

Best Practices for Integrated Wildfire Information Management: Lessons from the 2024 Season, British Columbia, Canada

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ABSTRACT

This research presents core components for an integrated, holistic approach to wildfire information and planning in northern British Columbia (BC), developed through partnerships with organizations, stakeholders, and at-risk communities. The approach focuses on providing timely, accurate, and culturally appropriate wildfire and air quality information to vulnerable communities, especially in remote and rural areas. Key elements include the deployment of automated air quality sensors and the use of R programming for efficient information dissemination. Through iterative collaboration and seasonal evaluations, best practices for knowledge translation and community-specific communication strategies have been established. The work-in-progress research also highlights the importance of community consent, feedback, and tailored messaging to improve comprehension and decision-making. Seasonal evaluations and impact assessment methods further refine the action plans for future wildfire seasons, ensuring continuous improvement in addressing the needs of at-risk populations. The study provides valuable ongoing insights for wildfire management both in Canada and globally, emphasizing collaborative, community-driven approaches.

Keywords

Wildfires, emergency management, information management, risk, Canada.

INTRODUCTION

Recent years have recorded unprecedented wildfire damages, losses and costs globally (Di Virgilio et al., 2019; Government of Canada, 2023; Pandey et al., 2023). Emergency management of wildfires is entering a new paradigm, where adaptability must be incorporated effectively to mitigate future ramifications (Essen et al., 2023; Pandey et al., 2023; Tymstra et al., 2020a). Wildfires are increasing in severity and frequency, exacerbated by global trends such as climate change, extreme fire activity, and human activity (Burke et al., 2021; Cunningham et al., 2024). Climate change increases drought frequency, extending the fire season and increasing the frequency of dry years (Bytnerowicz et al., 2008; Pausas & Keeley, 2021). Fire activity depends upon ignitions, continuous fuels, droughts, and appropriate weather conditions (Di Virgilio et al., 2019). Human factors modify ignition

patterns and landscapes in ways that increase the probability of ignitions coinciding with extreme weather in landscapes with contiguous fuel beds (Pausas & Keeley, 2021). These complex factors combined may cross fire thresholds, resulting in increased risk, especially for more susceptible regions globally (Di Virgilio et al., 2019).

Canada is particularly susceptible due to geography, ecology, availability of landscape and ignition resources, combined with increasing human activity and aforementioned factors (Tymstra et al., 2020). This presents complex challenges for emergency management, planning and response which must carefully utilize resources appropriately, and balance social and cultural tensions between communities (Mihalus et al., 2024; Tymstra et al., 2020a). While wildfire is an important ecological process contributing to forest ecosystem health in Canada, recent fire seasons recorded exceed the average and are now becoming more common (the 2023 season most destructive to date) (Coogan et al., 2019). Frequency and severity of wildfires vary between provinces; however British Columbia (BC) saw the most wildfires so far this year (1,687) (National Wildland Fire Situation Report, 2024). Indigenous and vulnerable communities are present in BC, particularly in remote and rural areas, further complicating effective emergency management of fire seasons (McGee, 2021a; Mihalus et al., 2024). The characteristics of BC pose barriers to action in wildfire management which require innovative solutions (McGee, 2021b; Tymstra et al., 2020a) which may be of value to other global communities similarly susceptible to wildfire risk.

Current global wildfire evacuation policy and emergency management best practices are lacking integrated, holistic and tailored approaches to wildfire management (Pandey et al., 2023). Particularly in Canada, more successful approaches feature initiatives that integrate best practices with socially appropriate culturally safe methods (McGee, 2021); advocacy and collaboration with Indigenous communities (Mihalus et al., 2024); planning adaptivity and flexibility (Tymstra et al., 2020a); and improved stakeholder engagement and communication (Bacciu et al., 2022; Essen et al., 2023). This paper presents an example of an ongoing integrated approach to wildfire evacuation management in BC. This focuses on wildfire information dissemination, which is a vital aspect of wider wildfire management, planning and response. Using the 2024 fire season as an example, we present an overview of the novel approach employed by the University of British Columbia (UBC), Carrier Sekani Family Services (CSFS), and other partners and stakeholders, for tailored wildfire information management of remote and rural northern areas of BC during the 2024 fire season. We present an overview of methods which form an integrated approach, which are: automated information systems for air quality warnings; knowledge translation for at-risk communities; seasonal evaluation; and impact evaluation. We highlight the best practices of each method, which collectively form an integrated and adaptable approach which is of value to other organizations and actors seeking to improve information dissemination for wildfires in future seasons. We conclude by scoping the barriers and challenges that arose during this undertaking, and scope how the lessons learned relate to wider global initiatives.

