forest Ministers, 2020). Furthermore, Indigenous Peoples' discouragement and, in some cases, prohibition of intentionally using fire has significantly altered Canada's landscape. Embracing cultural and prescribed fire as a land stewardship practice can play a crucial role in reducing the intensity of wildfires while returning an integral and culturally significant process to the land base (Government of BC, 2024). Canada is expected to see longer fire seasons and increased wildfire risk in regions that have not historically faced wildfire hazards (Canadian Council of Forest Ministers, 2016). Studies project a potential increase of 74% to 140% in the total area burned by the end of the 21st century, along with a rise in the number of days when fire intensities could exceed the capabilities of suppression resources (Flannigan et al., 2013; Wotton et al., 2017).

The relationship between populated areas and the WUI does not solely determine wildfire hazard risk. A community's vulnerability depends on various interconnected factors, including climate, weather, topography, resource dependence, social capital, and risk perceptions. Large WUI fires have wide-ranging consequences, including mass evacuations, property and livelihood losses, social disruption, and risks to evacuees and responders (Bénichou et al., 2021; Caton et al., 2017; Paveglio et al., 2015). As global temperatures rise, these challenges will only become more complex (Bénichou et al., 2021; Haynes et al., 2020; Sankey et al., 2018; Wang et al., 2020).

Public Safety Governance

In Canada, managing wildland fires is a shared responsibility between all levels of government. Provincial and territorial governments, in cooperation with public safety agencies, decide whether and how to respond to wildfires within their jurisdictions (Government of Canada [NRC], 2024). In some areas—federal lands, Department of National Defense reserves, and First Nation reserves—provincial/territorial agencies do not have the authority to order evacuations (McGee, 2021; Tymstra et al., 2020). Across Canada, evacuation is preferred to minimize the risk of death and injury (Bénichou et al., 2021; Parisien et al., 2020; Tymstra et al., 2020) or to protect vulnerable populations from wildfire smoke (Beverly & Bothwell, 2011; McGee, 2021). Several agencies are involved in administering and executing wildfire evacuations. The decision to enact evacuation orders and alerts is based on current and forecasted fire behaviour, fire suppression capabilities, access to egress routes, and potential impacts on infrastructure (Beverly & Bothwell, 2011). When the population is determined to be at imminent risk, emergency officials issue an evacuation order, and people must leave the area immediately. Police services, such as the Royal Canadian Mounted Police (RCMP), enforce evacuation orders. At the same time, Provincial Emergency Management programs coordinate with local authorities to activate reception centres and disaster support services for evacuees (Bénichou et al., 2021).

In B.C., emergency officials have protocols to move individuals out of harm's way. An Evacuation Alert (EA) serves as a warning to prepare to leave your home on short notice. At the same time, an Evacuation Order (EO) is issued when officials determine an area has become unsafe and residents must leave a specific area immediately. Residents who evacuate before or during an alert are classified as 'voluntary evacuees' (Government of BC, 2022). Officials may rescind an EO once it is safe for residents to return, though an EA may remain in place. In certain situations, a tactical evacuation is required when an immediate threat to life leaves no time for written warnings. This involves first responders going

door-to-door instructing residents to evacuate immediately. Several studies warn that staying in an area under evacuation order puts individuals, families, and first responders in danger (McLennan et al., 2019; McCaffrey et al., 2018; Public Safety Canada, 2023). Evacuation routes may become impassable, services and utilities may shut down, and emergency responders may be unable to access affected areas. The Government of BC (2024) warns citizens that in other jurisdictions (such as Australia and California), fatalities have occurred when people chose to remain behind or evacuate too late after an evacuation order was issued.

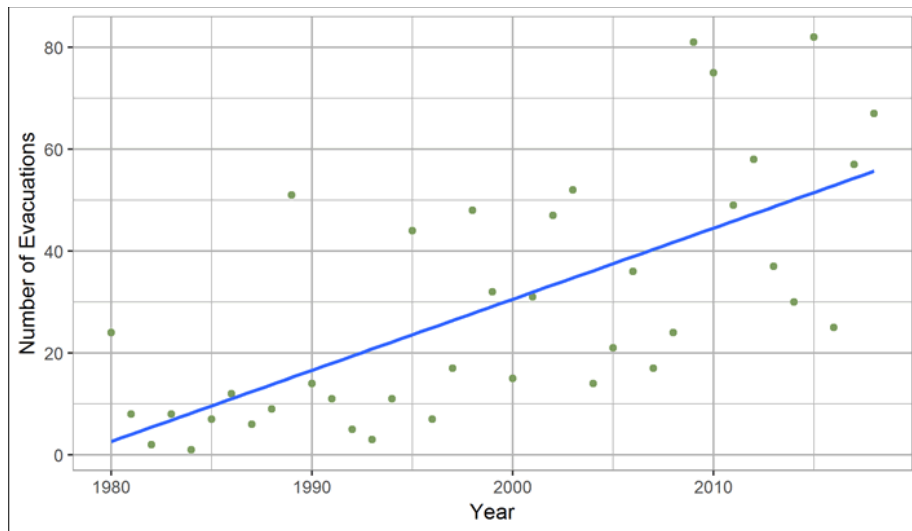
Wildfire Evacuations in Canada

Canada has experienced numerous wildfires surpassing historical norms, causing widespread destruction to communities, wildlife habitats, and natural resources (Hagmann et al., 2021; Tymstra et al., 2020). The six most significant wildfire events in Canada's history, based on the area burned, suppression costs, and evacuations, all occurred in western Canada within the last decade (Canadian Council of Forest Ministers, 2020). The 2016 Horse River wildfire near Fort McMurray, Alberta, remains the costliest disaster in Canadian history, destroying 2,400 structures and causing an estimated \$9 billion in direct and indirect damages (Johnston et al., 2020; Natural Resources Canada, 2024). Approximately 88,000 people were evacuated, marking the largest wildfire evacuation in Canadian history. Data on wildfire evacuations in Canada is limited due to the lack of a centralized agency and insufficient resources for tracking. The Canadian Forest Service (CFS) manages the Canadian Wildfire Evacuations Database (CWFED), the sole database tracking Canadian wildfire evacuations. The Canadian Disaster Database, managed by Public Safety Canada, monitors 'significant disaster events' that meet specific criteria, including evacuating 100 or more people (Government of Canada, 2024). Records show a steady increase in the annual number of wildland fire evacuations (Figure 1) and evacuees (Figure 2) between

1980 and 2018, with BC leading in both categories. Six of the ten largest wildfire evacuations by number of evacuees occurred in BC, including two in 2023 (Table 1).

Figure 1

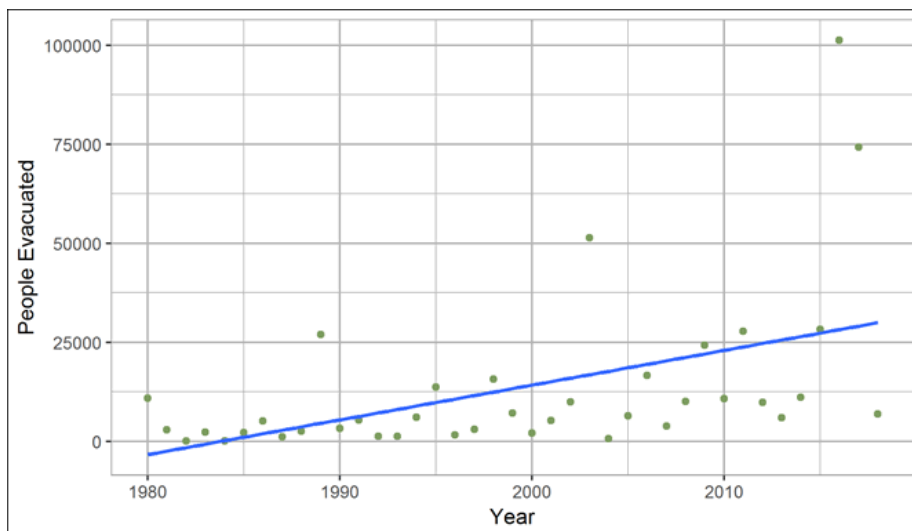
1 Annual Number of Wildfire Evacuations in Canada Between 1980–2018



Source: The Canadian Disaster Database, Public Safety Canada (2025). <https://open.canada.ca/en/open-government-licence-canada>

Figure 2

2 Annual Number of Wildfire Evacuees (in Thousands) in Canada Between 1980–2018



Source: The Canadian Disaster Database, Public Safety Canada (2025). <https://open.canada.ca/en/open-government-licence-canada>

Table 1

1 Ten Largest Wildfire Evacuations (by Number of Evacuees) by Canadian Province/Territory between 1980–2023¹

Evacuation Date	Province/Territory	Location	# of Evacuees
2016-05-03	Alberta	Fort McMurray	88,000
2003-08-18	British Columbia	Kelowna	33,050
2023-08-16	Northwest Territory	Yellowknife	21,720
2023-08-17	British Columbia	West Kelowna	11,000
2023-05-28	Novia Scotia	Halifax	16,400
2009-07-18	British Columbia	West Kelowna	11,000
2017-07-15	British Columbia	Williams Lake	10, 753
2023-08-17	British Columbia	Kelowna	9,757
2023-05-05	Alberta	Edson	8,414
1998-08-10	British Columbia	Salmon Arm	8,000

Note: Adapted from The Canadian Disaster Database, Public Safety Canada (2025). <https://open.canada.ca/en/open-government-licence-canada>

2023 Wildfire Season in Canada

In 2023, Canada faced its most destructive wildfire season on record. Fuelled by record-breaking temperatures, widespread drought and frequent lightning strikes, all 13 provinces and territories sustained impacts (Government of Canada, 2023). Over 7,131 fires burned 17.2 million hectares of land (Canadian Interagency Forest Fire Centre Inc., 2024), leading to the evacuation of more than 200 communities and approximately 232,000 people. This record-setting season underscores the escalating challenges of wildfires in Canada.

¹ The bibliometric data have limitations resulting from variability in the reporting level across agencies and the difficulty of compiling this information (Beverly et al., 2021; Christianson et al., 2024).

Wildfire Evacuations in British Columbia

BC has a well-established history of wildfire disasters. In August 2003, the Okanagan Mountain Park Wildfire ('2003 Firestorm') was the largest interface wildfire in BC, forcing the evacuation of 33,050 people (4,050 of these people evacuated for a second time) and destroying 238 homes (Government of BC, 2018). The past seven years have seen four of the most severe wildfire seasons of the last century, occurring in 2017, 2018, 2021, and 2023 (Parisien et al., 2023).

2017: The summer of 2017 stands as one of the worst wildfire seasons in BC's history, marked by an unprecedented amount of land burned (over 1.2 million hectares) and the displacement of approximately 65,000 people. The province declared a Provincial State of Emergency on July 7, which lasted 70 days—the longest in BC's history and the first since the 2003 firestorm. Fire suppression costs exceeded \$649 million (Government of BC, 2023).

2018: In 2018, the wildfire season impacted nearly every region of the province, setting a new record for area burned. A total of 2,117 fires consumed 1,354,284 hectares, surpassing the 2017 record. Sixty-six evacuation orders affected 2,211 properties, and the suppression costs reached \$615 million. The Elephant Hill fire was particularly devastating, destroying 123 homes and severely impacting 23 First Nation communities. The Central Cariboo Complex fire, spanning 31,181 hectares, forced the evacuation of Williams Lake, a city with a population of over 10,000.

2021: The 2021 wildfires in BC set several new records. The wildfire season started a month earlier than average, following three days of record-setting temperatures reaching almost 50° C. This 'heat dome' catalyzed a series of wildfires, including one that burned 90% of the community of Lytton, BC, resulting

in the loss of two lives. The wildfires triggered the implementation of 181 evacuation orders and 304 evacuation alerts. The 2021 wildfire season became the third largest annual area burned in BC, with the most expensive suppression price tag of any BC wildfire season at 800 million dollars.

2023: In August 2023, the Province of British Columbia (BC) declared a State of Emergency to support the response to 366 wildfires burning across the province (Government of BC, 2023). The wildfires burned 2.84 million hectares of land, ten times the 20-year average annual area burned and what would historically be expected over a decade (Government of BC, 2023). The fires triggered 208 evacuation orders, displacing approximately 48,000 people for as long as five weeks and damaging hundreds of homes and structures, with unquantifiable impacts on people's health and well-being (Government of BC, 2023).

Wildland fire is essential for forest ecosystem regeneration (Bénichou et al., 2021; Erni et al., 2023). However, climate change, urbanization, and the legacy of fire suppression increase the frequency and intensity of wildfires, particularly in regions not historically exposed to such risks (Bowman et al., 2020; Erni et al., 2023). The steady rise in evacuation orders further complicates the situation, creating substantial challenges for residents, communities, and the economy (McGee, 2021; Parisien et al., 2023). While evacuation remains the primary protective action during wildfires, there are increasing scenarios where this becomes perilous or unfeasible, forcing residents to choose between staying and defending their property, sheltering in place, or seeking refuge. This heightened risk underscores the need for novel approaches to public safety during wildfires (Cova, 2020; Struik, 2017). While alternatives to conventional evacuation orders have been explored and tested in Australia and certain U.S. jurisdictions, such strategies have yet to receive attention in Canada (Cote & McGee, 2014).

Motivation and Research Objectives

Despite the well-documented history of wildfires and mass evacuations across Canada and B.C., there is a conspicuous lack of literature examining the determinants of evacuation behaviours. Given the significant risks wildfires pose to population health and safety, and the increasing frequency of events, there is a pressing need to understand the factors that shape residents' responses.

The objective of this study is to investigate the key factors that influenced evacuation behaviours and protective actions during the 2023 Bush Creek East Wildfire in British Columbia. Specifically, the research seeks to distinguish between residents who chose not to evacuate and those who were unable to do so, thereby expanding the scope of existing literature. The study aims to contribute evidence-based insights to improve evacuation planning, enhance public safety strategies, and ultimately reduce wildfire-related harm.

Research Question and Hypotheses

Considering the above discussion, the following primary research question is proposed: What factors influenced residents' evacuation behaviours and protective action during the 2023 Bush Creek East Wildfire? Additionally, this research will address the following five sub-questions:

- 1. Which demographic variables influence stay or evacuation behaviours?*
- 2. Does prior wildfire experience influence evacuation?*
- 3. To what extent do environmental cues influence the decision to stay or leave?*
- 4. To what extent do social cues influence the decision to stay or leave?*
- 5. Does household emergency preparedness influence the decision to stay or leave?*

Three hypotheses were developed based on these research questions. First, I anticipate that environmental and social cues will have the most significant impact on evacuation behaviors. Second, contrary to the literature, I hypothesize that prior experience will not consistently correlate to

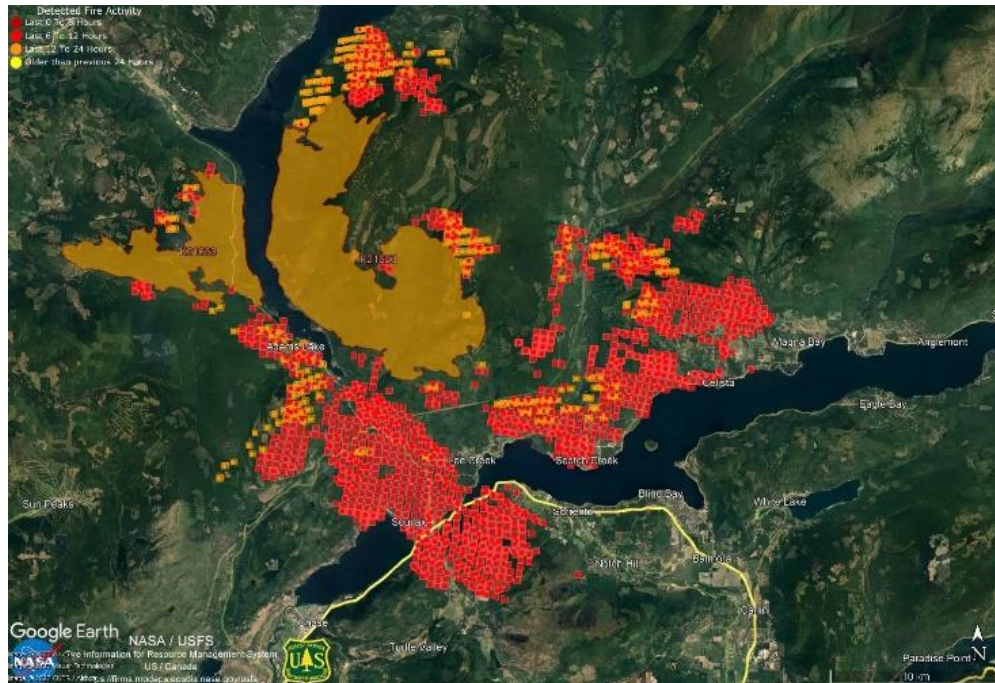
evacuation compliance but will result in residents choosing to stay and defend or adopting a wait-and-see approach. Finally, consistent with predominant themes in the literature, it is expected that sociodemographic characteristics, specifically age, gender, and family structure, will influence evacuation behaviours and timing (Fothergill, 1999; Fothergill et al., 1999; Gladwin & Peacock, 1997; Lindell et al., 2005). These questions are generally investigated in the context of a Canadian case study, a small, rural, seasonal WUI community in the BC Interior.

