

Building Fire Resilience Through Data: Why Social and Material Conditions Must Shape Canada's Wildfire Strategy

By Len Garis, Mandy Desautels

Wildfire seasons in Canada are no longer rare, once-in-a-generation events. They are now a defining feature of our emergency landscape. The 2023 season burned more than 18 million hectares — the most destructive in Canadian history — and 2024 continued at elevated levels. For firefighters, emergency managers, and community leaders, the challenge is not only suppressing fires, but understanding *where* risk concentrates, *why* certain communities face greater harm, and *how* data can guide better outcomes.

When we look at census information alongside decades of historical wildfire records, one pattern becomes impossible to ignore: Indigenous communities in Canada face significantly higher wildfire risk across every stage of the fire cycle. This is not simply a matter of geography. It is rooted in the social and material conditions that shape exposure, vulnerability, and recovery.

For frontline firefighters, this is not an abstract policy issue — it is an operational reality.

Wildfire Risk Is Uneven — and Predictable

Census data shows where people live, how they live, and what resources they have. Historical wildfire records show where fires start, how they spread, and which communities are repeatedly affected. When these two sources are viewed together, the picture is clear.

About 18.9% of people living on Indigenous reserves are located in high-risk wildfire zones, compared with just 2.4% of the non-reserve population. And although Indigenous Peoples make up only 5% of Canada's population, they experience about 42% of wildfire evacuations.

For firefighters, this means a disproportionate share of evacuations, smoke exposure, long-duration fires, and recovery support occurs in communities with the least infrastructure to withstand them.

Social and Material Conditions Drive Fire Outcomes

One of the strongest findings is also the simplest: Communities that face the biggest social and material challenges are the ones hit hardest by wildfires.

This includes challenges such as:

- homes needing major repairs
- overcrowded housing
- limited income
- unreliable water systems
- remote or single-access roads
- lack of local fire services

These conditions are not technical categories — they are real, everyday factors that firefighters see on the ground. And they directly shape how dangerous a wildfire becomes.

Housing Conditions: A Direct Wildfire Risk Multiplier

Census data shows that Indigenous Peoples are far more likely to live in homes needing major repairs. In a wildfire context, this matters. Homes that are older, poorly insulated, or in disrepair are more vulnerable to ember intrusion, smoke infiltration, and rapid fire spread. Overcrowding — which is twice as common in Indigenous communities — also increases the number of people at risk when a wildfire approaches or when smoke conditions worsen.

For firefighters, this means that when wildfires threaten communities with aging or overcrowded housing, the stakes are higher. Evacuations become more urgent, smoke exposure affects more people, and the margin for safe shelter-in-place is much smaller. These housing conditions amplify wildfire impacts long before flames reach a community and long after the fire has passed.

Geographic Isolation: The Operational Challenge

Many First Nations, Métis, and Inuit communities are accessible only by air or seasonal roads. In these locations, a fire can fully involve a structure before external suppression support can arrive.

This means:

- early suppression is often impossible
- evacuation becomes the primary life-safety strategy
- communications failures can turn small fires into major emergencies

Firefighters know this reality well: remote fires burn longer, spread faster, and demand more coordination.

Economic and Social Vulnerability

Limited income, higher proportions of elders, and chronic health conditions make evacuation more complex and recovery slower. Communities with fewer resources cannot easily:

- maintain FireSmart landscaping
- upgrade heating systems
- replace aging electrical infrastructure
- relocate during prolonged smoke events

These factors directly shape operational outcomes.

Plain-Language Insight: Data Confirms What Firefighters Already Know

The modelling work in the report simply confirms what frontline crews see every season: wildfires do the most damage in places where people have the least.

Communities with strong housing, reliable roads, good communications, and local fire services can detect fires earlier, respond faster, and recover more quickly. Communities without those supports face longer burn times, more smoke exposure, more evacuations, and higher risk during prolonged smoke events.

In short: Wildfire risk in Canada is shaped as much by people's living conditions as by fuel, weather, or topography.

Ignition Patterns: A Dual Threat for Indigenous Communities

Historical fire records show that lightning-caused fires account for most of the total area burned, even though they represent less than half of all ignitions. These fires ignite in remote boreal regions — exactly where many Indigenous communities are located.

At the same time, human-caused fires dominate near Wildland–Urban Interface (WUI) zones, where many southern First Nations reserves are situated.

This creates a dual threat:

- Lightning fires in remote northern regions
- Human-caused fires in southern WUI communities

During extreme seasons like 2023 and 2024, both threats intensified simultaneously.

Why Data-Driven Assessment Matters for Firefighters

Using census information and historical fire records together allows fire agencies to:

1. Target Mitigation Where It's Needed Most

Mitigation must be targeted, not uniform. Communities with the greatest structural challenges need the earliest and strongest support.

2. Adapt Response Protocols to Remote Realities

Standard emergency response frameworks do not work in communities with:

- single access roads
- limited water supply
- no local fire department

Firefighters benefit from:

- pre-positioned suppression resources
- Indigenous-led emergency response teams
- multi-modal evacuation plans

3. Support Long-Term Recovery

Recovery in Indigenous communities involves:

- restoring traditional land and food systems
- addressing water contamination
- supporting mental health
- rebuilding cultural infrastructure

Firefighters increasingly play roles in early recovery phases; understanding these needs strengthens coordination.

Conclusion: Firefighters Are Key Partners in Building Fire Resilience

Canada's wildfire future will be shaped not only by climate change but by the choices made today about how risk is understood and addressed. Census information and historical wildfire records show clearly that Indigenous communities face disproportionate wildfire risk because of structural conditions, not chance.

For frontline firefighters, embracing data-driven assessment means:

- recognizing where risk concentrates
- understanding why certain communities face greater harm
- advocating for targeted mitigation
- supporting culturally grounded response strategies
- strengthening partnerships with Indigenous leadership

Wildfire resilience in Canada will be built through equitable, data-informed, community-driven strategies — and firefighters are central to that future.

Authors

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