BACKGROUND: 2024 WILDFIRE SEASON

In 2024, BC faced its fourth largest wildfire season, with over 1.07 million hectares burned (BC Wildfire Service, 2024). This was impacted by the previous 2023 season - the worst on record to date – adding to the need to better manage upcoming seasons. The 2024 season resulted in 51 evacuation orders, which affected more than 4,100 properties (BC Wildfire Service, 2024). There were also 112 evacuation alerts, which affected more than 12,500 properties (BC Wildfire Service, 2024). Wildfires in 2023 and 2024 within the Prince George Fire Centre (northern BC) have burned 10% of the land base in the region, which is more than the previous 60 years combined (BC Wildfire Service, 2024). The characteristics of northern BC feature many remote and rural communities and Indigenous communities, where roads and other transport links are easily disrupted by extreme weather, hazards, and events such as falling trees (Daniels et al., 2024; Kurowski et al., 2022). These areas feature little to no access to public transport, or easy means of evacuation during wildfire events. Further, these communities are commonly small and interspersed by significant geography, have few resources, and often feature variations in socio-economic status. As of November 1, 2024 the estimated cost of wildfire suppression was \$621 million (BC Wildfire Service, 2024).

Indigenous populations in BC continue to be disproportionately affected by wildfires (Kehoe, 2020), emphasizing the need for more integrated approaches that place importance on partnerships, collaboration and communication (McGee, 2021b; Mihalus et al., 2024). For example, as of 2023 Indigenous communities have comprised 42% of total wildfire evacuations, however only make up 5% of total Canadian population (Public Health Agency of Canada, 2023). The impacts of evacuation and displacement are more significant for Indigenous communities who face trauma, PTSD and other underlying exacerbations from colonialism (Kehoe, 2020; McGee, 2021a). Better management of fire seasons and evacuations through integrated approaches can reduce stresses and traumas experienced by individuals (McGee, 2021b) and support/advocate Indigenous voices (Christianson, 2015; McGee, 2021b), reducing risk. There are currently a range of actors and organizations active in wildfire emergency

evacuation management across northern BC, with varying mandates and action plans (Daniels et al., 2024). In recent years, lack of communication, collaboration and knowledge translation have been highlighted as areas for future improvement with our partners CSFS (McGee, 2021b; Tymstra et al., 2020a).



Figure 1. A map of northern BC (comprised of the northwest, northern interior and northeast territories) Source: Macleod et al., 2019)

DEVELOPING INTEGRATED AND HOLISTIC EMERGENCY MANAGEMENT

The research team involved in developing the following integrated approach for wildfire information during the 2024 season in northern BC is the result of a 10-year partnership between UBC and Carrier Sekani Family Services (CSFS). CSFS is a First Nations-led health care organization that delivers primary care, wellness, and social services to 11 First Nations in north-central BC. The components of the integrated approach to wildfire management have been developed over this period of time, through iterative methodological approaches that have naturally arisen throughout multiple wildfire seasons. By this we mean we began working together on one project or output, the results of which were then incorporated into future seasons. Over time these have formed a range of components – each with their own individual methodology, challenges and best practices. The results and findings learnt from these components are used to feed into, support and improve the other components, as well as future iterations in the next wildfire season, thus forming a holistic approach. Some of the core components which may be of value to other global cases are as follows:

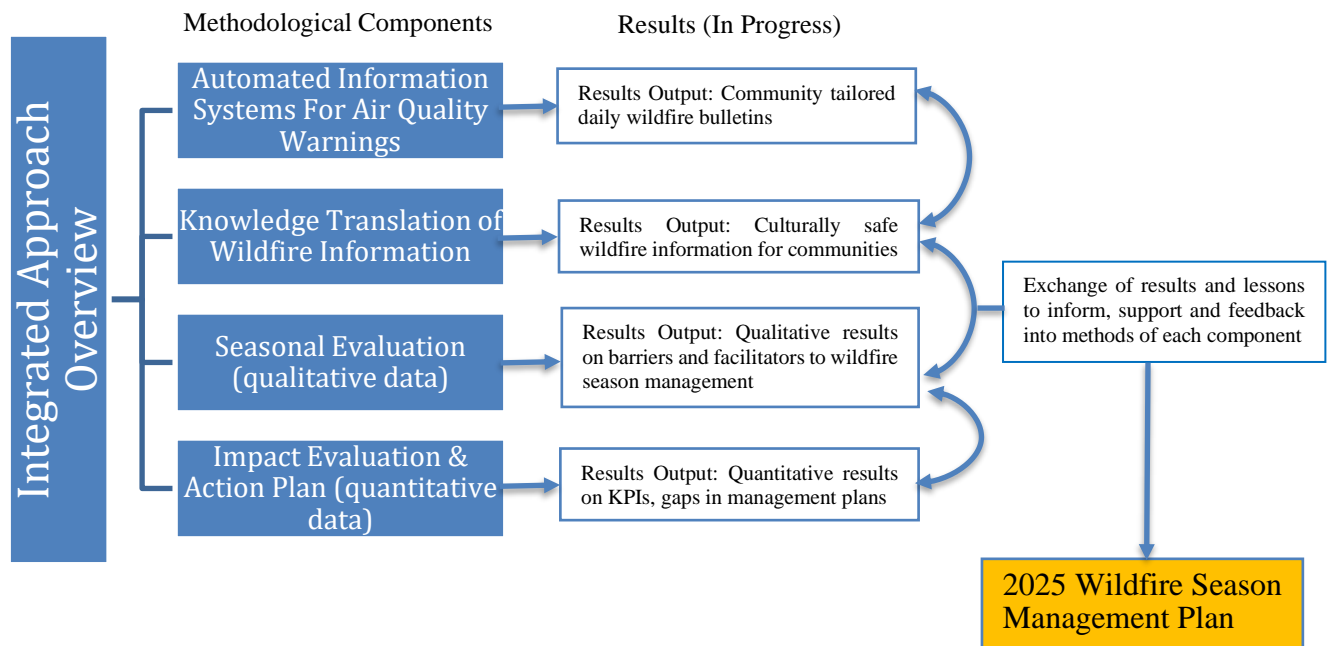


Figure 2. An overview of the integrated approach to wildfire season management scoped in this paper.

Automated Information Systems for Air-quality Warnings

Through data collection of annual seasonal experience using semi-structured interviews, and community engagement and feedback from partnerships through qualitative meetings and discussions, we learned that there is a pressing need for wildfire and air quality information by First Nations communities (method further explained in following sections). Further, the information should be timely, accurate and culturally appropriate, and relevant to the community receiving it. This corresponded with wider published literature such as Taylor et al., (2007), Thompson et al., (2019), Velez et al., (2017) and Vien et al., (2024) who explain that monitoring of this kind of wildfire data – and its dissemination - is critical to wildfire season management and reducing risk of poor health outcomes. It also corresponds with best practices for integrated and improved future wildfire season management outlined by McGee (2021b) through methods which take into account community needs, promote collaboration and tailor management actions to the communities themselves.

Through a series of qualitative meetings and discussions, our research team developed an action plan for the deployment of air quality sensors in First Nations communities. These continually monitor and measure air quality, with the data accessible through PurpleAir.com – an interactive website that allows commercial users to access their individual sensor data. During the wildfire season, our team monitors the sensor outputs on a daily basis and provides a daily bulletin regarding air quality (and any immediate wildfire information if appropriate, i.e. should there be an active evacuation alert or order in effect in the area). This is directly shared with Bands and CSFS (elected councils for a community), who are then able to make a judgement call for their own communities' safety. This upholds Indigenous data sovereignty, whereby communities have the right to understand and own the data related to their own community, and subsequently to make autonomous decisions based upon this (OCAP principles, 2025; UNDRIP principles, 2025; TCPS 2 Research Ethics, 2022). Communities' choices to make use of this information include issuing warnings about going outside; issuing a stay at home advisory; recommending different methods of air quality control in public and private housing; sharing relevant information through their own community channels; and issuing evacuation warnings. This is summarized in more detail in the knowledge translation section below.