A Canadian Case Study –Background and Timeline

In July and August 2023, the Columbia Shuswap Regional District (CSRD) dealt with one of the largest wildfires in the area's history. Drought conditions in the region and hot, dry, and windy weather combined to create conditions for an extreme wildfire (CSRD, 2023). The Shuswap conflagration started as two separate fires, first detected on July 12, 2023. The first fire, Bush Creek East, ignited on a ridge near Bush Creek between Adams Lake and Sun Peaks to the west. The second fire, Lower Adams Lake East, started on the steep eastern shores of Adams Lake. Both fires were assessed as lightning caused by thunderstorms (BCWS, 2023). Over 8,000 people from seven communities in the Columbia Shuswap Regional District (CSRD) were evacuated, along with evacuations in First Nations reserves and the Thompson-Nicola Regional District (TNRD). The fires destroyed 187 homes and businesses in the CSRD, 87 structures in Skwlāx teSecwepemcúlecw (Squilax Reserve), and nine in the TNRD. The fires devastated forests and displaced or killed wildlife. Remarkably, no lives were lost. The CSRD rescinded the evacuation alerts and orders on October 5, 2023 (CSRD, 2023). The BC Wildfire Service described the Bush Creek East wildfire as one of the most aggressive over the last decade, running 20 kilometres in just 12 hours (BCWS, 2023). The fire swept through the North Shuswap forests and communities, leaving a path of devastation and earning the ominous moniker "The Fire Dragon."

Figure 3

3 Satellite Imagery Detecting Heat Signatures on the Two Adams Lake Wildfires



Source: Google Earth NASA Fire Information for Resource Management System (FIRMS) (2023).

Event Timeline²

- On July 12, 2023, the fire was discovered in the Adams Lake area. BC Wildfire Service (BCWS) attended the wildfire, and local firefighters in Anglemont, Celista, and Scotch Creek were tasked to protect structures in their jurisdictions.
- On the afternoon of August 2, BCWS issued projections that the Lower East Adams Lake wildfire did not present an imminent risk to structures. Unfortunately, those projections proved inaccurate. Later that evening, fire behaviour increased dramatically.

² Event timeline data points summarized from the Columbia Shuswap Regional District (CSRD) 2023 Annual Report.

- The CSRD issued Evacuation Orders and Alerts for the Rawson Road area at 6:30 PM and then expanded that night. Ultimately, with the efforts of BCWS and CSRD firefighters, no structures were lost.
- **During the afternoon and evening of August 17, BC, Wildfire moved ahead with an aerial ignition of approximately 2,600 hectares, 14 km long, along the powerline in the North Shuswap, ahead of the predicted wind that would arrive the next day.**
- By August 17, the fire had spread toward communities in Electoral Areas F and G, putting residents at risk. Evacuation Orders and Alerts were issued in rapid succession.
- Eventually, the Lower East Adams Lake and Bush Creek East fires merged into one blaze, and the entire fire area was renamed the Bush Creek East wildfire.
- The wildfire forced the evacuation of more than 8,000 people from eight communities in the Shuswap region. At its peak, the fire consumed more than 45,600 hectares of land and forest.
- Emergency support services, including accommodations and meals, were provided to affected community members. A Resiliency Centre was established in Salmon Arm to provide residents with direct access to organizations and services to begin recovery.
- After 18 days, the Evacuation Orders were rescinded to Alerts for the most impacted areas. Residents could return once people with destroyed or partially destroyed homes could view their properties.
- On September 6, the CSRD reported 176 total structure losses and 50 partial losses, including the destruction of the Scotch Creek/Lee Creek Fire Hall. Following re-entry, the focus of the CSRD's EOC shifted to recovery and rebuilding, which continued into 2024.

“This was the largest and most complex activation of an EOC in the CSRD’s history. Recovery will be a long process” 2023 Annual Report (CSRD, 2024).

CHAPTER 2: LITERATURE REVIEW

In 1980, Quarantelli wrote, “What is known about evacuation is not as much as might be expected” (p. 12), a research lacuna that reflects current Canadian disaster science. Most research on the factors influencing residents' decision-making during wildfires is based in the United States (U.S.) and Australia. Compared to other disaster research (hurricanes or flooding), relatively little behavioural research focuses on WUI fires. In Canada, evacuation research remains scarce, primarily addressing wildfire science (Sankey, 2018), traffic simulation (Woo et al., 2017) and evacuation intentions (Cote et al., 2014). This literature review presents what is known about evacuation behaviours during WUI fires and identifies limitations within the research. It draws on literature from peer-reviewed journal articles, conference proceedings, book chapters, and government agencies. Key search terms included *Wildfire, Forest Fire, Wildland Urban Interface, WUI, Evacuation Behaviour/Decision, Decision-Making, Shelter-In-Place, Wait and See, Protective Actions, and Risk Perception*. Six interrelated themes emerged: risk perception, prior experience and preparation, environmental and social cues, familial and societal responsibilities, location and community, and situational impediments. These themes provide the framework for this study's Independent Variables (IVs).

Wildfire Evacuation Literature

While mandatory evacuations are typical across North America, not all wildfire-prone regions enforce evacuation orders. A systematic review of wildfire evacuation behaviour research in North America and Australia (published between 2005 and 2017) revealed differences in evacuation policies across the two regions - North America tends to favour mandatory evacuations, while most evacuations in Australia remain advisory (McLennan et al., 2019). According to McLennan et al. (2019), some Australian fire management agencies have resisted implementing mandatory evacuations to allow

property owners to make decisions on asset protection. The authors noted that mandatory evacuation typically results in greater compliance, and enforcement policies are likely influential (McLennan et al., 2019). However, if evacuation warnings lack clarity or sufficient information, residents may delay evacuation and seek additional details before acting (McCaffrey et al., 2018; McLennan et al., 2019). Several studies conducted in Australia indicate that a significant number of individuals – ranging from 30%-60% - intend to wait and assess the risks before deciding to evacuate in the event of a wildfire (Rhodes, 2007; McCaffery & Winter, 2011; McCaffrey et al., 2018; McLennan et al. 2014, 2015). These findings underscore the dynamic and contextual nature of evacuation decision-making. Research in the U.S. reveals that 10% to 13% of individuals living in fire-prone areas intend to stay behind during an evacuation (McCaffrey et al., 2010; Mutch et al., 2011). In response to these findings, the International Association of Fire Chiefs launched the “Ready, Set, Go!” (RSG) program in 2011 to improve community evacuation planning. The RSG program encourages residents to take three actions: (1) be “ready” by managing vegetation and making structural improvements to enhance the survivability of their homes; (2) be “set” by preparing essential supplies, pets, and important documents; and (3) to “go” by evacuating early if a wildfire is likely to threaten their property (IAFC, 2020). This approach aligns with the principles of Australia’s “Stay and Defend or Leave Early” (SDLE) strategy.

The study of the human dimensions of wildfires has expanded over the past few decades, particularly in Australia and the U.S. (McLennan et al., 2019). Although residents in these countries exhibit similarities in their response to wildfires, recognizing and understanding the unique characteristics of each country, region, or community is crucial. Factors such as population density, demographics and historical fire management policies influence how emergency managers evacuate and how residents respond during wildfire events. While alternatives to evacuation have been explored and evaluated in Australia and certain U.S. jurisdictions, such alternatives have yet to receive scholarly

attention in Canada. Cote and McGee (2014) noted that in 1999, the Partners in Protection—a coalition of fire management agencies and stakeholders in Canada—introduced the idea of evacuation alternatives in the first edition of their FireSmart guide. However, the second edition, published in 2003, stated that the only option is to prepare for evacuation.

Wildfire Evacuation Research in Canada

Research on fire management in Canada has primarily focused on biophysical aspects such as fire ecology, behaviour, and prediction (Government of Canada, 2020). Recently, scholars have increasingly focused on measuring fire risks (Erni et al., 2023) and addressing the widespread hazards faced by homeowners, municipalities, Indigenous communities, and industries such as forestry, oil, gas, and insurance (Johnson et al., 2020). Social aspects of fire management have also gained attention. The public acceptance of prescribed burning, health risks associated with smoke, impacts on non-timber values, and threats to private property and human life in the WUI have recently come into focus (Government of Canada, 2020). Several qualitative studies have explored wildfire evacuations in First Nations and Métis communities (Cote et al., 2014; McGee et al., 2018). These studies, typically involving small sample sizes, focus on isolated communities. One study reported that remote residents evacuated by plane or helicopter due to limited escape routes (McGee et al., 2018). Evacuations followed a "risk triage protocol" that prioritized vulnerable groups, such as those with respiratory issues, the elderly, and pregnant women. Consequently, families and social units were often separated, leading to increased reluctance to evacuate in the future (McGee et al., 2018). Another study by Cote and McGee (2014) examined Canadian residents' attitudes toward evacuation alternatives through a small case study of 12 Mt. Lorne, Yukon, residents during a wildfire. Participants expressed a strong desire to stay on their property despite evacuation orders, citing concerns about leaving their property unprotected and managing food stocks and livestock. Others reported feeling unsure of how to shelter in place safely.

The authors acknowledged a need for further research with a larger sample size to identify evacuation intentions in Canadian communities. The variability in data across self-governing provinces and territories exacerbates the scarcity of Canadian research on evacuation activities (Coogan et al., 2019; Johnston et al., 2020). The lack of coordinated documentation and reporting at the national level further compounds this issue, leaving the evacuation or non-evacuation behaviour of Canadians largely unknown (Cote & McGee, 2014).

Evacuation and Alternatives to Evacuation

Evacuation researchers typically focus on preparation and response, giving less attention to the experiences and impacts evacuees face (Cohn & Carroll, 2006). However, a growing body of research reveals that these behaviours vary and are shaped by risk perception, beliefs about self-reliance, and the level of community connectedness (Cova, 2009; McLennan et al., 2019; Lindell et al., 2020; Lindell & Perry, 2012). Several studies suggest that residents facing imminent wildfire threats have three options: they can stay and defend their property, shelter in place, or evacuate (Cova et al., 2009; McCaffrey et al., 2018; McLennan et al., 2019; Stasiewicz & Paveglio, 2021). Some researchers contend that evacuation behaviours are nuanced, encompassing a spectrum of behaviours that may include evacuating, evacuating then returning, staying and defending, or waiting to see what happens before deciding (Lindell & Perry, 2012; McLennan et al., 2019; Stasiewicz & Paveglio, 2021). Studies indicate that residents facing imminent wildfire threats have three options: stay and defend their property, shelter in place, or evacuate (Cova et al., 2009; McCaffrey et al., 2018; McLennan et al., 2019; Stasiewicz & Paveglio, 2021). Evacuation behaviours are complex and vary, including evacuating, evacuating and returning, staying and defending, or waiting to assess the situation (Lindell & Perry, 2012; McLennan et al., 2019; Stasiewicz & Paveglio, 2021).

The Dependent Variables

Evacuate

According to Beverly & Bothwell (2011), “evacuations represent an integral aspect of protecting public safety in locations where intense, fast-spreading forest fires co-occur with human populations” (p.1). Across Canada, authorities order evacuations to minimize the risk of death and injury (Bénichou et al., 2021; Parisien et al., 2020; Tymstra et al., 2020) or to protect vulnerable populations from wildfire smoke (Beverly & Bothwell, 2011; McGee, 2021). In the U.S., evacuation is also the preferred policy; however, some communities have adopted a shelter-in-place model, which encourages individuals, families, and communities to prepare to take shelter during a wildfire (Stasiewicz & Paveglio, 2021) Mozumder et al. (2008) found that 89% of survey respondents in New Mexico would evacuate if under a mandatory evacuation order. Conversely, McCaffrey and Winter (2010) found that 11% of California, Florida, and Montana survey respondents indicated they would stay on their property if a wildfire occurred nearby. In Australia, authorities encourage residents to prepare their properties and plan to leave early or prepare to stay and defend their property (Cotes et al., 2009). While evacuations can prevent loss of life, they can significantly impact evacuees (Cohn & Carroll, 2006; Johnston et al., 2020). Evacuations disrupt community cohesion and economic stability and negatively affect evacuees' physical and mental health (Asfaw et al., 2019; Cherry & Haynes, 2017; McGee, 2019; Quarentelli, 1980).

Stay and Defend

Some residents choose to stay behind during a wildfire despite evacuation orders. They are often driven by a desire to protect their property (McLennan et al., 2015; McNeill et al., 2016; Paveglio et al., 2010) and their pets and livestock (Cote & McGee, 2014; Kuligowski et al., 2022; Wong et al., 2022). Several studies indicate that support for Stay and Defend (SD) actions is common in rural areas (Tibbits & Whittaker, 2007; Paveglio et al., 2010). Some residents choose to stay behind during wildfires,

recognizing that embers are a leading cause of home loss and that firefighters cannot protect every structure (Lindell & Perry, 2012; McCaffrey et al., 2018). Supporting this decision, research indicates that the presence of individuals defending their property increases the likelihood of structural survival (Blanchi et al., 2006; Syphard & Keeley, 2019).

Studies on divergent approaches to wildfire management in fire-prone areas of the U.S. suggest that populations with specific social characteristics -self-reliance, distrust of government, and ties to working landscapes – are more likely to consider staying and defending as a viable option (Paveglio et al., 2018). Johnston et al. (2020) note that “while there is some acknowledgement of alternatives to evacuation being supported in Canada, the comparative effects of varying strategies are unknown (p. 173).

Shelter-In-Place

Sheltering may be the best option when there is little time to evacuate. The natural hazards literature provides numerous examples where late evacuations lead to congested roadways, exposing evacuees to increased risk of heat stroke, motor vehicle accidents, or being overcome by the fire while trying to escape (Strahan & Gilbert, 2021; Thompson et al., 2017). Two alternatives to late evacuations exist: shelter-in-place (SIP), where individuals remain in their structure or location, and shelter-in-refuge (SIR), where individuals make a short trip to a safer area within the threat zone, typically a water body (Cova et al., 2017). Cova et al. (2020) distinguish between using SIP as a backup plan when evacuation is perceived as too risky and using SIP to improve structure survivability. While the dangers of late evacuations are well documented (McLennan et al., 2015; Strahan & Gilbert, 2021; Thompson et al., 2017), the effectiveness of sheltering “...depends on the quality of a shelter, road network geometry,

fire intensity, wind speed and direction, visibility, travel demand, water availability and other factors that are difficult to assess and synthesize under pressure” (Cova, 2005, p. 4).

Wait and See

The threat posed by a wildfire compels residents to choose between evacuating — as required by compliance regulations in North America — or staying to defend their property. Some residents, however, adopt a 'wait and see' approach, monitoring how the situation develops before deciding their actions (McLennan et al., 2012; McNeil et al., 2015; Strahan & Gilbert, 2021; Whittaker et al., 2013). Rhodes (2007) suggests that some individuals consider waiting and only leaving when threatened as a viable strategy to increase their chances of protecting property and personal safety. Residents often report that they choose to stay until they notice environmental cues, such as the presence of smoke or flames (McCaffrey et al., 2018; McLennan et al., 2012; Strahan & Gilbert, 2021). Several studies indicate that rural residents are likelier to adopt a wait-and-see approach during a wildfire. This tendency is due to a lack of temporary housing options (Christianson et al., 2019), disruptions to their livelihoods (Handmer et al., 2019), and the challenges associated with finding places to shelter or care for livestock (Kuligowski et al., 2022; McLennan et al., 2013; Wong et al., 2022). Notably, McNeill et al. (2015) found that the primary cause of evacuation decision delay is a lack of apparent attractiveness of one option over another. Similarly, Strahan and Gilbert (2021) noted that when both options appear undesirable, individuals commit to waiting and hoping that the fire threat will not materialize. A study involving 1,314 residents impacted by the 2009 Australian 'Black Saturday' bushfires found that approximately 25% adopted a wait-and-see approach (Whittaker et al., 2013). A forensic analysis of the 172 fatalities from the event revealed that 26% of those who perished intended to wait and see before committing to a protective action (Handmer & O'Neill, 2016). Delaying commitment to action often leads to perilous late evacuations and higher fatalities (Haynes et al., 2010; Strahan, 2021). The literature highlights that

the wait-and-see approach remains a critical issue for researchers and emergency management professionals (McCaffrey et al., 2018; McLennan et al., 2015; Handmer et al., 2019; Whittaker et al., 2020; Walpole et al., 2020).

The Independent Variables

A review of the wildfire literature provides insight into why residents prefer evacuation over other protective strategies. Several studies have identified sociodemographic, psychological, environmental, and social factors influencing evacuation behaviours (Mileti & Peek, 2000; Lindell & Perry, 2012). The key factors discussed in the literature often relate to location, preparation, and prior experience (McLennan et al., 2012; Thompson et al., 2017). Strong cultural ties to the land (Asfaw et al., 2019), possession of local knowledge that aids in firefighting (Stasiewicz, T.B. Paveglio, 2021), and the belief or experience that well-prepared residents can reduce property damage while ensuring personal safety are additional reasons why at-risk populations may choose evacuation alternatives (Syphard & Keeley, 2019). The following section identifies relevant independent variables in the literature: risk perception, prior experience, place and community, environmental and social cues, household preparedness, sociodemographic variables and situational impediments.