To date, this partnership between UBC, CSFS, and member Nations has resulted in the installation of 14 air quality sensors across 13 communities across rural and remote areas in Northern BC. The order in which sensors have been installed has partly been determined by community availability (i.e. some communities have restricted access through certain times of the year due to weather conditions), partly by research team availability, and partly due to access to a suitable installment location on-site (i.e. the sensor must be easily accessible, have access to reliable Wi-Fi, be surrounded by a minimum amount of clear space etc.).

During the 2024 season, we were able to innovate this method further through the automation of wildfire

information bulletins. To streamline their creation, we utilized the R programming software to gather essential data from websites that provide air quality readings, employing a technique known as web scraping. This technique involves extracting data from the HTML code of a webpage and has been effectively used for obtaining weather data, among other applications in online data extraction. The primary packages employed for scraping both static and dynamic air quality data were Rvest and RSelenium, respectively. Additionally, we utilized RMarkdown for the seamless integration of extracted air quality data from PurpleAir into the bulletins. This supported the creation of accurate, timely and appropriate information critical in supporting at-risk communities in decision-making.

This methodology holds innovative value to the Canadian setting for wildfire smoke information management, which as previously explained features many areas across territories and provinces that are remote, rural and face unique challenges. It also holds value to other wildfire season management initiatives globally, especially those that seek to integrate a more tailored and collaborative approach with at-risk communities. Through seasonal evaluation (see section below for method) we have been able to determine several generalized best practices and lessons from this method. Firstly, community consent and collaboration are of high importance; this is vital to build trust, which is essential during emergency events (Taylor et al., 2007). Secondly, knowledge translation relevant and appropriate to the community is important; this is essential for information comprehension, timely decision-making, and strengthening relationship between communities and partners.

Knowledge Translation of Wildfire Information

Timely, accurate and culturally appropriate information regarding wildfires and air quality are essential for at-risk communities (Coogan et al., 2019; McCaffrey et al., 2013). For such information to be meaningfully conveyed however, data and information must be communicated clearly and in an accessible way (Coogan et al., 2019; McCaffrey et al., 2013). A majority of wildfire information and communication in Canada are created and shaped by policy and governance (Nikolakis & Roberts, 2022). Often, this results in a gap in knowledge transfer between authoritative management of wildfires and the public (Nikolakis & Roberts, 2022). This can result in lower levels of knowledge comprehension of messaging and/or warnings by communities if methods of effective knowledge transfer are not present in communication about wildfires (Steelman et al., 2015). Subsequently, knowledge translation of critical information must be prioritized by wildfire management initiatives to reduce risk posed to communities (Nikolakis & Roberts, 2022; Kulig & Westlund, 2015).

McGee et al., (2016) and Christianson (2014) further advocate for knowledge translation that is culturally appropriate for Indigenous communities, specific to Canada. They explain that there is limited research conducted and published on the needs and wants of Indigenous communities during wildfire seasons. Due to differences in world views, social and political structures, and approaches to wildfire information management, there has historically been discord in sharing knowledge between all parties exposed to wildfires. To address this, we have designed methods of knowledge translation in all our outputs aimed at northern BC First Nations communities. Best practices were determined through conversations, meetings and feedback from all partners, stakeholders and communities collected during seasonal evaluation (see section below on seasonal evaluation). These have formed a standard communication protocol for all internal and external documentation and dissemination of wildfire information, which our research team adheres to. This is designed to ensure higher levels of information comprehension for all parties and individuals. The following steps summarize our communication protocol:

1. Critical review of data and information by the research team with topic-expertise
2. Identification of key points to be communicated and development of information feedback loops with CSFS (supporting the principle of direct benefit and doing no harm, and avoiding unnecessary panic)
3. Re-drafting key points in simple language that is both concise and culturally appropriate
4. Tailoring of key points to community (i.e. using context to inform communication, inclusion of community-specific information, inclusion of local information etc.)
5. Review by a minimum of two other research staff with expertise
6. Review and addressing feedback from the most relevant partners (particularly those with existing relationships to a particular community)
7. Final sign-off from most relevant partners
8. Dissemination through the method/medium of choice selected by the community, chosen prior to the season beginning (including the sharing of research team information for follow-up communication or further clarity needed)

Throughout the development and application of this communication protocol, several best practices have been learned which may be valuable and applicable to other wildfire management cases. Firstly, knowledge comprehension for communities varies and cannot be assumed by stakeholders, partners or researchers.

Communities have individual and complex structures and characteristics, and so information must be simplified as much as possible to reduce confusion or misinterpretation. The more tailored to the community information can be, the higher the likelihood of comprehension, thus supporting timely and appropriate decision-making. Secondly, incorporating stages of feedback and evaluation between communities, partners and the research team builds trust and increases comprehension. This opens up two-way conversations where all parties are able to more clearly communicate what they need and want to be able to better understand wildfire information. This, in turn, allows better knowledge transfer for future dissemination, and strengthens the relationship where all parties feel respected and heard.

Seasonal Evaluation

There is a pressing need for effective policies, initiatives and plans of action for future wildfire seasons and their mitigation (Pandey et al., 2023). Tailoring these to the characteristics of populations at-risk is essential for their effectiveness (Pandey et al., 2023). Tymstra et al., (2020) argue that detailed evaluation of strategies, informed by underlying characteristics such as social and political structures, are important in wildfire management strategies. Steelman and Nowell et al., (2019) further explain that such evaluations may illustrate the strengths and weaknesses of wildfire management components, partnerships, and actions. This type of information is therefore valuable to feed back into processes that facilitate the creation of plans of action, SOPs, other forms of guidance and response documentation, and best practices (Steelman & Nowell, 2019). Consequently, our team has produced a range of guidance documents that are designed to support and improve information management in future wildfire seasons.

We have created an annual wildfire evaluation designed to assess the strengths and weaknesses of wildfire information dissemination (such as the automated bulletins), including evaluation of systems and processes. Additionally, this collects and analyzes the experiences of individuals involved throughout the wildfire season, such as emergency responders, employees of CSFS and Nations, members of the public impacted by wildfires, evacuees, volunteers, healthcare and wildfire professionals. Semi-structured interviews generate qualitative data from participants regarding their insights and contextual experiences into wildfire events, with the aim of highlighting future gaps in research. Results are discussed collaboratively with partners and communities for methods of improvement and development of existing and new guidance documents, literature and other resources. The seasonal evaluation is conducted at the end of each season, which is officially declared ended by the Government of Canada, commonly in October-November (depending on the season). Qualitative interview methodology has been informed by literature such as Thompson et al., (2018 & 2019), Hertelendy et al., (2024), and Canton (2019). Feeding back valuable evaluation material improves the robustness of the integrated approach, reducing the risk of communities during future wildfire seasons, currently ongoing.

Impact Evaluation and Response Plans

We have created a response plan for CSFS, which is designed to clearly and transparently list health and social roles, responsibilities and related actions for wildfire evacuation information and response during the season. To assess the impacts of the actions and information outlined in this document, we have created a range of key performance indicators (KPIs). These have been guided by literature such as Akşit et al., (2024), Moore, (2016) and Thompson et al., (2019), which scope in particular holistic and integrated approaches to creating KPIs. These are across a number of domains which include: processes and action efficiency, quality of action outputs, community satisfaction, cost efficiency, employee performance and resources, and program-specific evaluation for information dissemination. Following literature guidance, the evaluation is co-designed by UBC and CSFS. To date, we are in the process of conducting this evaluation and expect to share the results with partners and stakeholders. Following this there will be qualitative interviews, discussions and meetings to scope solutions and improvements to the action plan. We expect this work to be completed in spring.

Finally, we have assessed current action plans published by authorities in BC, such as Vancouver Coastal Health (VCH), Northern Health (NH), and Interior Health (IH) with the aim to identify ways we can adapt and improve messaging, information, and clinical decision-making about wildfires. This method corresponds to literature discussed in the previous section regarding knowledge translation and community comprehension. The aim of this is to improve the quality and content of wildfire messaging, resulting in higher community comprehension and thus reduced risk. Using a qualitative interview methodology, we are conducting a range of interviews with healthcare professionals and Indigenous-led partners to gain feedback on the existing Vancouver Coastal Health and Interior Health Wildfire Smoke and Extreme Heat Action Plan. This is employed and used across BC, including in northern communities. Results from these interviews, combined with literature regarding best practices for knowledge translation for Indigenous communities, has informed and created a revised and updated Indigenous Wildfire Smoke and Extreme Heat Action Plan (for VCH & IH). We anticipate the creation and

publication of this action plan during 2025.

There are several main distinctions between the seasonal evaluation and the impact evaluation and actions plans. The seasonal evaluation focuses on qualitative semi-structured interviews, with thematic analysis applied by the research team. This generates a range of key themes in the form of barriers and facilitators to wildfire management for future seasons. In comparison, the impact evaluation seeks to assess and improve specifically the action plan and documentation, through the method of KPIs and quantitative methods of measurement. This produces the output of action plans, guidance documents and highlights gaps in management plans in quantitative rather than qualitative deliverables. The combination of the seasonal evaluation (qualitative) and impact evaluation (quantitative) together may better support, compliment and feed into the other, producing a more integrated and robust analysis.

Throughout these approaches, several best practices have been highlighted that may be of value to other cases and seasons. Firstly, there remains a clear need to communicate more clearly and effectively in all kinds of documentation and messaging – both internally within actors, partners and stakeholders, as well as externally to the public and at-risk communities. By adopting methods to assess messaging and comprehension, communication about wildfire information can be more effectively designed and disseminated. Secondly, an individual's personal experience with wildfire seasons may offer rich contextual information that can inform and support our understanding of wildfire events.

CHALLENGES AND OPPORTUNITIES

While the mechanisms of impact evaluation and seasonal evaluation have proved valuable in improving integrated management strategies of wildfire information dissemination, there remain challenges. Particularly that of inter-agency communications between research teams, partners and communities; which is a common theme in all kinds of emergency management to date (Steelman & Nowell, 2019; Tymstra et al., 2020b). In BC, there tends to be an overreliance on government-generated wildfire information during seasons, which can cause confusion and undermine decision-making should information be disrupted through communication lapses (Daniels et al., 2024; Tymstra et al., 2020b). The use of air-quality sensors has demonstrated success in solving this challenge in part. It has allowed us to generate independent information autonomously from agencies, removing many intermediary steps of communication before information can be received, analyzed and then distributed to at-risk communities. Furthermore, this approach is relatively low cost and low-resource, making this a valuable methodological opportunity for other cases and countries.

Methods of management that focus on inter-agency collaboration and coordination must be prioritized, and trusting relationships must be built and maintained (McGee et al., 2016). Here there is an opportunity to incorporate stages of feedback, two-way communication, discussions and collaborative practices into integrated approaches, as well as methods of building trust that allow all partners and communities to feel seen, heard and respected. This holds even more importance to countries which have Indigenous populations, such as Canada, where there has been historic suppression and lack of trust (Christianson, 2015; McGee, 2021b; Mihalus et al., 2024). Relationships with higher trust may produce greater collaboration and communication, which may aid in all areas of future wildfire season information management. It may also lead to more opportunities to integrate different worldviews, approaches and ideas into the paradigm of wildfire management, which could be beneficial in reducing risk in ways previously unexplored (Christianson, 2015; McGee, 2021b; Mihalus et al., 2024).

FUTURE WORK

Our team is currently completing data collection and analysis of results for the impact evaluation stage of the 2024 wildfire season in BC. We anticipate this to be finalized in spring, with the aim of feeding back lessons into the integrated approach (in each relevant component) prior to the beginning of the 2025 season. Full methodologies for the above sections discussed in this paper will be published individually, which will be available to any other teams or agencies seeking to adapt and apply these methods to their own cases. These will be published individually to allow for greater detail in methodology and analysis of results; this paper represents an overview of methods together as the broader integrated approach itself.