Risk Perception

Risk perception (RP) is a psychological process in which individuals evaluate the probability of being affected by an imminent undesirable event while assessing their perceived vulnerability and available coping resources (Kinatader et al., 2014). In this study, RP refers to how individuals personalize the risks associated with wildfire threats and are “influenced by emotions and prone to cognitive biases” (Kinatader et al., 2015, p.1). Quarantelli (1980) suggests that a fundamental social--psychological principle is that "if a situation is defined as real, it is real insofar as consequences are concerned." This idea emphasizes that subjective perception may hold more significance than objective reality as

perceived by others. Thus, during a crisis, it is not just "what is" that matters but "what is believed" that influences evacuation. Several studies have highlighted the importance of risk assessment in evacuation decision-making (Mozumber et al., 2008; Strawderman et al., 2012; McLennan et al., 2015; Thompson et al., 2017). For individuals planning to evacuate, "risk" often refers to concerns for their lives and homes (Mozumber et al., 2008; McLennan et al., 2015). Conversely, for those who decide to wait and see or stay and defend their property, "risk" is associated with the dangers of leaving unnecessarily and navigating hazardous conditions (McLennan et al., 2015; Rhodes, 2007). Risk perception, particularly concerning natural disasters, has been associated with factors such as prior experience, socioeconomic status, and household composition (Cova, 2009; Kuligowski et al., 2022; Mozumber et al., 2008). Studies show temporal trends influence risk perceptions (Terpstra et al., 2009). In an earlier study, Slovic et al. (1987) found that "perceived risk is influenced (and sometimes biased) by the imaginability and memorability of the hazard. Meaning "people may not have valid perceptions about even familiar risks" (Coppola, 2020, p. 250). Cova et al. (2017) highlight that while many studies have examined long-term changes in risk perception, few explore how RP evolves during evacuation and re-entry. The authors also note a lack of understanding about how dynamic RP influences compliance with official protective action recommendations.

Prior Experience

Research indicates that individuals who have never experienced a wildfire are more likely to underestimate potential losses than those with prior experience (Mozumber et al., 2008; McLennan et al., 2012). This raises a critical question: What does "experience a wildfire" mean? Quarentelli (1980) observed that prior experience often refers to general disaster experience. However, a crucial yet frequently overlooked distinction in the literature is the difference between *experiencing a disaster* and

undergoing an evacuation. A deeper understanding of the challenges evacuees face is essential for tailoring public safety messages, improving evacuation protocols, and enhancing preparedness.

Lindell et al. (2008) found that an individual's risk perception depends on the recency, frequency, and intensity of their experiences with a hazardous event. The situation becomes more complex when recurrent evacuation warnings are issued in a particular area, as this can lead to 'warning fatigue' and negatively impact evacuation decisions (McLennan et al., 2019). Quarantelli (1980) described how repeated evacuations without an actual disaster could cause the "cry-wolf syndrome" (p. 28), reducing compliance with future evacuation orders. Whittaker and Handmer (2010) also found that previous false alarms—such as evacuation orders later deemed unnecessary—made people less likely to evacuate in the future. In contrast, Lindell et al. (2008) found no negative impact of prior experience on evacuation intentions. Strawderman et al. (2012) found that individuals who evacuated during prior wildfires were more likely to evacuate again, supporting the idea that *past behaviour predicts future behaviour*. This notion is further supported by Whittaker et al. (2013), who discovered that nearly three-quarters of individuals who delayed evacuation—despite challenges like poor visibility, heavy traffic, fallen trees, and smoke—stated they would make the same decision in future wildfires, as they ultimately reached their destination unharmed.

Place and Community

This variable relates to ownership of or emotional attachment to a place or community, commonly referred to in the literature as place attachment. Place attachment is often conceptualized as a cognitive, emotional, and behavioural connection between a person and a place (Jorgensen & Stedman, 2001; Asfaw et al., 2019). The literature highlighted several residence-specific characteristics - the length of residency, type of residency (e.g., part-time, full-time, seasonal), and property ownership - as influencing evacuation behaviours (McLennan et al., 2019; Stasiewicz & Paveglio, 2021). Several

studies found that property attachment can significantly hinder evacuation efforts (Huang et al., 2016; McLennan et al., 2019). For example, residents with a strong attachment to their property often become more concerned about its monetary value, increasing the likelihood of staying and defending it from looters (McLennan et al., 2019). A study of a Canadian First Nation community found that attachment to their reserve made the prospect of evacuating unappealing and distressing (McGee et al., 2019).

The relationship between the length of residence in at-risk areas and the likelihood of evacuating remains inconsistent (McLennan et al., 2011). Generally, individuals who have lived longer in a community are less likely to evacuate (Kuligowski et al., 2022; Lindell et al., 2015). Additionally, homeownership, in contrast to renting, has been shown to influence the decision not to evacuate (McLennan et al., 2019). While attachment to the community positively correlates with adopting self-protective actions (Lindell et al., 2015; McLennan et al., 2019; Wong et al., 2022), research limitations may influence this association. Community attachment in hazard research has primarily been measured through easily quantifiable factors, such as residential tenure. Cowan and Kennedy (2023) argue that attachment to place is much more complex than residential tenure; it also encompasses social perceptions about one's location, the types of individuals within the community, and social expectations regarding attitudes and behaviours.

Environmental and Social Cues

Lindell and Perry (2012) noted that the decision-making process for protective actions often begins with environmental and social cues. Environmental cues include visual, olfactory, or auditory signals that indicate potential danger. For example, the presence of flames, smoke, or ash is frequently cited in the literature as a reliable indicator that prompts individuals to evacuate (Lindell & Perry, 2012; McCaffrey et al., 2018; Mileti & Peek, 2000). Social cues, on the other hand, arise from observing the behaviour of others. And “while peers do not explicitly transmit warning messages, their behaviour—

especially obvious preparations for evacuation—can serve as social cues for protective action.” (Baker, 1991, para). Research shows that evacuation rates are higher when individuals receive multiple warnings from different sources (McLennan et al., 2012; Whittaker et al., 2016). Moreover, advice to evacuate from family, neighbours, and emergency services influences the decision to leave, with a greater impact noted among women than men (Whittaker et al., 2007). However, Strawderman et al. (2012) found that recommendations from these informal sources have less influence than formal warnings from authorities.

Household Preparedness

Household preparedness refers to any prior cognitive or physical actions taken by residents to mitigate risks to safety or property in the event of a wildfire (Dunlop et al., 2014). A commitment to a well-developed plan, along with the belief that household preparedness will effectively address the perceived level of risk, are key factors in the decision to stay and defend (McLennan et al., 2009; McLennan et al., 2012; Tibbitts et al., 2007). Three Australian studies noted that individuals who planned to stay and defend their homes exhibited greater confidence in their physical preparedness and ability to successfully protect their properties compared to those who intended to evacuate (McCaffrey, 2015; McLennan et al., 2014; McNeill et al., 2016). Several studies examined the connection between planning and evacuation behaviours post-disasters. Factors such as female gender (Gray-Graves et al., 2011), having a higher income (McNeill et al., 2016), and experiencing adverse physical health symptoms (Cova, 2009; McLennan et al., 2012) were all significantly associated with having an evacuation plan before a disaster. However, it has yet to be determined whether having a plan predicts actual evacuation behaviour (Thompson et al., 2016). Evacuation intentions, including alternatives to evacuation, require varying levels of household preparation. This may involve reducing wildland fuels near buildings or throughout the property, identifying evacuation routes, designating temporary lodging, and acquiring

necessary equipment and skills (Erikson & Prior, 2013). Several studies reported that individuals living in fire-prone areas are typically aware of wildfire risk and have a plan for evacuation or alternative when a wildfire threatens their property (Whittaker & Eriksen, 2016; McCaffery et al., 2018; McLennan et al., 2009). McNeill et al. (2016) noted that preparedness was only associated with perceived consequences rather than probability. This suggests that risk communications framing fire risk in terms of likelihood may have limited effectiveness in enhancing household preparedness.

Sociodemographic Factors

Various demographic factors have been identified as common predictors of evacuation behaviour. However, meta-analyses reveal that many individual determinants—particularly socio-demographic characteristics—are inconsistently associated with household evacuation behavior (Baker, 1991; Thompson et al., 2016). For example, older age was generally associated with a decreased likelihood of evacuation (Kuligowski et al., 2020; Paveglio et al., 2014; Whittaker et al., 2016), although this trend is not consistent across all studies (Thompson et al., 2016). Additionally, some studies indicate that higher levels of education and income are associated with a greater likelihood of evacuation (McCaffrey et al., 2018; Thiede et al., 2013), while others have reported a negative correlation (Huang et al., 2016; McCaffrey, 2014).

Household size is significant predictor of evacuation behaviour, influencing the decision to evacuate and the timing of the evacuation. Specifically, households with more children are more likely to evacuate (McLennan et al., 2012; Wong et al., 2022). In contrast, households with pets or livestock (Kuligowski et al., 2022; Mozumder et al., 2008; Wong et al., 2022) often adopt a "wait and see" approach or stay and defend their property. Tibbits and Whittaker (2007) found that many farmers and individuals whose livelihoods depend on livestock feel compelled to stay and defend their property, a

decision motivated not only by economic considerations but also by concern for the welfare of their animals.

One of the most frequently cited factors influencing wildfire evacuation behaviour is gender. Several studies indicate that men are more likely to stay and defend their properties (Whittaker et al., 2013, 2016; Haynes et al., 2010; Mozumber et al., 2008). Fothergill (1996) and Enarson and Tobin-Gurley (2013) noted that females perceive hazard threats more acutely than men and are thus more likely to take protective actions. Similarly, Lindell (2017) found that gender differences in risk perception are consistently observed. A recent study by Rahn et al. (2021) explored how risk perception and individual characteristics impact compliance with warning messages issued through official apps. The research revealed that older individuals and females were significantly more likely to comply with safety recommendations during severe weather. In a qualitative study conducted in Australia, Tyler and Fairbrother (2018) explored the impact of gendered norms on wildfire preparation and household decision-making. They identified a "split household" plan in which the male partner stays to defend the property while the female partner evacuates. The study found that gender inequality and differing expectations create challenging conditions for negotiation, especially when there are conflicting desires to evacuate. They submit that this tension may contribute to residents adopting a "wait and see" approach.

Situational Impediments

The behavioural responses of residents during an emergency are determined not only by intention but also by the physical and social environment, which can hinder the intended action or facilitate unintended actions (Triandis, 1980, as cited in Lindell & Perry, 2012). Various situational factors influence evacuation: blocked evacuation routes, perceived danger in evacuating, or situational impediments that prevent an individual from evacuating independently or with assistance (Thompson et

al., 2017; Quarantelli, 1980; Van Willigen et al., 2002). In rapid-onset disasters, separation from family members can be a barrier to evacuation. Van Willigen et al. (2002) found that evacuation is unlikely until family members are reunited, communication is established, and a designated meeting place is secured.

Limitations of Previous Research

An in-depth analysis of the existing wildfire evacuation research identified four notable limitations. These limitations highlight critical gaps in our understanding of residents' evacuation decision-making and behaviours during wildfires. First, much of the North American research in this domain focuses on the binary decision of whether to stay or evacuate, neglecting a third category: "Wait and See." The assertion that "No decision is, in itself, a decision" (James, n.d.) merits attention. This idea suggests that not making a decision is as important as making one and that any delay can have its own set of consequences. Indecisiveness is of significant concern, given the dangers of late evacuation for residents and first responders (McCaffrey et al., 2018; McLennan et al., 2019; Strahan & Gilbert, 2021). Second, numerous studies found that individuals with prior wildfire evacuation experience often have heightened risk perceptions. In their literature review, Kinateder et al. (2015) identified a potential reason for this: publication bias. The authors observed that very few studies reported no correlation between risk perception and evacuation, suggesting a tendency to publish only positive findings regarding this relationship. Furthermore, the authors noted that much of the literature on evacuation and risk perception relies on self-reported rating scales. Questions like "How at risk did you feel?" fail to capture the full complexity of risk perception. Thirdly, many studies use bivariate regressions, which do not account for the interactions between independent variables. This represents a significant gap in the research on the factors influencing evacuation. Lastly, one of the most well-known and referenced conceptual models describing individual responses to environmental hazards is the Protective Action Decision Model (PADM) developed by Lindell and Perry in 2004. An updated version published in 2012

supported some of their existing propositions while calling for re-evaluating of others (Lindell & Perry, 2012). The authors acknowledged that opinions on various aspects of the model vary; while some propositions have substantial support, others present “conflicting or counter-intuitive findings, and some are largely untested” (Lindell & Perry, 2012, p. 14). In 2025, the PADM remains unverified, and new research, particularly involving indigenous populations, is necessary.

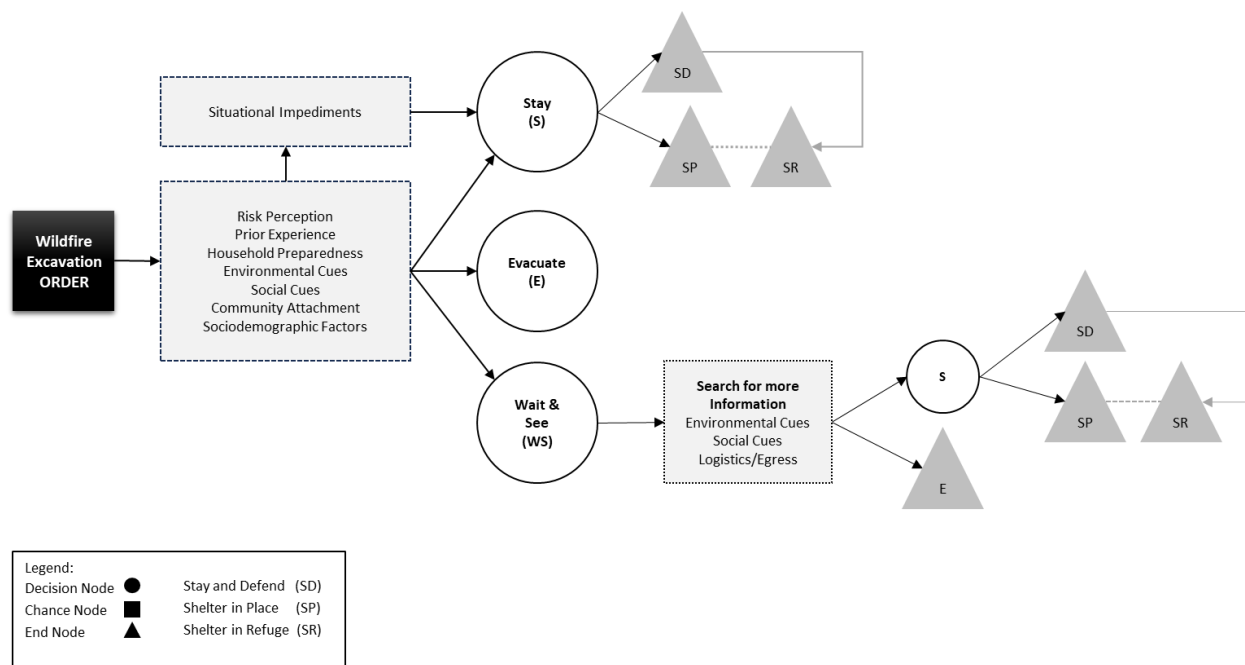
Three primary options exist for wildfire protective actions: evacuate, stay and defend, or shelter in place. However, this categorization oversimplifies the behavioural response. Some evacuees may delay leaving to seek more information or locate family members, while others may decide to evacuate while family members stay behind to defend their homes. The constantly changing nature of wildfires makes it challenging to determine the best course of action, as the preferable option can quickly change. Historic wildfires resulting in fatalities, such as the 2009 Black Saturday Fires in Australia, the 2018 Camp Fire in the US, Canada's 2016 Horse River Fire and the 2021 Lytton Wildfire, underscore the complexities of evacuation decision-making and the challenges of safely executing evacuation plans (Stasiewicz & Paveglio, 2021). Evacuation thus emerges as the primary protective action during wildfires, which Canada has made mandatory. However, residents increasingly face scenarios where evacuation becomes too risky or unfeasible. Researchers from various disciplines are examining evacuation decision-making and behaviours; however, there has been limited synthesis of findings. The literature on wildfire evacuation behaviours in Canada and abroad reveals the complex interplay of multiple factors that affect how residents respond to wildfires. Future research on evacuation behaviours among diverse populations is critical for developing strategies that enhance public safety against Canada’s growing threat of wildfires.

Conceptual and Theoretical Frameworks

Conceptual and theoretical frameworks guide research and anchor studies in established constructs (Adom et al., 2018; Salawu et al., 2023). They stimulate research, enhance rigour, and facilitate the advancement of knowledge (Adom et al., 2018; Salawu et al., 2023). In an early paper on evacuation behaviour, Quarantelli (1980), an American sociologist known for pioneering disaster research, defined evacuation as “the mass physical movement of people, of a temporary nature, that collectively emerges in coping with community threats, damages, or disruptions” (p. 23). The author cautioned that “several problems arise when evacuation is conceived as solely involving [a] range of physical flights of people and groups” (p. 23). This early conception remains particularly relevant to the aim of this study, as it emphasizes the complexity, interactivity, and convergence of evacuation behaviour, often involving large groups of people. Figure 4 provides a graphical representation of the research organization, comprising the dependent and independent variables and demonstrating their expected relationships (Miles et al., 2013).

Figure 4

4 Determinates of Residents' Wildfire Evacuation Behaviors



Resident's Wildfire Behaviour and Protective Action Decision Tree. Hicik (2025).

A theoretical framework serves as a blueprint for research inquiry (Grant & Osanloo, 2015; Salawu et al., 2023). It consists of beliefs and values guiding research and how knowledge is conceptualized within scientific communities (Allemang, 2022; Adom et al., 2018). Selecting the appropriate research methodology is crucial for ensuring the value and applicability of a study's findings (Stokes, 1997). This process begins with the researcher asking several fundamental questions: What do I hope to accomplish by conducting this study, and why? Which method aligns best with the research scope and objectives? Does the proposed method meet the needs of the study population? Is it suitable considering the project timeline and available resources? After consideration, the researcher must elucidate the rationale for choosing a particular methodology (Creswell, 2023). Pragmatism offers an action-oriented framework in which the researcher aims to address complex social problems requiring multiple approaches (Allenmang et al., 2022; Creswell, 2023; Hothersall, 2019). The goal of pragmatic research is to utilize human experience as the primary means for building knowledge and understanding

the world rather than depending on absolute truths (Hildebrand, 2011). Pragmatism does not privilege one type of knowledge or research method over another; instead, it encourages researchers to critically analyze which interests are served by applying knowledge in each situation (Cornish, 2009). Several authors postulate that pragmatism's roots in social justice and democracy and the resolve to produce tangible outcomes make it a fitting worldview for conducting mixed-method research (Creswell, 2018; 2023; Mertens, 2013; Maxwell & Mittapalli, 2010).

CHAPTER 3: METHODS AND METHODOLOGY

An Explanatory Sequential Mixed Methods Design was employed to examine the intersection of variables from a social science perspective (Creswell, 2023). In Phase 1, quantitative data were collected through an online survey using rigorous sampling methods. Phase 2 built on these findings by purposefully sampling a subset of non-evacuees, distinguishing between those who chose to stay and those unable to evacuate. This design offers strong external validity, allowing for confident generalization to the broader population. By combining quantitative and qualitative approaches, the mixed methods framework provides a comprehensive understanding of residents' evacuation behaviours. As Creswell (2023) explains, this pluralistic approach involves “gathering numbers and hearing the voices of the impacted individuals” (p. 231), with qualitative data enriching and contextualizing the quantitative findings. To examine the influence of the independent variables on the dependent variables, correlational research provided insight into the complexity of real-world relationships surrounding evacuation behaviours (Bhandari, 2023).

Location and Population

Wildfires have distinct spatial impacts, affecting some communities and neighbourhoods more severely than others. To examine this, a multi-scalar approach was employed to survey residents across seven small rural communities, all impacted by the same wildfire. The Columbia Shuswap Regional District (CSRD) governs seven rural electoral areas and four municipalities—Golden, Revelstoke, Sicamous, and Salmon Arm—serving over 57,000 residents in the Southern Interior of British Columbia (CSRD, 2024). Spanning 28,929 square kilometres, this region features a diverse landscape, ranging from the rugged peaks and glaciers on the eastern edge to the temperate lakes, rivers, and valleys of the Shuswap (CSRD, 2024). The Columbia-Shuswap is situated within the traditional, ancestral, and unceded

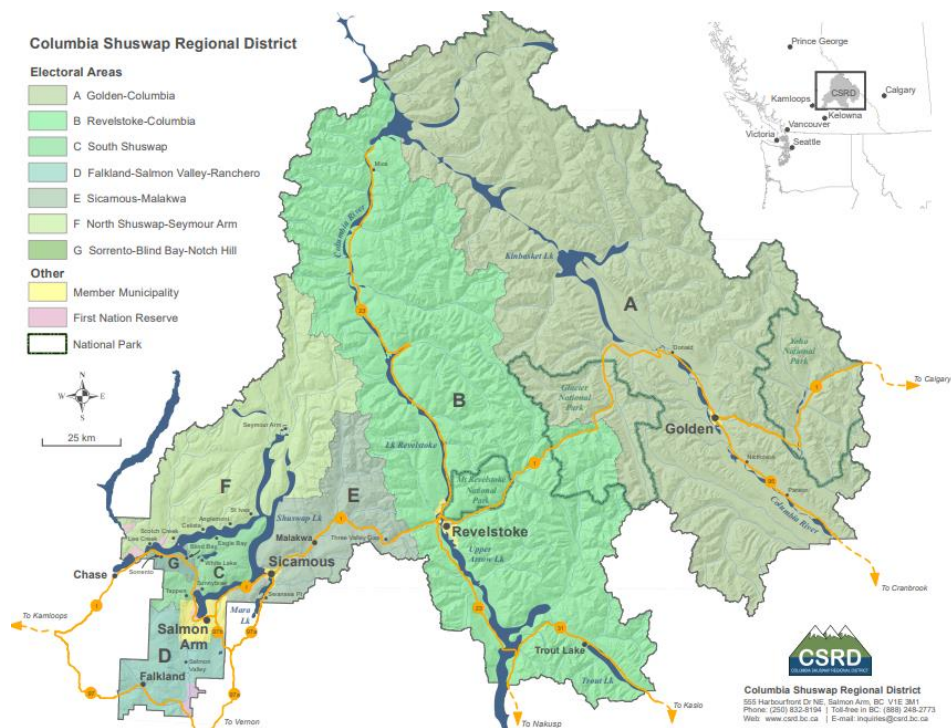
territory of the Secwepemc people. Secwepemc, meaning “meeting of the waters,” is known in English as the Shuswap. The North Shuswap was selected as the study area due to socially diverse populations with individuals likely to implement a range of behaviours during wildfires. This geographically stratified sample and focus on rural WUI populations expands upon existing Canadian evacuation research.

Local Fire Management

The CSRD provides rural fire suppression services to over 80 percent of its electoral area residents through 13 paid-on-call fire departments and service extension agreements with municipalities and First Nations. When factoring in coverage from rural and municipal fire departments, approximately 95 percent of residents within the CSRD have access to fire suppression services (CSR, 2023). The CSRD fire departments are dispatched through the provincial 911 program (Fire Services CSR, 2024). Although the fire suppression services cover most of the region, some areas fall outside the current fire suppression boundaries.

Figure 5

5 Map of the Columbia Shuswap Regional District



Source: The Columbia Shuswap Regional District (2024)

Study Sample

The sample population comprises all residents in the evacuation zone who were under an evacuation order or alert during the 2023 Bush Creek East Wildfire. Approximately 6,793 individuals were ordered to evacuate 3,685 properties in the Shuswap. Additionally, evacuation alerts were issued for an estimated 5,210 individuals across 3,226 properties in the area (CSRD, 2023). Figure 2 shows the map of the fire-affected sample area. Participants outside this boundary, specifically those with properties not under an evacuation order or alert, were excluded from the final data set.

Figure 6

6 Areal Map of the Fire-Affected Study Sample Area



Source: Google Earth (2023) adapted by Columbia Shuswap Regional District (2023).

Note: As of Wednesday, August 30, 2023, the areas in red were under Evacuation Orders, and the areas in yellow were under Alerts due to the Bush Creek East Wildfire.

Exclusions

In accordance with the RRU policy for student research, the study excluded participants under 18. Also, in compliance with the Government of Canada Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans – TCPS 2 (2022) Chapter 9, which addresses research involving the First Nations, Inuit, and Métis people of Canada, and Section L of the RRU Research Ethics Policy, I needed a written letter of permission or Band Council Resolution to engage with the Adams Lake Indian Band. Due to time constraints related to the impending wildfire season and the likelihood of evacuation, I decided not to actively seek participation from local First Nations. However, the survey included a question allowing participants to self-identify as First Nations, Inuit, Métis, or other visible minorities to ensure the demographic diversity among respondents was captured.

Survey Design

The survey questions were partially inspired by the PADM (Lindell & Perry, 2012) and incorporated specific independent variables recommended by the extant literature. The survey

comprised five main sections: eligibility, evacuation behaviours, household information, demographics, and voluntary end-of-survey comments. Three screening questions determine the eligibility of respondents: residents who were 18 years of age or older and either lived in or owned property (including part-time seasonal residents) in the CSRD, who were placed under evacuation order or alert during the wildfire. Demographic questions used language consistent with the 2021 Canadian Census to enhance participant familiarity. The survey featured closed, open, and partially closed-ended questions, enabling respondents to provide alternative answers and ensuring comprehensive data collection. Open-ended questions captured unanticipated variables influencing evacuation behaviours. Participation was voluntary and based on informed consent through the Participant Consent Form (Appendix I) and again in the survey introduction. Participants could withdraw from the study at any time by exiting the survey before completion, in which case their responses would not be collected. They were informed that once the survey was submitted, their responses became part of an anonymous data set, indicating consent to data collection.

Piloting

Piloting is essential for assessing the instrument's suitability for the study sample and refining questions (Rea & Parker, 2014). For closed questions, it reveals whether response categories are sufficient and helps determine the optimal survey length, which affects completion rates (Rea & Parker, 2014). With the help of colleagues, including a team of Health Emergency Managers familiar with the event, I conducted a pilot to evaluate the questions' functionality, clarity, and relevance, making necessary revisions.

Data Collection

Primary research was conducted through an online survey via SurveyMonkey. Participants were recruited using a multi-mode approach, including email invitations, social media posts, and posters in public places (Table 2). From August 1 to September 15, 2024, the survey link was widely distributed to the sample population, with reminders sent at one-week intervals. Snowball sampling was employed at the halfway point to increase the sample size.

Table 2

2 Study Participant Recruitment Strategies and Methods

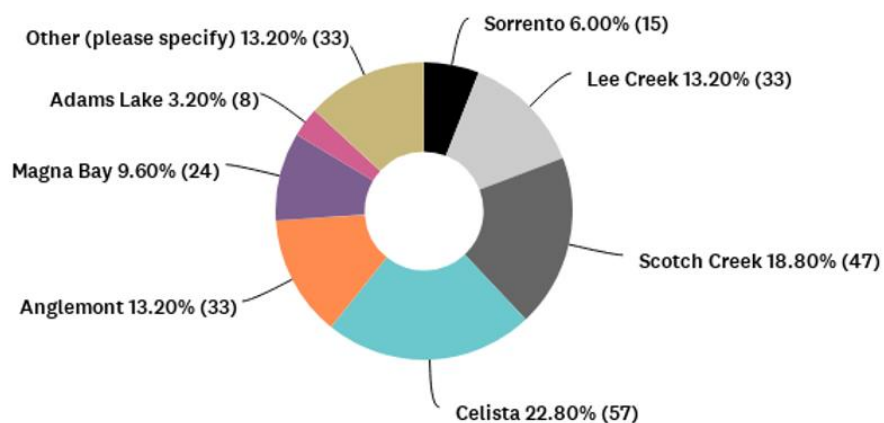
Recruitment Method	Description	Date(s)
Social media	A recruitment ad was posted to 12 North Shuswap community Facebook groups.	August 11, 21, September 2 and a final reminder September 12
Posters	100 8.5 X 11 colour posters displayed on community notice boards and group mailboxes	
Print advertising	'North Shuswap Kicker' article and recruitment poster	September 1
Email	Emails were sent to individuals who met sampling criteria and who would snowball recruitment (influencers)	August 11-September 2

Response Rates

The online survey received 264 responses, with 250 surveys completed. After excluding participants who answered "no" to any of the four eligibility questions, 213 responses were deemed usable for analysis. Figure 7 illustrates the distribution of respondents and response rate across the seven affected communities.

Figure 7

7 Distribution of Respondents and Response Rate Across the Seven Affected Communities (n=213)



Data Analysis

Phase One: Quantitative Analysis

The data was analyzed using IBM SPSS Statistics version 29.0.2.0. A descriptive analysis was conducted to examine the socioeconomic and sociodemographic characteristics, disaster preparedness factors, and behavioural responses, focusing on frequency distributions. Percentages and absolute counts were used to describe all quantitative variables. Secondly, a bivariate analysis using a Chi-square test was conducted to examine the distribution of socioeconomic and sociodemographic characteristics, disaster preparedness characteristics, and behavioural responses according to the decision whether to evacuate or not. Two-sided p-values less than 0.05 were considered statistically significant. An explorative unadjusted binary logistic regression analysis was used to calculate the odds ratios (OR) and their corresponding 95% confidence intervals (CI) for the associations between all predictors and evacuation decisions. Also, unadjusted, multinomial logistic regression models were used to calculate the relative risk ratios (RRR) and their 95% CIs. The goodness-of-fit of the model was assessed by the Hosmer-Lemeshow test and Cox&Snell R Square test. Lastly, unadjusted binary logistic regression analysis was used to

calculate the odds ratios and 95% CIs for the association between socio-demographic and socio-economic characteristics and participants' emergency preparedness and protective action profiles.

Phase Two: Qualitative Analysis

Open-ended questions were analyzed using a classic grounded theory approach (Glaser & Strauss, 2017) to identify emerging themes and sub-themes. Where appropriate, themes were presented as contextual data to enrich the broader study. For example, participants' evacuation experiences varied significantly and were influenced by urgency, risk assessment, and unpredictable circumstances. Including excerpts from these accounts emphasized the unique challenges of navigating rapidly changing conditions, which quantitative data alone could not fully capture. At the end of the survey, participants were invited to share additional comments about their experience during the 2023 Bush Creek East Wildfire. A thematic analysis was employed using manual inductive coding and GenAI on Survey Monkey. Excerpts from participants' accounts, observations, and suggestions for future evacuations substantiate the qualitative findings.

Margin of Error

A primary objective of survey research is to obtain data representative of a population. I used survey data to generalize findings from a sample to the broader population within a margin of error of - 5%. Given the moderate sample size and mixed methods approach, I am confident in the results, with a 95-99% confidence level.

Limitations

Survey participants may have been afraid or unwilling to admit non-compliance with evacuation orders, a known limitation in self-reported data on sensitive behaviours (Tourangeau & Yan, 2007). To mitigate this and encourage honest responses, the informed consent and survey introduction clearly

stated that responses would remain anonymous and could not be traced back to individuals, which has been shown to improve response accuracy in emergency management research (Guarantee et al., 2021; Dillman et al., 2014). Using snowball sampling to recruit a larger sample introduced the risk of selecting participants with similar viewpoints, which could limit the generalizability of the findings (Noy, 2008; Goodman, 2011).

Ethical Concerns

Phillips (2014) emphasizes the importance of asking, “Is it essential to conduct this research?” when initiating a study, arguing that research should primarily aim to advance knowledge on a given topic. Given the limited information on evacuation behaviours and protective actions during Canadian wildfires, it is critical to address this gap to enhance public safety. When selecting and implementing research methods, ethical principles must prioritize protecting participants' rights and well-being, including obtaining informed consent, ensuring anonymity and confidentiality, and communicating the research's purpose, risks, and benefits (Creswell et al., 2023). Ethical research also requires conducting studies in a socially responsible and accountable manner, avoiding conflicts of interest, and minimizing participant risks. As with most studies, participation may involve both positive and negative aspects. The Bush Creek East wildfire, which significantly impacted thousands of residents, was a focal event for this research. Participants were informed that reflecting on this event could cause distress and that their involvement could offer benefits, such as a deeper understanding of their evacuation decisions and personal preparedness. Coinciding with the wildfire's one-year anniversary, the survey allowed participants to reflect on the experience. Acknowledging the potential for reminders of the devastation, losses, grief, and trauma associated with the evacuation, participants were provided with a resource, [Tips-for-Navigating-the-One-Year-Mark-EN.pdf](#), by the Canadian Red Cross.

CHAPTER 4: RESULTS

This chapter presents the results of the analysis examining residents' behaviours and protective actions during the 2023 Bush Creek East Wildfire. The study aimed to address the primary research question: What factors influenced residents' evacuation behaviours and protective actions during the event? Additionally, several sub-questions were explored to understand the role of prior experience, decision-making cues (environmental and social), and household emergency preparedness in shaping evacuation, stay, or wait-and-see behaviours. The analysis employed a range of statistical methods, including bivariate Chi-square tests, unadjusted binary logistic regression, and multinomial logistic regression models. These techniques were used to explore the relationships between sociodemographic, socioeconomic, and preparedness variables and residents' behavioural responses (Evacuate, Stay or Wait and See) to the wildfire threat.

Characteristics of Study Participants

Participants were asked a series of socioeconomic and sociodemographic questions referenced in broader literature as salient indicators of intended evacuation behaviours. Characteristics of study participants (sample number alongside the corresponding percentage for each category) are presented in Table 3. Percentages and absolute counts were used to describe all quantitative variables.