Currently, lessons learned from the 2024 season indicate that a clearer description of roles and responsibilities is needed for wildfire action plans to ensure that communities and partners know who to communicate during wildfire events. This can be particularly challenging when usual procedures and functioning of at-risk communities and of partners can be disrupted by events such as First Nation elections, where roles and responsibilities have yet to be determined by the new chief and council.

Our team additionally aims to publish the results of qualitative interviews collected for the seasonal evaluation

from a range of health professionals, partner employees, individuals who experienced wildfires or wildfire evacuations, emergency responders and evacuation volunteers during the 2024 season. These results will similarly be fed back into the integrated approach, and shared with partners and communities for collaborative discussion moving forward.

CONCLUSIONS

Recent years have seen a surge in wildfires globally, prompting a shift in emergency management strategies to address exacerbations driven by climate change and human activities. BC faces unique challenges due to its geography, ecology, and remote and rural communities, necessitating innovative wildfire management solutions. Current best practices advocate for more integrated and culturally appropriate approaches that enhance partner and stakeholder engagement and collaboration with at-risk populations. In 2024, BC faced its fourth-largest wildfire season, burning over 1.07 million hectares. Remote and Indigenous communities in northern BC, which lack transport infrastructure, are disproportionately affected by wildfires and subject to underlying trauma are particularly susceptible to increasing wildfire risk. Moving forward, there is a need for enhanced communication, collaboration, and integrated approaches to emergency management, particularly to support at-risk communities, and to reduce health impacts and long-term risks; achieved through improved information management and dissemination of wildfire information.

This paper has discussed some core components of an ongoing integrated approach to wildfire information dissemination employed by our UBC/CSFS research team partnership. Through engagement and feedback, we identified a critical need for timely, accurate, and culturally appropriate wildfire and air quality information for at-risk communities, particularly 13 First Nations communities in northern BC, served by CSFS. Collaborating with CSFS, we developed an action plan to install 14 air quality sensors across the communities, providing continuous monitoring through PurpleAir.com. The data is used to create daily bulletins with air quality updates and relevant wildfire information. This initiative was enhanced in 2024 with automated wildfire information bulletins using R programming for data extraction and integration. The project highlights the importance of community consent, collaboration, and tailored knowledge translation in wildfire season management, offering valuable insights for both Canadian and global wildfire initiatives.

Timely, accurate, and culturally appropriate wildfire and air quality information is crucial for at-risk communities. To improve knowledge translation, we developed a communication protocol for northern BC, which involves simplifying information, ensuring cultural relevance, and gathering feedback from communities and partners. Key best practices include tailoring messages to community needs, using clear language, and fostering trust through ongoing collaboration, which enhances comprehension and supports better decision-making during wildfire seasons.

Effective policies and initiatives are crucial for mitigating future wildfire risks, and tailoring them to the specific characteristics of at-risk populations enhances their effectiveness. Evaluating wildfire management strategies, informed by social and political factors, helps identify strengths and weaknesses in response actions and partnerships. Our team has developed annual wildfire evaluations to assess the effectiveness of information dissemination, systems, and processes, gathering qualitative data from various stakeholders, including responders, evacuees, and professionals. The results, discussed with partners and communities, inform the creation of improved guidance documents and resources, which are essential for refining future wildfire management and reducing risks for vulnerable communities.

Finally, we have discussed an approach in developing an action plan with clear roles and responsibilities for the wildfire season, using KPIs to assess impact across various areas like efficiency and stakeholder satisfaction. We are evaluating these KPIs and gathering feedback through qualitative interviews to refine the plan currently. Additionally, we are reviewing existing action plans, such as the one developed within VCH and IH, to improve wildfire messaging, especially for Indigenous communities. This will inform a revised Indigenous Wildfire Smoke and Extreme Heat Action Plan, expected in 2025. Key lessons include the need for clear communication and tailored qualitative data collection to enhance and support wider wildfire management strategies. We conclude by emphasizing that the best practices and methods throughout this paper are both relevant and valuable to generalized wildfire management, going beyond Indigenous communities and the Canadian setting. Such steps are beneficial to global wildfire management actions, initiatives and mitigation methods.

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