Table 3

3 Characteristics of Study Participants

	%	(n)
Gender		
Female	64.1	(118)
Male	35.9	(66)
Age (years)		
<45	14.1	(26)
45-54	9.8	(18)
55-64	29.9	(56)

65-74	37.5	(70)
75+	8.7	(16)
Ethnicity		
European White	84.2	(155)
First Nations, Metis, or Inuk (Inuit)	1.1	(2)
Others	14.7	(27)
Community of living		
Sorrento	6	(15)
Lee Creek	13.2	(33)
Scotch Creek	18.8	(47)
Celista	22.8	(57)
Anglemont	13.2	(33)
Magna Bay	9.6	(24)
Adams Lake	3.2	(8)
Other	13.2	(33)
Residency status		
Full-time resident	67.6	(169)
Part-time resident	12.8	(32)
Seasonal resident	19.6	(49)
Housing situation		
Homeowner	86.4	(159)
Other	13.6	(25)
Housing type		
Single-family home	85.3	(175)
Other	14.7	(27)
Time at address		
<2 years	8.4	(17)
2-5 years	16.3	(33)
6-10 years	22.7	(46)
>10 years	52.7	(107)
Family status		
Single	13	(24)
Married	79.3	(146)
Other	7.6	(14)
Education		
Some grade school or high school	3.2	(6)
Completed high school/ GED	8.6	(16)
Some post-Secondary	17.2	(32)
College/Trade certificate or diploma	32.3	(60)
University degree	23.1	(43)
Post-graduate diploma or degree	15.6	(29)
Household income		
Under \$30,000	12.1	(17)
Between \$30,000 and \$49,999	9.9	(14)
Between \$50,000 and \$74,999	15.6	(22)
Between \$75,000 and \$99,999	24.1	(34)
Between \$100,000 and \$150,000	21.3	(30)
Over \$150,000	17	(24)
Children <18 years at home		
Yes	63.3	(167)
	36.7	(97)

Over two-thirds of the sample were full-time residents (full-time = 67.6%, part-time = 12.8% and seasonal 19.6%). Participants were largely homeowners (86.4%) who lived in the community for an extended period, with 22.7% residing there for 6 to 10 years and 52.7% for more than 10 years. Participants ranged in age from 19 to 75+, with 46.2% (n=86) being over 65 and the majority (64.1%, n=118) identifying as female. When asked which best describes their family status, most respondents (79.3%) indicated that they were married or in a common-law relationship, with over two-thirds (63.3%) having at least one child under the age of 18 in the household at the time of the Bush Creek East Wildfire. When asked about their educational background, 32.1% (n=43) reported holding a university degree (bachelor's), while 15.6% (n=29) had obtained a post-graduate diploma or degree. Additionally, 32.3% (n=60) indicated having a college or trade certificate or diploma, and 11.8% (n=22) had completed no more than a high school diploma. Most reported household income levels over \$50,000 (78%), with 38.3% reporting household income levels over \$100,000.

Exposure to Wildfire Threat

Participants (n=250) were asked to indicate their level of exposure and vulnerability to wildfire hazard (actual or potential) during the 2023 wildfire by answering the following questions:

- i. Were you at home or in the neighbourhood when the Bush Creek East Wildfire started?
- ii. Was your civic address put on Evacuation Order or Alert during the Bush Creek East Wildfire?

Figure 8

8 Number of Residents at home or in the neighbourhood when the wildfire started (n=233)

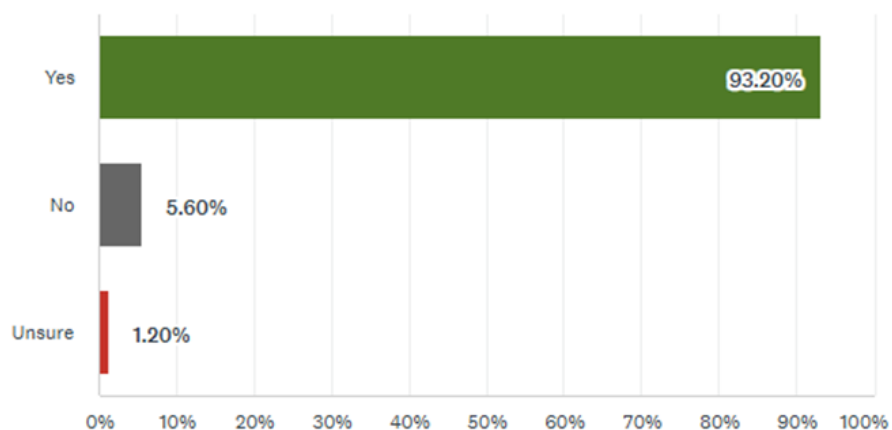


Figure 8 shows that 93.20% (n=233) of participants were at home (or in the neighbourhood) when the wildfire threatened the community.

Figure 9

9 Number of residents on Evacuation Order or Alert (n=213).

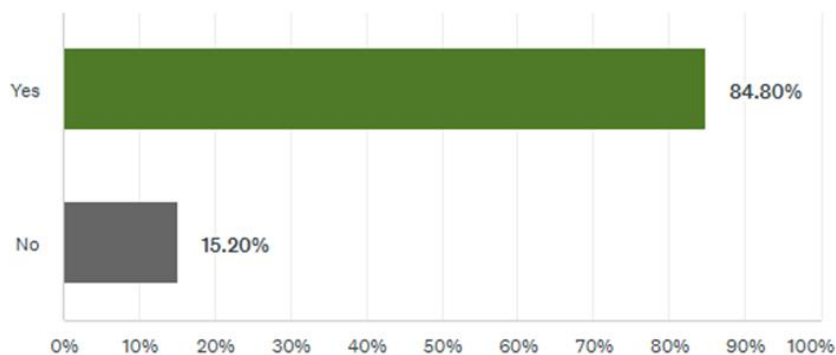


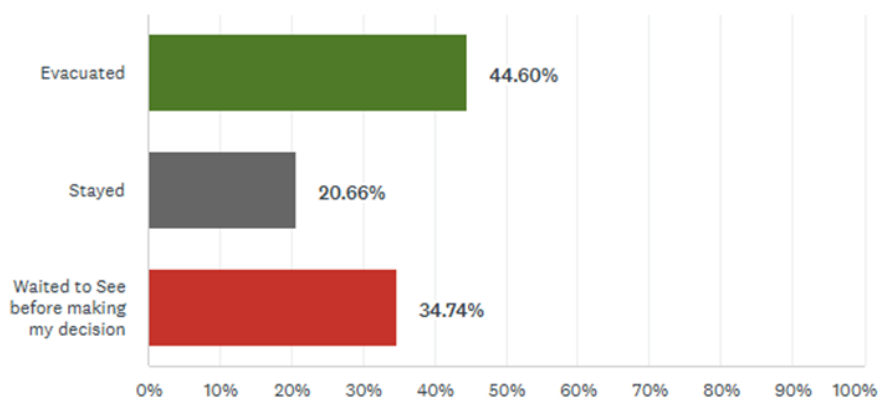
Figure 9 shows the number of participants (84.8%; n=213) who reported that their civic addresses were placed on Evacuation Order or Alert during the wildfires.

Behavioural Response to Wildfire Threat

Two hundred and thirteen participants stated that after learning about the Bush Creek East Wildfire threatening their community, 44.60% (n=95) evacuated, 20.66% (n=44) stayed, and 34.74% (n=74) waited to see how the wildfire developed before deciding on a course of action (Fig. 10).

Figure 10

10 Residents' behavioural response to wildfire threat: evacuate, stay, or wait and see (n=213)



Evacuation Behaviors

19.7% (n=47) of participants reported grabbing essential items and evacuating when they heard a wildfire was threatening their community, while another 9.1% (n=24) voluntarily self-evacuated once their address was placed on Evacuation Alert. 3.8% (n=10) initially evacuated but returned home after determining that the risk was low. Table 4 details the factors influencing residents' decision to evacuate.

Table 4

4 Factors influencing residents' decision to evacuate (n=95)

Factors	Percentage	(n)
<i>I grabbed important items and evacuated right away</i>	8.7	(23)
<i>I voluntarily self-evacuated as soon as I knew my address was put on evacuation alert</i>	9.1	(24)
<i>I left as soon as I knew that a wildfire was threatening my community</i>	11	(29)
<i>I evacuated but returned after determining the risk was low</i>	3.8	(10)
<i>Other</i>	12.9	(34)

Once participants decided to evacuate, their experiences varied widely, often driven by a combination of urgency, risk assessment, and unpredictable circumstances. In sharing their accounts, many highlighted

their challenges in navigating rapidly changing conditions. One participant described their desperate attempt to flee the area:

*“I jumped into my vehicle and headed out of town, only to find that the Scotch Creek route was closed. I raced back home, **swam out to my ski boat**, and departed to Blind Bay, leaving my loaded SUV on the beach at the water line.”*

Others took proactive measures based on their assessments of the situation. As one participant explained:

*“**Self-evacuated 3 days before the evacuation order came in.** I had been watching the fire for over a month, and with the forecasted high temperature and winds, I wasn’t waiting around for (a) the government to tell me when to leave and (b) getting stuck on the wrong side of the one-lane Scotch Creek bridge.”*

The wildfire threat was imminent for some, even without an official evacuation alert. One participant recounted:

*“The fire was being blown at us fast and was only 3 kilometres away. **We grabbed important stuff and headed to the ferry...we were not even on alert.**”*

Others found themselves relying on the guidance of emergency responders, though not all were reassured by the response. As one participant noted:

*“Firefighters came by when we were on alert and said they would come back and let us know when to evacuate. They never came so we eventually left. **Seeing flames along the side of the road as we were leaving.**”*

Stay (Stay and Defend and Shelter-in-Place) Behaviors

Twenty percent of the study participants (20.6%; n=44) stated they remained on their property. Of these, 33.3% (n=88) chose to stay and defend their home/property (12.9%; n=34), their neighbour’s home/property (9.8%, n=26), protect pets (4.5%, n=12) or livestock (3.4%. n=9) or had concerns about

looting (2.7%, n=7). Very few residents (1.1%; n=3) reported prior experiences with ‘false alarms’ as the deciding factor for staying behind. These behaviours align with the hypothesis that prior wildfire experience will not consistently correlate to evacuation compliance but will result in residents choosing to stay and defend or adopting a wait-and-see approach. Table 5 provides details on the factors influencing residents' decisions to stay.

Table 5

5 Factors influencing residents' decision to stay (n=44)

Factors	Percentage	(n)
<i>I stayed as I determined the risk was low</i>	3.4	(9)
<i>I stayed and searched for more information</i>	3	(8)
<i>I stayed to protect my home/property from harm</i>	12.9	(34)
<i>I stayed to protect my neighbour's home/property from harm</i>	9.8	(26)
<i>I stayed to protect my pets from harm</i>	4.5	(12)
<i>I stayed to protect my livestock from harm</i>	3.4	(9)
<i>I stayed as I was concerned about looting</i>	2.7	(7)
<i>I evacuated because of a wildfire before, which was unnecessary</i>	1.1	(3)
<i>There was no safe evacuation route out of the community</i>	1.9	(5)
<i>I did not have a reliable vehicle to leave the community</i>	0.4	(1)
<i>I did not have the financial resources to leave the community</i>	0.8	(2)
<i>I did not feel comfortable staying in public shelters</i>	0.4	(1)
<i>Other (please specify)</i>	3.8	(10)

For some participants, official guidance and available resources influenced the decision to stay during the wildfire. Their actions and reflections highlight the complexity of navigating a community wildfire. One participant explained:

*“We stayed after we knew about the wildfire because we did not receive an evacuation alert, and the **authorities asked people not to evacuate unless they were given the order**...so that people who were evacuated had space on the roadways to leave.”*

Others felt they had a safer option or could make informed choices based on their circumstances. As one person noted:

*“I had a **safe evacuation route via boat** on the lake.”*

One participant shared the tense moments when the situation escalated:

*“We waited for the order to evacuate, which came just after 4 pm. We went about 400m when **we saw trees on the hill in flames with embers igniting fires in roadside ditches**. We drove 200m more, and the local firefighters were on the road telling us to go back as the fire had crossed the road and we could not go that way, which was the **ONLY** road to safety.”*

The lack of confidence in the government's response added to some residents' uncertainty and frustration. As one participant reflected:

“I had/have little faith in our government and their ability to protect us.”

Wait and See Behaviors

The decision to wait and see how the wildfire progressed before evacuating was a common response, with 34.7% (n=74) indicating they would assess the situation and evacuate only if it became too dangerous. Several participants stated how they sought out more information before making their decision. This behaviour aligns with the hypothesis that environmental and social cues significantly affect evacuation behaviours. For instance, 11.4% (n=30) of participants reported actively searching for additional information, while 8% (n=21) waited for emergency services such as police or fire departments to give the evacuation order. A smaller group, 7.6% (n=20), relied on what their neighbours, friends, or family decided to do before taking action themselves. Table 6 details the factors influencing residents' wait-and-see behaviours before deciding on a protective action.

Table 6

6 Factors influencing residents' wait-and-see behaviours (n=74)

Factors	Percentage	(n)
<i>I waited to see what my neighbours decided before deciding to evacuate or stay</i>	4.2	(11)
<i>I waited to see what my family decided before deciding to evacuate or stay</i>	3.4	(9)
<i>I waited for emergency services (police/fire) to tell me to get out</i>	8	(21)
<i>I searched for more information before making my decision to evacuate or stay</i>	11.4	(30)
<i>Other</i>	8	(21)

For some participants, the decision to wait and assess the fire's behaviour was based on a combination of available information and uncertainty about the evolving situation. One participant explained:

“Never received an evacuation order – only an alert. My neighbour's house burnt down around 5:30 PM, and we got the order to evacuate close to 7 pm.”

Others turned to their community and resources to stay informed. As one participant shared:

“I searched for more information but was also in close contact with my neighbours regarding the overall situation.”

For some, staying in a perceived safe zone seemed the best option, especially when egress was compromised. One participant reflected:

“The roads were comprised anyway, so it was safer to stay in a safe zone.”

Characteristics of Residents According to Protective Action

A bivariate analysis using a Chi-square test examined the distribution of socioeconomic and sociodemographic characteristics, emergency preparedness characteristics, and behavioural responses according to the decision whether to evacuate or not. Two-sided p-values less than 0.05 were considered statistically significant. Table 7 details the characteristics of residents according to protective action (Evacuate, Stay, or Wait and See).

Table 7

7 Characteristics of Study Participants According to the Decision to Evacuate

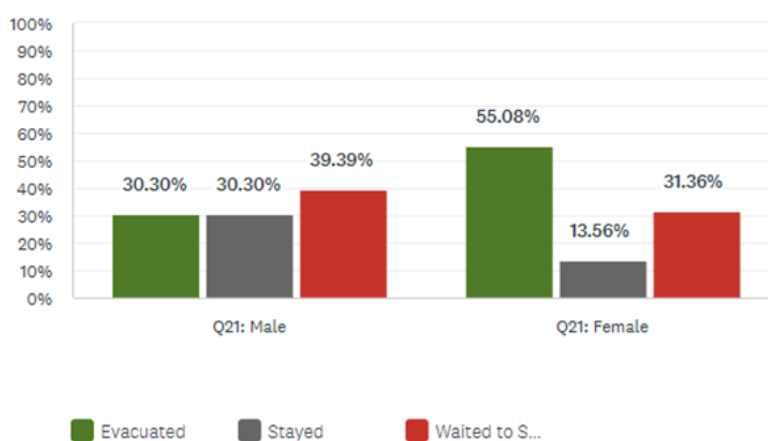
	Evacuated		Stayed		Wait & See		p-value
	%	(n)	%	(n)	%	(n)	
Gender							0.002
Female	55.1	(65)	13.6	(16)	31.4	(37)	
Male	30.3	(20)	30.3	(20)	39.4	(26)	
Age (years)							0.09
<45	30.8	(8)	34.6	(9)	34.6	(9)	
45-54	33.3	(6)	38.9	(7)	27.8	(5)	
55-64	50.9	(28)	12.7	(7)	36.4	(20)	
65-74	53.6	(37)	15.9	(11)	30.4	(21)	
75+	37.5	(6)	12.5	(2)	50	(8)	
Ethnicity							0.145
European White	47.1	(73)	21.3	(33)	31.6	(49)	
First Nations, Metis, or Inuk (Inuit)	100	(2)	0	(0)	0	(0)	
Others	37	(10)	11.1	(3)	51.9	(14)	
Community of living							0.076
Sorrento	35.7	(5)	0	(0)	64.3	(9)	
Lee Creek	44.4	(4)	11.1	(1)	44.4	(4)	
Scotch Creek	55.2	(16)	20.7	(6)	24.1	(7)	
Celista	51.2	(22)	16.3	(7)	32.6	(14)	
Anglemont	41.3	(19)	19.6	(9)	39.1	(18)	
Magna Bay	35	(7)	45	(9)	20	(4)	
Adams Lake	47.1	(8)	11.8	(2)	41.2	(7)	
Other	66.7	(4)	33.3	(2)	0	(0)	
Residency status							0.558
Full-time resident	46	(58)	17.5	(22)	36.5	(46)	
Part-time resident	36.4	(8)	27.3	(6)	36.4	(8)	
Seasonal resident	52.8	(19)	22.2	(8)	25	(9)	
Housing situation							0.834
Homeowner	46.5	(74)	18.9	(30)	34.6	(55)	
Other	44	(11)	24	(6)	32	(8)	
Housing type							0.975
Single-family home	45.9	(72)	19.7	(31)	34.4	(54)	
Other	48.1	(5)	18.5	(5)	33.3	(9)	
Time at address							0.145
<2 years	56.3	(9)	31.3	(5)	12.5	(2)	
2-5 years	33.3	(9)	11.1	(3)	55.6	(15)	

6-10 years	50	(21)	19	(8)	31	(13)	
>10 years	46.5	(46)	20.2	(20)	33.3	(33)	
Family status							0.963
Single	50	(12)	20.8	(5)	29.2	(7)	
Married	45.2	(66)	19.2	(28)	35.6	(52)	
Other	50	(7)	21.4	(3)	28.6	(4)	
Education							0.348
Some grade school or high school	50	(3)	33.3	(2)	16.7	(1)	
Completed high school/ GED	25	(4)	25	(4)	50	(8)	
Some post-secondary	43.8	(14)	21.9	(7)	34.4	(11)	
College/Trade certificate or diploma	55.9	(33)	16.9	(10)	27.1	(16)	
University degree	40.5	(17)	26.2	(11)	33.3	(14)	
Post-graduate diploma or degree	48.3	(14)	6.9	(2)	44.8	(13)	
Household income							0.706
Under \$30,000	58.8	(10)	23.5	(4)	17.6	(3)	
Between \$30,000 and \$49,999	64.3	(9)	14.3	(2)	21.4	(3)	
Between \$50,000 and \$74,999	45.5	(10)	3	(5)	31.8	(7)	
Between \$75,000 and \$99,999	32.4	(11)	23.5	(8)	44.1	(15)	
Between \$100,000 and \$150,000	43.3	(13)	26.7	(8)	30	(9)	
Over \$150,000	41.7	(10)	20.8	(5)	37.5	(9)	
Children <18 years at home							0.346
Yes	41.7	(40)	12	(22)	35.4	(34)	
No	51.1	(45)	15.9	(14)	33	(29)	

The hypothesis anticipated that sociodemographic characteristics—specifically age, gender, and family structure—would influence evacuation behaviours and timing. The analysis of variance revealed a statistically significant difference between male and female genders regarding chosen behaviours. Gender significantly influenced whether a resident was affiliated with the evacuation or stay group; 55.1% (n=65) of females stated they evacuated compared to 30.3% (n=20) of males (p=.002).

Figure 11

11 Male and Female Gender Differences and Evacuation Behaviours



In contrast, age did not show a statistically significant association with evacuation behaviour. However, within the middle-aged group (55-74 years), 52.25% were more likely to evacuate compared to those in the younger (≤ 45 years) or older (≥ 75 years) age groups, who evacuated at lower rates (30.8% and 37.5%, respectively). Family status had minimal impact on evacuation behaviour, with slight variance between single and married/common-law participants. However, the presence of children in the home did influence decision-making. Participants who were single and *without* children were more likely to evacuate (55.5%) compared to those who were single *with* children (33.3%) or married *with* children (38.3%). 23.2% of married/common-law participants with children adopted a wait-and-see approach, suggesting that family dynamics may play a role in evacuation decisions. Similarly, no significant differences were observed based on residency status (FT, PT or Seasonal) or home ownership versus renting. However, one interesting finding emerged among full-time residents: 14.5% of those who evacuated returned home after assessing that the wildfire risk was low, compared to only 4.3% of seasonal residents.

Emergency Preparedness Characteristics and Behavioural Responses

A bivariate analysis using a Chi-square test examined participants' emergency preparedness characteristics and behavioural responses according to the decision on whether to evacuate or not. Two-

Yes	20	(1)	60	(3)	20	(1)
No	25	(1)	75	(3)	0	(0)

Most participants (76.8%; n=156) indicated that they had an evacuation or emergency plan in place. Additionally, most residents reported having specific evacuation plans for their pets (83.6%; n=112) and livestock (63.6%; n=7). Among those with a household evacuation plan, 44.4% (n=64) chose to evacuate, while 20% (n=30) decided to stay, and 34.7% (n=50) adopted a wait-and-see approach. Age was a moderate factor in the presence of a household emergency plan. Specifically, 66% of participants aged 18-34 reported having an evacuation plan, compared to 81.46% of those aged 65 and older. Most participants (96.2%; n=177) owned a reliable vehicle, while 2.9% (n=6) relied on a boat for evacuation. Ownership of a reliable vehicle was a significant factor in evacuation decisions: 47.5% (n=84) of those with a reliable vehicle (motor vehicle or boat) evacuated, compared to 18% (n=32) who stayed and 34.5% (n=61) who adopted a wait-and-see approach.

Household evacuation plans were more common among full-time residents (81.75%) and part-time residents (84.6%) than among seasonal residents (57.5%). Additionally, the length of residency in the community influenced household emergency preparedness, with higher rates of planning among those who had lived in the community for 6-10 years (23.5%; n=37) and over 11 years (53.2%; n=82), compared to those who had lived there for under 2 years (8.9%; n=14) or 2-5 years (15.2%; n=24).

Predictors and Decision to Evacuate, Stay or Wait and See

An explorative unadjusted binary logistic regression analysis was used to calculate the odds ratios (OR) and their corresponding 95% confidence intervals (CI) for the associations between all predictors and the decisions to evacuate (Table 8). Also, unadjusted, multinomial logistic regression models were used to calculate the relative risk ratios (RRR) and their 95% CIs (Table 9). The goodness-of-fit of the model was assessed by the Hosmer-Lemeshow test and Cox & Snell R Square test.

Table 9

9 Unadjusted Odds Ratios Between Participants' Characteristics and the Decision to Evacuate

Characteristics	OR	Unadjusted (95% CI)
Gender		
Female	1	Ref
Male	0.36	(0.19-0.67)
Age (years)		
<45	1	Ref
45-54	1.13	(0.31-4.07)
55-64	2.33	(0.87-6.26)
65-74	2.3	(0.99-6.78)
75+	1.35	(0.36-5.01)
Ethnicity		
European White	1	Ref
First Nations, Metis, or Inuk (Inuit)	N/A	N/A
Others	0.66	(0.29-1.53)
Community of living		
Sorrento	1	Ref
Lee Creek	1.44	(0.26-7.96)
Scotch Creek	2.22	(0.59-8.26)
Celista	1.89	(0.54-6.56)
Anglemont	1.27	(0.37-4.38)
Magna Bay	0.97	(0.23-4.04)
Adams Lake	1.6	(0.38-6.82)
Other	3.6	(0.48-27.11)
Residency status		
Full-time resident	1	Ref
Part-time resident	0.67	(0.26-1.71)
Seasonal resident	1.31	(0.62-2.75)
Housing situation		
Homeowner	1	Ref
Other	0.9	(0.38-2.11)
Housing type		
Single-family home	1	Ref
Other	1.1	(0.48-2.48)
Time at address		
<2 years	1	Ref
2-5 years	0.39	(0.11-1.39)
6-10 years	0.78	(0.24-2.48)
>10 years	0.68	(0.23-1.96)
Family status		
Single	1	Ref
Married	0.83	(0.35-1.96)
Other	1	(0.27-3.74)
Education		
Some grade school or high school	1	Ref
Completed high school/ GED	0.33	(0.05-2.37)
Some post-secondary	0.78	(0.14-4.46)
College/Trade certificate or diploma	1.27	(0.24-6.82)
University degree	0.68	(0.12-3.78)
Post-graduate diploma or degree	0.93	(0.16-5.42)
Household income		

Under \$30,000	1	Ref
Between \$30,000 and \$49,999	1.26	(0.29-5.42)
Between \$50,000 and \$74,999	0.58	(0.16-2.10)
Between \$75,000 and \$99,999	0.34	(0.10-1.12)
Between \$100,000 and \$150,000	0.54	(0.16-1.79)
Over \$150,000	0.5	(0.14-1.77)
Children <18 years at home		
No	1	Ref
Yes	0.68	(0.38-1.22)
Do you own a reliable vehicle?		
No	1	Ref
Yes	5.42	(0.64-45.95)
Were people living in your household who required assistance during the evacuation?		
No	1	Ref
Yes	1.32	(0.53-3.29)
Do you have pets at the address?		
No	1	Ref
Yes	1.01	(0.55-1.86)
Do you have livestock at this address?		
No	1	Ref
Yes	0.32	(0.67-1.59)

Table 10

10 Unadjusted and Adjusted Multinomial Logistic Regression Analysis

Characteristics	Wait & See vs Stay		Evacuated vs Stay	
	RRR	(95% CI)	RRR	(95% CI)
Gender				
Male	1	Ref	1	Ref
Female	1.78	(0.78-4.07)	4.06	(1.78-9.29)
Age (years)				
<45	0.25	(0.04-1.52)	0.3	(0.05-1.91)
45-54	0.18	(0.03-1.23)	0.29	(0.41-1.98)
55-64	0.71	(0.12-4.20)	1.33	(0.22-8.08)
65-74	0.48	(0.09-2.65)	1.12	(0.20-6.36)
75+	1	Ref	1	Ref
Ethnicity				
European White	0.32	(0.09-1.19)	0.66	(0.17-2.57)
First Nations, Metis, or Inuk (Inuit)	N/A	N/A	N/A	N/A
Others	1	Ref	1	Ref
Community of living				

Sorrento	N/A	N/A	2	(0.13-31.98)
Lee Creek	N/A	N/A	1.33	(0.19-9.27)
Scotch Creek	N/A	N/A	1.57	(0.24-10.49)
Celista	N/A	N/A	1.06	(0.16-6.87)
Anglemont	N/A	N/A	0.39	(0.06-2.77)
Magna Bay	N/A	N/A	2	(0.20-19.91)
Adams Lake	1	Ref	1	Ref
Other	N/A	N/A	N/A	N/A
Residency status				
Full-time resident	1.86	(0.63-5.47)	1.11	(0.43-2.90)
Part-time resident	1.19	(0.29-4.92)	0.56	(0.15-2.15)
Seasonal resident	1	Ref	1	Ref
Housing situation				
Homeowner	1.38	(0.44-4.34)	1.35	(0.46-3.97)
Other	1	Ref	1	Ref
Housing type				
Single-family home	0.97	(0.30-3.15)	0.89	(0.29-2.72)
Other	1	Ref	1	Ref
Time at address				
<2 years	0.24	(0.04-1.37)	0.78	(0.23-2.63)
2-5 years	3.03	(0.78-11.79)	1.3	(0.32-5.33)
6-10 years	0.99	(0.35-2.79)	1.14	(0.43-3.01)
>10 years	1	Ref	1	Ref
Family status				
Single	1.05	(0.16-6.92)	1.03	(0.19-5.68)
Married	1.39	(0.29-6.67)	1.01	(0.24-4.19)
Other	1	Ref	1	Ref
Education				
Some grade school or high school	0.08	(0.01-1.30)	0.21	(0.02-2.19)
Completed high school/ GED	0.31	(0.05-2.08)	0.14	(0.02-1.09)
Some post-secondary	0.24	(0.04-1.41)	0.29	(0.05-1.62)
College/Trade certificate or diploma	0.25	(0.05-1.33)	0.47	(0.09-2.44)
University degree	0.2	(0.04-1.06)	0.22	(0.04-1.17)
Post-graduate diploma or degree	1	Ref	1	Ref
Household income				
Under \$30,000	0.42	(0.07-2.66)	1.25	(0.26-6.07)
Between \$30,000 and \$49,999	0.83	(0.10-6.78)	2.25	(0.35-14.61)
Between \$50,000 and \$74,999	0.78	(0.16-3.80)	1	(0.22-4.56)
Between \$75,000 and \$99,999	1.04	(0.26-4.18)	0.69	(0.17-2.81)
Between \$100,000 and \$150,000	0.63	(0.15-2.66)	0.81	(0.20-3.26)

Over \$150,000	1	Ref	1	Ref
Children <18 years at home				
No	1.34	(0.58-3.08)	1.77	(0.80-3.91)
Yes	1	Ref	1	Ref
Do you own a reliable vehicle?				
No	1	Ref	1	Ref
Yes	3.81	(0.66-21.95)	10.5	(1.13-97.53)
Were people living in your household who required assistance during the evacuation?				
No	1	Ref	1	Ref
Yes	1.38	(0.33-5.68)	1.64	(0.43-6.25)
Do you have pets at the address?				
No	1	Ref	1	Ref
Yes	0.41	(0.16-1.03)	0.56	(0.22-1.36)
Do you have livestock at this address?				
No	1	Ref	1	Ref
Yes	0.08	(0.01-0.70)	0.12	(0.02-0.64)

Lastly, unadjusted binary logistic regression analysis was used to calculate the odds ratios and 95% confidence intervals for the association between socio-demographic and socio-economic characteristics and participants' emergency preparedness and protective action profiles (Table 10).

Table 11

11 Unadjusted Ratios Between Participants and Reasons to Stay or Evacuate (Protective Action Profile)

Characteristics	Protect their property/home.		Protect neighbour's property/home		Protect pets		Protect livestock	
	OR	Unadjusted (95% CI)	OR	Unadjusted (95% CI)	OR	Unadjusted (95% CI)	OR	Unadjusted (95% CI)
Gender								
Female	1	Ref	1	Ref	1	Ref	1	Ref
Male	1.33	(0.28-6.44)	0.59	(0.17-2.72)	0.29	(0.06-1.44)	1.75	(0.28-11.05)
Age (years)								
<45	1	Ref	1	Ref	1	Ref	1	Ref
45-54	0.75	(0.04-14.58)	N/A		1.5	(0.20-11.54)	N/A	
55-64	0.17	(0.01-2.16)	0.71	(0.07-6.92)	N/A		N/A	

65-74	0.56	(0.04-7.44)	0.11	(0.01-0.84)	0.44	(0.06-3.51)	0.44	(0.06-3.51)
75+	0.13	(0.01-4.00)	0.29	(0.01-6.91)	2	(0.09-44.35)	2	(0.09-44.35)
Family status								
Single	1	Ref	1	Ref	1	Ref	1	Ref
Married	4	(0.50-31.98)	1.41	(0.20-9.93)	0.1	(0.03-1.50)	0.25	(0.03-2.00)
Other	0.33	(0.12-6.65)	0.33	(0.02-6.65)	N/A		N/A	

Thematic Analysis of Participant Insights on the 2023 Bush Creek East Wildfire Evacuations

At the conclusion of the survey, participants were invited to provide additional information about their evacuation experiences by responding to the open-ended prompt: “What else would you like me to know about your evacuation experience during the 2023 Bush Creek East wildfire? Please feel free to describe it in detail.” A total of 133 participants responded—most shared in-depth accounts of their experiences, observations, and suggestions for future wildfire evacuations. A thematic analysis was conducted using manual inductive coding and GenAI on Survey Monkey. The analysis identified ten key themes across the 133 responses: Evacuation Procedures (62), Firefighting Resources (41), Communication Issues (42), Property Protection (42), Emergency Response (50), Wildfire Management (39), Local Government (36), Stay and Fight (29), Weather Conditions (13), and Government Accountability (8). Participant accounts from five key themes related to the study’s research questions are presented below. The quotes are provided verbatim whenever possible, with minor edits for clarity and ethical considerations (Corden & Sainsbury, 2006).

Theme 1: Evacuation Procedures

Participants (n=62) described the evacuation process as intense, distressing, and sometimes chaotic. Some individuals reported delayed or unclear evacuation orders and the need to navigate unsafe routes.

*“It was very **intense, exhausting and frightening**. It was a hard decision to make to either stay or leave.”*

*“At the time we left, **we were not on an alert, but by sometime in the evening, our house had burnt to the ground...** We found out later that an evacuation order came at 4:07 pm Friday, August 18/2023. We left at 10:30 am.”*

*“The only way out was through a very rough backroad with **NO SIGNAGE**. We left at 5:30 PM with the **smoke rolling overhead and flames shooting hundreds of feet into the air**. We travelled into nightfall not really knowing if we were lost.”*

*“Some neighbourhoods were **so late in receiving a warning that there was not even safe exit by road**, requiring them to leave by boat.”*

*“We lost our home, and by the time the order to evacuate came, **our house was on fire**. We barely made it out of the area.”*

*“My husband and I did not receive the evacuation order until 2 hours after we had evacuated. A neighbour knocked on our door to inform us that the fire was very close and we needed to leave. When we left, **we could hear the fire. It sounded like a jet engine roaring towards us**. Utterly terrifying.”*

Theme 2: Staying to Fight

Participants (n=29) expressed varying views on the importance of personal and communal responsibility in safeguarding property. Some chose to stay and defend their homes despite evacuation orders, highlighting their distrust of external support.

*“With the lake being right there, I felt safe **staying to fight to protect** mine and my neighbours' properties. If I got into trouble, I would not have contacted authorities asking for help during an evac order. **It was my decision and right to stay...**”*

*“We chose not to evacuate as my husband is a contractor in the area... we prepared that we were in for a disaster. Equipment was prepared. Extra pumps and fire hoses were purchased. We stayed! I watched all of the firefighters leave. **We fought like hell to protect our community**. We didn't see firefighters back for three days!”*

*“Totally surprised that BC Wildfire Services did not stay and help put the fire out. **If it were not for our heroic neighbors our place would have burned**. Also upset that rather than be supported in doing what they did, they were threatened and harassed by authorities and treated in a disgraceful manner.”*

Theme 3: Property Protection

The theme of property protection emerged strongly, with participants (n=42) emphasizing proactive measures and feelings of personal responsibility in defending their homes. They often expressed frustration with perceived inadequacies in the official response.

*“My husband and I stayed to protect our home because **we were PREPARED to fight**. We had approximately 3000 gal of water, a fire pump, 250 ft of fire hose and a generator...”*

*“As I am a senior and live alone, I was advised by friends and to evacuate when the alert came down, local fire fighters arrived at my house to show and help me prepare my home on top of what I had already done. **Two sprinklers on the roof, pump ready, kiddie pool filled with water, clearing brush etc. around the house.**”*

*“We knew that **saving our home was OUR responsibility**, as much as the firefighters on the ground are good capable persons they are under control of a bureaucracy that often has interests other than saving property.”*

*“I feel that the order to leave what is a person’s private property is wrong. Legislation should be in place so that **no one is held accountable nor liable should [they] choose to stay and try protecting [their] property.**”*

Theme 4: Communication Issues

A recurring theme in participants' (n=42) responses was the lack of clear, reliable communication from authorities regarding the fire's progression. As a result, many individuals relied on alternative sources, such as social media, for critical updates.

*“Extremely poor communication from authorities on the status, situation and activities of the fire and plans to contain and defend properties. The **best information was through social media** from others in our community and near it.”*

*“Felt like we were not properly kept in the loop about the advancements of the fire in the lead up to it. **Had to rely more on Facebook posts and word of mouth** than have a government-backed and reliable source of information.”*

“...the availability of information due to internet going out and cell service being absolute garbage made me feel absolutely terrified and claustrophobic. “

Theme 5: Local Government

Participants (n=36) expressed dissatisfaction with local government responses, citing inadequate warnings, poor coordination, and concerns about resident's treatment during the evacuation process.

*"No notice from the regional district. **Highways were not closed, but we had to drive through flames.**"*

*"Incredible that **citizens had to use decoy boats to lure the RCMP away from boats bringing aid from across the lake...what country are we even in?**"*

Future Evacuation Intentions

Although participants were not asked if they would choose to evacuate or stay and defend in the future, several spoke about what they would do in the event of a future wildfire.

*"All the experienced firefighters were pulled out just when they were needed most.... The authorities did everything they could to stop the locals from protecting their homes after the ones who should have been doing that were pulled out. Even those further up the lake who weren't even on alert were stopped from getting essential supplies. **Next time I will stay and help my neighbours.**"*

*"We were on alert, not order. Our address was very close to the evacuation order boundary. On August 18, 2023, when the fire blew up on the North Shore and crossed the river at Skwlax, we decided to leave for the night. We returned the next day and kept our home sprinkled...**We chose to stay to protect our home. Moreover, would do so again.**"*

CHAPTER FIVE: DISCUSSION

The findings of this study reveal diverse evacuation behaviours, consistent with typologies identified in previous research (Cova, 2009; Lindell et al., 2012; McCaffrey et al., 2018; McLennan et al., 2013, 2019; Stasiewicz et al., 2021; Strahan et al., 2018). The variability in protective actions—evacuate, stay, or wait and see—reflects a continuum of responses shaped by perceived risk, prior experience, personal circumstances, and available information, in line with models discussed in evacuation literature (Lindell et al., 2005, 2012).

Behavioural Response to Wildfire Threat

Consistent with previous research, participants described the evacuation as chaotic, characterized by delayed or unclear orders and unsafe routes (McLennan et al., 2019; Strahan, 2020). Among those who evacuated, 19.7% did so immediately upon learning of the wildfire threat, while 9.1% evacuated voluntarily after receiving an Evacuation Alert. This proactive behaviour supports Lindell and Perry's (2004) view that risk perception and urgency influence early evacuation and McLennan et al.'s (2016) finding that individuals with heightened risk perceptions often evacuate before official alerts. These findings highlight the disconnect between official communications and personal risk assessments, aligning with a “self-reliance” approach to disaster management, where personal safety takes precedence over-reliance on government warnings (Oloruntoba et al., 2021). In contrast, 20.6% of participants remained on their properties despite evacuation orders. This behaviour indicates a complex sense of personal responsibility for property protection and a distrust of external support. Participants' motivations for staying—such as protecting their homes, pets, livestock, or concerns about looting suggest that varying risk attitudes are associated with different behaviours -staying and defending is a higher risk to life but a lower risk to property. Resource availability also influenced participants'

decisions to remain (e.g., stay and defend or shelter in place), with those having access to alternative evacuation routes, such as boats, demonstrating more informed and confident choices. This aligns with McCaffrey et al. (2015), who found that residents with alternative evacuation methods are more likely to stay or evacuate at their discretion. In this sense, personal resources—whether financial, physical, or logistical—are critical factors in how people perceive their ability to navigate evacuation scenarios (Lindell et al., 2005).

Over one-third of participants adopted a wait-and-see approach, monitoring the wildfire's development before deciding on action. Many sought additional wildfire information before making their decisions, a behaviour consistent with the PADM and Social Confirmation Theories, emphasizing the importance of individual risk assessment. This finding is consistent with several Australian studies that found that a significant number of individuals – ranging from 30%-60% - plan to wait and assess the risks before deciding to evacuate in the event of a wildfire (McCaffrey et al., 2018; McLennan et al., 2015; Strahan & Gilbert, 2021; Whittaker et al., 2013). This result supports Strahan's (2020) argument that waiting to take protective action can be a purposeful, deliberative process rather than indecision or non-compliance. However, study participants noted that access to information was hindered by inconsistent internet and cell service, particularly in rural areas, echoing McLennan et al.'s (2019) identification of communication failures as a key barrier during wildfire evacuations. Future strategies should include leveraging satellite-based communication systems or other technologies to ensure critical information is accessible to all residents, particularly in isolated communities.

The results highlighted the importance of official cues as several participants waited for formal evacuation orders from emergency services. This became problematic when evacuation orders were either delayed, rescinded, or never issued, leading some residents to seek information from unofficial sources. The reliance on social media suggests growing mistrust or perceived inadequacy of formal

evacuation channels, reinforcing the need for accurate, real-time information to influence evacuation decisions. A common pattern in the wait-and-see group, as identified in the literature, is reliance on the decisions of neighbours, friends, or family before taking action themselves (Lindell et al., 2008; McCaffrey et al., 2018; Tibbits et al., 2007). However, this study found that social cues had a limited impact on the wait-and-see group (7.6%).

Previous research has identified egress as a key factor influencing residents' decisions to stay during emergencies (McCaffrey et al., 2014; Paveglio et al., 2010). Some study participants reported staying in perceived safe zones when egress was compromised, though the influence of this factor was inconsistent. Some also evacuated early due to concerns about traffic congestion, as did those with livestock or recreational vehicles. Conversely, others chose to remain until evacuation orders were issued, citing a desire to keep roads clear for emergency vehicles. The experience of a few participants who had to abandon their vehicles and use boats to flee highlights the logistical challenges in wildfire evacuation, particularly in rural communities. These findings highlight the importance of planning for infrastructure limitations, ensuring alternative routes, and providing clear guidance on transportation options in official warning messages.

Prior disaster experience is often discussed as a predictor of future evacuation behaviour, though its impact remains debated. Some argue that experience increases the likelihood of evacuation by enhancing risk awareness and understanding of evacuation procedures (Riad et al., 1999). Others suggest that previous events may make individuals feel overly secure or dismissive of future threats, especially if they have safely navigated past disasters (Gladwin & Peacock, 1997; Lindell et al., 2005; Lindell & Hwang, 2008). In this study, some participants reported that prior experience with "false alarms" did not significantly influence their decision to stay during the wildfire; some chose to defend their property, while others opted to wait and see. However, those who evacuated indicated they would

likely do so again, suggesting that prior behaviour may be a more reliable predictor of future evacuation decisions than prior experience. This finding aligns with the Theory of Planned Behavior (TPB) (Ajzen, 1991; Fishbein et al., 2010), which distinguishes between behavioural intention and actual behaviour and emphasizes the role of past behaviour in predicting future actions.

Demographics and Evacuation Preferences

Participants' evacuation decisions were shaped by the immediate wildfire threat and demographic and household factors, including gender, age, family status and emergency preparedness (Fothergill, 1996; Gladwin & Peacock, 1997; Lindell et al., 2005). Gender emerged as a significant factor in evacuation rates, with a higher proportion of women (55.1%) evacuating than men (30.3%). This disparity can be explained mainly by the role that gender plays in shaping risk perception and decision-making during disasters. Additionally, research indicates that women tend to have stronger social networks, which may heighten their awareness of warnings and influence their decision-making by reinforcing the perceived severity of the threat (Enarson et al., 2013; Fothergill, 1996; Fothergill, 1999). These gendered behaviour patterns underscore the complex interaction between risk perception, social roles, and the decision-making processes that drive evacuation behaviours. No significant differences in evacuation rates were observed across age groups; however, the middle-aged cohort (55-74 years) demonstrated higher evacuation rates than younger and older age groups. This pattern indicates that age-related variations in risk perception and evacuation behaviour are more nuanced than simple age-based distinctions suggest. McLennan et al. (2019) explain that older adults may face physical or health-related barriers that hinder their ability to evacuate effectively, while younger individuals may lack the experience to accurately assess or respond to the risks posed by disasters such as wildfires.

Households with children were more likely to evacuate, a finding consistent with previous studies that suggest parents, particularly mothers, tend to prioritize the safety of children, resulting in

higher evacuation rates (Enarson, 2000; Gladwin & Peacock, 1997). However, family status (i.e., married/common law versus single) did not significantly influence evacuation rates, indicating that while family dynamics may shape decision-making, other factors, such as perceived risk and self-efficacy, play a more substantial role in determining evacuation behaviour (Lindell & Perry, 2012). Notably, the wait-and-see approach adopted by 23.2% of married/common-law participants with children underscores the complexity of family considerations, which can sometimes lead to delayed or indecisive evacuation actions. This aligns with previous findings by Lindell et al. (2005), who highlighted how family roles and the need for household consensus can complicate the decision-making process during a disaster.

The study revealed that homeowners were less likely to evacuate than renters, reflecting concerns about property protection and potential looting. This aligns with previous studies suggesting that homeowners may be more inclined to stay due to their attachment to property and the risks of financial loss (Bubeck et al., 2012; Riad et al., 1999). While the current study did not find significant differences based on residency status (full-time, part-time, seasonal), it is noteworthy that 14.5% of full-time residents evacuated but later returned after assessing that the wildfire risk was low. This indicates that full-time residents may be more familiar with the local environment and better positioned to assess the evolving situation.

Most participants (76.8%) reported having an evacuation or emergency plan. Of those with a plan, 44.4% evacuated, 20% remained, and 34.7% adopted a wait-and-see approach. These findings are consistent with previous research indicating that most individuals living in fire-prone areas are aware of wildfire risk and have a plan for evacuation or alternate when a wildfire threatens their property (McCaffery et al., 2018; McLennan et al., 2009; Whittaker & Eriksen, 2016). These results also highlight the importance of preparedness in increasing the likelihood of evacuation (Lindell et al., 2005; McCaffrey et al., 2018; McLennan et al., 2019). Additionally, a significant proportion of residents had

evacuation plans for their pets (83.6%) and livestock (63.6%), reflecting the broader scope of preparedness among these households. Emergency plans were more common among full-time and part-time residents (compared to seasonal residents), especially those with longer tenure in the community, suggesting that prolonged exposure to wildfire risk encourages preparedness behaviours. Age was a moderate factor in the presence of a household emergency plan, with 66% of participants aged 18-34 reporting having a plan, compared to 81.46% of those aged 65 and older. Most participants (96.2%) owned a reliable vehicle, while 2.9% relied on a boat for evacuation. The ownership of a reliable vehicle was a significant factor in evacuation decisions, as 47.5% of those with a reliable vehicle (motor vehicle or boat) evacuated, compared to 18% who chose to remain. These findings underscore the role of personal preparedness and transportation access in shaping evacuation behaviours during disasters.

Official Guidance and Trust in Authorities

Another key finding was that some participants chose to stay because they had not received an evacuation alert and were advised by authorities not to evacuate unless ordered. This reflects a reliance on official guidance and signals that some individuals may prioritize compliance over perceived risk. However, as highlighted in the study, this decision was also tied to the concern that if people evacuated prematurely, they could impede the movement of those officially ordered to evacuate. Participants expressed a lack of faith in the government's ability to protect them, a sentiment echoed in prior studies examining the role of trust in evacuation decisions (Baker, 2009; McLennan et al., 2016; Mileti & Peek, 2000). A lack of confidence in government responses to emergencies undermines warning messages and prompts individuals to rely on personal judgment or informal networks. Addressing these issues will require improving the clarity and timeliness of official communication and fostering stronger community relationships through preparedness programs.

Mandatory Evacuations and Law

The implications of forced evacuation orders during wildfires in Canada, particularly in contrast to the flexible "leave early or stay and defend" programs in Australia, raise critical questions about the efficacy and fairness of evacuation policies. In Canada, mandatory evacuation orders are typically issued to ensure the safety of residents, with the expectation that individuals will vacate the area to minimize exposure to life-threatening conditions. Unlike the Australian model, which permits residents to stay and defend their homes *if they are adequately prepared*, Canada's approach typically prioritizes blanket evacuation orders, which may not always account for the nuanced needs of individuals, such as those with livestock, pets, or other critical responsibilities. This lack of flexibility can result in delayed evacuations and potentially dangerous outcomes, as residents may defy orders due to concerns about property protection or distrust of the evacuation system. Furthermore, it may undermine community resilience, as residents more familiar with their local environments may possess the knowledge and resources to defend their properties effectively. A more flexible approach like the Australian system, which combines mandatory evacuations with options for residents to stay and defend under certain conditions, could enhance safety and agency, providing adequate preparation, risk assessment, and guidance from emergency management authorities. Ultimately, this comparison highlights the need for tailored evacuation policies that balance the imperative of public safety with the practicalities and desires of affected residents.

Limitations

Location

The study was conducted in a rural setting, which may limit the generalizability of the findings to urban or remote areas. Rural communities face unique challenges, such as limited communication

infrastructure and firefighting resources, which can influence emergency preparedness and evacuation behaviours (Carroll, 2016; Kapucu, 2013). Future research should include comparative studies across urban, rural, and remote locations to understand better the location-specific factors affecting evacuation decisions.

Sample Size

The small sample size was partially due to the difficulty of recruiting some participants who distrusted government authorities and, by extension, were skeptical of academic institutions and researchers, leading to a wariness toward participation.

Demographics

The sample was predominantly homogeneous, with 98% of participants identifying as White/European ethnicity. A notable proportion (32.1%) held a university degree, and another 15.6% had completed post-graduate studies. In contrast, 11.8% had attained a high school diploma. These educational levels suggest that the sample may be more educated than the general population, influencing their awareness and preparedness for emergencies. Seventy-eight percent of participants reported household incomes exceeding \$50,000, with 38.3% earning over \$100,000. These relatively high incomes indicate better resource access, potentially influencing evacuation decisions and preparedness behaviours (Fothergill et al., 1999). While this study provides valuable insights into resident's behaviours from higher socioeconomic backgrounds, the findings may not fully represent the experiences of lower-income and underrepresented groups. Further research on wildfire evacuation in Canada, mainly focusing on these groups, is essential to ensure equitable and inclusive emergency planning (Smith et al., 2020).

Hindsight Bias

Finally, the data collection occurred 12 months after the wildfire, introducing the potential for hindsight bias and inaccurate retrospective accounts. However, Fivush (2011) and Roese and Vohs (2012) found that emotionally charged events are often encoded deeply in memory and can reduce the tendency to reinterpret past decisions through a biased lens.

Implications for Future Research

This study highlights the complexity and variability of evacuation behaviours among residential populations during wildfire events, particularly in rural Canadian WUI areas. Future research should examine the influence of demographic factors such as community type, household composition, and residency tenure on evacuation strategies (e.g., "leave early," "stay and defend," or "shelter-in-place"). Additionally, research should investigate how these behaviours differ across seasonal, rural, and urban communities. Delays in evacuation decision-making point to the need for better-timed and more effective evacuation orders, particularly in areas with limited access to information. Studies should also explore the impact of targeted public education and emergency preparedness campaigns on evacuation compliance, especially among transient populations such as tourists and seasonal workers. Understanding the interaction between human behaviour and community characteristics is essential for enhancing wildfire evacuation preparedness.

Recommendations:

- 1. Investigate how community type, family composition, and residency tenure influence wildfire evacuation behaviours and strategies, including "leave early," "stay and defend," and "shelter-in-place."*
- 2. Explore the effectiveness of tailored communication strategies on wildfire evacuation in seasonal communities (cottage/cabin country and industrial camps such as logging and mining).*

3. *Investigate the role of public education and emergency preparedness in improving evacuation compliance among transient populations (e.g., tourists and seasonal workers).*

Implications for Professional Practice

The study underscores the need for community-specific strategies in wildfire evacuation planning. Firefighting, emergency management, and public safety professionals must recognize residential groups' distinct needs and collaborate with communities to develop tailored evacuation plans. Incorporating local and traditional knowledge and considering social networks into evacuation strategies is crucial for their effectiveness.

This study, consistent with recent trends in mandatory evacuations for wildfires, hurricanes, and floods, found that 20.6% of participants ignored evacuation orders, with over one-third opting to monitor the situation before taking action. These findings suggest that disaster risk messaging should go beyond the standard “evacuate immediately” directive, considering those unable to evacuate and respecting individuals’ rights to remain behind to protect property and livestock. Enforcing orders during a disaster may not be ideal; prioritizing life-saving measures while respecting personal autonomy is crucial. Strengthening local preparedness through partnerships, integrating Indigenous and local knowledge, and providing community-based fire smart and wildfire fighting programs will drastically reduce wildfire risk. This collaborative approach ensures that residents and authorities work together to reduce wildfire impacts and improve safety outcomes.

Recommendations:

1. *Develop community-specific evacuation plans, incorporating alternative escape routes and leveraging social networks for timely warnings.*
2. *Investigate the preparatory actions, skills, equipment, and the efficacy of alternative evacuation strategies, such as "leave early," "stay and defend," and "shelter-in-place," as implemented in Australia.*

3. *Invest in community-based wildfire training programs (e.g., S-100 basic fire suppression training) to empower residents in wildfire risk mitigation.*
4. *Strengthen partnerships between emergency management agencies and local communities, incorporating Indigenous and local knowledge into mitigation, response and recovery strategies.*
5. *Develop targeted communication strategies for wildfire preparedness and evacuation in seasonal communities (cottage/cabin areas) and broadcast them during peak tourist seasons*
6. *Leveraging satellite-based communication systems or other technologies to ensure critical information is accessible to all residents, particularly in isolated communities.*

CHAPTER SIX: CONCLUSION

Across Canada, wildfires cause widespread destruction of communities, wildlife habitats, and vital resources, highlighting the escalating threat exacerbated by urban expansion, population growth, and climate change (Daniels et al., 2025; Bénichou et al., 2021). The 2023 wildfire season set new records, with 7,131 fires burning over 17.2 million hectares and displacing more than 232,000 evacuees (Government of Canada, 2023). These trends are not exclusive to Canada; other countries have similarly experienced an uptick in climate-related WUI fire risks (Manzello et al., 2018). The recent and devastating wildfires that impacted Los Angeles in January 2025 further illustrate the intensifying hazards of WUI fires, exacerbated by climate change. This study offers insights into the complexity of evacuation behaviours during wildfires in the Canadian WUI, with findings applicable to rural communities across North America.

Among the 213 participants, 44.6% evacuated immediately after learning about the Bush Creek East wildfire, 20.6% chose to stay, and 34.7% adopted a wait-and-see approach. These behaviours reflect a continuum of protective actions influenced by perceived risk, prior experience, personal circumstances, available information and trust in authorities. Notably, over fifty percent (n=55.3%) of evacuees acted independently of official alerts, demonstrating a preference for personal risk assessments over governmental directives. This trend aligns with the concept of self-reliance in disaster management, emphasizing the role of individual resilience and psychological preparedness in evacuation decisions (FEMA, 2019; Oloruntoba et al., 2021). A significant proportion (34.7%) of those who stayed employed a wait-and-see strategy, consistent with the PADM and Social Confirmation Theory. This reflects findings from similar studies in Australia and the US, where a similar percentage of

residents delayed their decisions while seeking additional information (McCaffrey et al., 2018; McLennan et al., 2015; Strahan & Gilbert, 2021; Whittaker et al., 2013).

The analysis revealed that demographic factors such as gender, family status, homeownership and emergency preparedness significantly shape evacuation decisions. Gender, in particular, was identified as a critical determinant, with women (55.1%) more likely to evacuate compared to men (30.3%). This disparity can be attributed to distinct risk perceptions, decision-making processes during disasters, and social roles that influence protective actions (Fothergill, 1996; Gladwin & Peacock, 1997; Lindell et al., 2005). Additionally, homeowners were less likely to evacuate than renters, a trend reflecting their attachment to property and concerns over potential looting (Bubeck et al., 2012; Riad et al., 1999).

Preparedness also emerged as a pivotal factor in evacuation behaviour. Most participants (76.8%) reported having an evacuation or emergency plan; of those, 44.4% evacuated. These figures are consistent with previous research indicating that individuals in fire-prone areas often have an evacuation plan (McCaffrey et al., 2018; McLennan et al., 2009; Whittaker & Eriksen, 2016). Aligned with disaster research (Lindell et al., 2005; 2011; McCaffrey et al., 2017), physical and logistical resource availability was a key determinant of evacuation behaviour. Residents with access to alternative evacuation methods like boats showed greater confidence in their decisions. While some chose to shelter-in-place due to compromised egress, others evacuated early to avoid traffic congestion. These decisions highlight the logistical challenges of wildfire evacuations, particularly in rural areas with limited alternative routes. This finding confirms the need for advanced planning for infrastructure limitations and guidance on evacuation routes in emergency communications.

A critical yet unexplored consideration in the Canadian context is that delaying evacuation may be deliberate rather than a sign of indecision or non-compliance (Strahan, 2020). Shifting the mindset

from viewing delays as defiance to recognizing them as purposeful will refocus official efforts on public safety and the protection of life rather than enforcement. During the 2023 Bush Creek East wildfire, residents who stayed behind sought additional information to guide their decisions; however, this process was hindered by limited cellular connectivity and a lack of timely official directives. While increasing reliance on unofficial sources like social media and networking is concerning, the growing distrust or perceived inadequacy of formal evacuation channels is equally troubling. These findings highlight the urgent need for real-time, reliable information from official sources to support evacuation decision-making. Finally, drawing from participants' accounts, this study contributes to the discourse on prior disaster experience as a predictor of evacuation behaviour by challenging the assumption that past experiences alone drive decisive action. Consistent with the Theory of Planned Behavior (TPB) (Ajzen, 1991; Fishbein & Ajzen, 2010), it suggests that patterns of previous behaviour—whether proactive evacuation, sheltering-in-place, staying and defending, or waiting for further information—serve as more accurate predictors of future behaviour.

Canada's current operational capacity for mass evacuations is inadequate, posing significant risks to life during wildfires (Canadian Council of Forest Ministers, 2024). Furthermore, reliance on blanket evacuation orders, such as "evacuate immediately," overlooks residents' diverse needs, situational factors, and communication limitations. Future studies should explore these dynamics to understand better how community characteristics shape evacuation behaviours and how to tailor evacuation strategies accordingly. In particular, future research should examine the role of public education campaigns in influencing evacuation compliance, especially among transient populations like tourists and seasonal workers who may be unfamiliar with local risks and more challenging to reach through traditional communication channels. Government officials must explore alternatives to conventional evacuation strategies, particularly in scenarios where such measures become overly

perilous or impractical. Strategies should respect residents' right to self-governance and property protection. Successful models from jurisdictions like Australia (“Leave Early or Stay and Defend”) and the United States (“Ready, Set, Go”) offer valuable insights and lessons learned. Moreover, while discussions continue about enhancing suppression efforts, the real solution lies in adopting an all-of-society approach emphasizing investment in local response capabilities. Sustainable solutions must integrate local and Indigenous knowledge, ensuring that residents and authorities work together to mitigate wildfire risks and improve safety during evacuations.

CHAPTER SEVEN: REFERENCES

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CHAPTER EIGHT: APPENDICES

- I. Participant Consent Form
- II. Survey Questions

Appendix A: Informed Consent

Shuswap Residents Wildfire Evacuation Behavior Survey Consent to Participate

My name is Alana Hicik, and you are invited to participate in my research project, “Stay, Leave, or Wait and See? Examining Determinants of Resident’s Evacuation Behaviors during the 2023 Bush Creek East Wildfire,” by completing a brief survey. I am a Disaster and Emergency Management graduate student in the School of Humanitarian Studies at Royal Roads University in Victoria, BC. I am conducting this research to complete a master’s degree, and your assistance is deeply appreciated.

My research aims to identify and understand the factors influencing residents’ evacuation behaviours during the 2023 Bush Creek East wildfire. The survey is expected to take less than 15 minutes to complete. Your voice matters, and participation in this study is a powerful way to contribute.

In addition to submitting my final report to Royal Roads University (RRU) in partial fulfillment for a master’s degree, I will share my research findings with Columbia Shuswap Regional District (CSR), Emergency Management and Climate Readiness (EMCR) and Provincial Health Services Authority (PHSA). The research results will be published in public outlets, including RRU’s Digital Archive, Pro-Quest and Library and Archives Canada. The results may also be disseminated at public and academic conferences and presentations. The data gathered will be retained for 2 years and stored under password encryption for 5 years. As with most studies, participation may have positives and negatives. The Bush Creek East wildfire was a significant event impacting thousands of residents. Reflecting on this time may cause some individual’s distress. Your participation may also lead to benefits such as a deeper understanding of your evacuation decisions. Your experiences are valuable in shaping future policies and practices to support public safety during wildfire evacuations. Your participation is entirely voluntary and via an online survey platform. I will not collect, use, or disclose personal information. Please do not provide personal or any third-party information (i.e., information about others) in your responses. *Survey Monkey is an American-owned company and is, therefore, subject to American law. By participating in the survey, you consent to have any personal information you may have provided in the survey stored in the US and subject to the USA Patriot Act.*

The RRU Research Ethics Board has approved this research project. If you have any questions regarding your rights as a research participant, please contact the Office of Research Ethics at ethicalreview@royalroads.ca; 1-250-391-2600 ext. 4425.

You are indicating your consent to participate by completing and submitting the survey. Thank you for your contributions to understanding how residents evacuate during a wildfire.

Appendix B: Survey Instrument

Wildfire Evacuation Behavior Survey

You are invited to participate in a research project to understand residents' decisions during wildfire evacuations. You must have lived in the Columbia Shuswap Regional District during the 2023 Bush Creek East Wildfire to participate.

This study aims to identify and understand the factors that influenced your decision to evacuate or not during the 2023 Bush Creek East wildfire. Everyone who went through this devastating event must have a voice and an opportunity to share their experiences. If you know anyone who evacuated during the Bush Creek East wildfire, please forward them the survey link or QR code and encourage them to participate. This survey is voluntary and will take approximately 15 minutes to complete. All responses are confidential and are not traceable to any individuals.

Please keep these definitions in mind as you answer the questions:

- An Evacuation Alert is the time to get prepared to leave your home on short notice
- An Evacuation Order means a government order was placed for all residents to leave a specific area immediately.

Section 1: Eligibility

I want to start by asking you about your area of residence, which will determine your continued participation in this survey.

1. **Did you live or own property in the Columbia Shuswap Regional District during the 2023 Bush Creek East Wildfire?**
 - Yes (Go to Q2)
 - No (Disqualified)
2. **Which community did you live in or own property in?**
 - Sorrento
 - Lee Creek
 - Scotch Creek
 - Celistia
 - Anglemont
 - Magna Bay
 - Adams Lake
 - Other. Please specify _____.
3. **Were you a:**
 - Full-time resident
 - Part-time resident
 - Seasonal resident
4. **Were you at home or in the neighbourhood when the Bush Creek East Wildfire started?**
 - Yes (Continue)
 - No (Disqualified)
5. **Was your address put on Evacuation Order or Alert during the Bush Creek East Wildfire?**
 - Yes (Continue)

- No (Disqualified)
- Unsure (Continue)

6. Are you over 18 years of age (18 plus one day)?

- Yes (Continue)
- No (Disqualified)

Section 2: Evacuation Behaviours

The following questions relate to your decision to evacuate or not during the 2023 Bush Creek East wildfire (July 19- October 5, 2023).

7. Which of the following best describes your behaviour after learning about the Bush Creek East Wildfire?

- Evacuated (Go to Q8)
- Stayed (Go to Q9)
- Waited to See (Go to Q10)

8. After deciding to evacuate, which of the following best describes your behaviour(s)? Choose all that apply.

- I grabbed important items and evacuated
- I voluntarily self-evacuated as soon as I knew my address was put on evacuation alert
- I left as soon as I knew that a wildfire was threatening my community
- I evacuated but returned after determining the risk was low
- Other. Please describe _____.

9. After deciding to stay, which of the following describes your behaviour(s)? Choose all that apply.

- I stayed as I determined the risk was low
- I stayed and searched for more information
- I stayed to protect my home/property from harm
- I stayed to protect my neighbour's home/property from harm
- I stayed to protect my pets from harm
- I stayed to protect my livestock from harm
- I stayed as I was concerned about looting
- I stayed to care for a person(s) unable to evacuate.
- I have evacuated because of a wildfire before, which was unnecessary. Please provide details _____.
- There was no safe evacuation route out of the community
- I did not have a reliable vehicle to leave the community
- I did not have the financial resources to leave the community. Please provide details _____.
- I did not feel comfortable staying in public shelters. Please provide details _____.
- I did not have an alternate place to stay.
- I have a medical condition that would make evacuation difficult. Please provide details _____.
- Other. Please describe _____.

10. After deciding to wait to see, which of the following describes your behaviour(s)? Choose all that apply.

- I waited to see what my neighbours decided before deciding to evacuate or stay
- I waited to see what my family decided before deciding to evacuate or stay
- I waited for emergency services (police/fire) to tell me to get out
- I searched for more information before making my decision to evacuate or stay
- Other. Please describe _____.

Section 2: Household Information

The next set of questions relates to your place of residence during the Bush Creek East Wildfire (July 19- October 5, 2023). This information will be used for household emergency preparedness and evacuation planning.

11. Which of the following best describes your housing situation?

- Homeowner
- Renter
- Was living with a friend or family at the time
- Experiencing homelessness
- Group housing facility (For example, a group home, treatment facility, assisted living, other)
- Other. Please describe_____.

12. Which of the following best describes your housing type during the wildfire? Choose all that apply.

- Single-family home
- Apartment
- Farm
- Group housing facility (Ex., a group home, treatment facility, assisted living, other)
- Other. Please describe_____.

13. How long have you long have you lived at this address?

- Less than 2 years
- 2-5 years
- 6-10 years
- 11 years +
- I do not know/do not remember

14. Did you have an evacuation plan in place for your household?

- Yes. Please describe _____.
- No

15. Did you have pets at this address?

- Yes (Go to Q16)
- No (Go to Q17)

16. Did you have an evacuation plan for your pet(s)?

- Yes. Please describe_____.
- No

17. Did you have a service animal?

- Yes. Please describe_____.
- No (Go to Q19)

18. Did you have an evacuation plan for your service animal?

- Yes. Please describe_____.
- No

19. Did you have livestock at this address?

- Yes Please describe_____.
- No (Go to Q21)

20. Did you have an evacuation plan for your livestock?

- Yes. Please describe_____.
- No

21. What was your primary method of transportation?

- I own a reliable vehicle
- I rely on public transit
- I rely on taxis, Uber, etc.
- I rely on friends and family
- Other

22. Were people living in your household who required assistance during the evacuation?

- Yes. Please describe _____.
- No

Section 3: Demographics

The following questions relate to population characteristics and draw from questions from the 2021 Canadian census. This information will help determine if there are connections between peoples' characteristics and their evacuation behaviours. If there are questions you do not wish to answer, please check the "prefer not to answer" option.

23. What is your gender identity?

- Female
- Male
- Non-binary
- Prefer to self-identify _____.
- Prefer not to answer

24. What is your age?

- 18-30
- 31-50
- 51-70
- 71-90
- 91+

25. What is your ethnic/cultural origin? Choose all that apply.

- African America
- Black
- Caribbean
- European/White
- First Nations, Metis, or Inuk (Inuit)
- Latin, Central and South American
- Oceania origins (e.g., Hawaiian, Samoan)
- East and Southeast Asian (e.g., Chinese, Filipino)
- South Asian (e.g., Indian, Sri Lankan)
- West Central Asian and Middle Eastern (e.g., Turkish, Iranian)
- Prefer to self-identify _____.
- I prefer not to answer.

26. Which best describes your family status?

- Single, no children
- Single, with children. How many children are under 18 years of age? _____
- Married/ common-law, no children
- Married/ common-law with children. How many children are under 18 years of age? _____
- Married/common-law and pregnant

27. What is your highest level of education?

- Some grade school or high school
- Completed high school/ GED
- Some post-secondary
- College/Trade certificate or diploma
- University certificate or diploma

- University degree
- Post-graduate diploma or degree
- Prefer not to answer

28. Which category best describes your total household income before taxes in 2023?

Participants should include all household members in the total and can use a rough estimate if it helps with your response.

- 0 - \$29,999
- \$30,000-\$49,999
- \$50,000-\$69,999
- \$70,000-\$99,999
- \$100,000-149,999
- \$150,000 or more
- Do not know
- Prefer not to answer

29. What else would you like me to know about your evacuation experience during the 2023 Bush Creek East wildfire? Please feel free to describe it in detail.
