

Wildfire experiences among Indigenous Peoples

by Lori Hohban, Katharine Strong, Simon Trottier and Hugo Larocque

Release date: July 28, 2026



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Note to readers

This descriptive analysis integrates results from the 2024 Survey Series on First Nations People off reserve, Métis and Inuit - Emergency Preparedness and Extreme Weather (SSFNPMI-EPEW) and the 2021 Census Indigenous population data, along with spatial data on forest fires, wildfires and air quality from 2023. The main data sources include the following:

Survey Series on First Nations People, Métis, and Inuit – Emergency Preparedness and Extreme Weather

The [survey series](#) consists of three short surveys given to the same individuals over a period of one year and represents the Canadian population aged 15 years and older who identify as First Nations people living off reserve, Métis and Inuit. The survey sample consists of respondents to the Indigenous Peoples Survey (IPS) who self-reported their Indigenous identity and who agreed to be contacted for follow up surveys. The SSFNPMI-EPEW is the third survey in the series and was collected from November 18 to December 15, 2024.

For this study, survey weights were adjusted to minimize bias that could arise from panel non-response. Despite these adjustments, the high degree of non-response to the panel increases the risk of remaining bias, which may impact estimates produced using the panel data. Users should therefore use caution when interpreting all results of the study. Further information on data quality guidelines and considerations can be obtained in the SSFNPMI user guide.

Single and multiple responses to the Indigenous identity question are used when reporting data for the three Indigenous groups.

Canadian Wildland Fire Information System (CWFIS) – National Burned Area Composite

The 2023 National Burned Area Composite (NBAC) data are available through the [Canadian Wildland Fire Information System \(CWFIS\)](#). The NBAC is a national Geographic Information System database that maps Canada's annual forest burned area dating back to 1972. The data are used to help estimate carbon emissions in Canada. The burned area is determined by evaluating a number of available sources of data, which use different techniques to map any given fire. The system chooses the best available source of data for each burned area and builds a national composite picture.

Air Quality Health Index (AQHI)

The [Air Quality Health Index \(AQHI\)](#) is a scale designed to help quantify the quality of the air in a forecast zone on a scale from 1 to 10+. The AQHI is calculated based on the relative risks of a combination of common air pollutants that are known to harm human health, including ground-level ozone, particulate matter and nitrogen dioxide. For this analysis, a single pollutant AQHI+ formula for particulate matter concentrations was used to derive index values based on work by Yao et al. (2019). AQHI+ values from 2023 were used for this analysis.

National Air Pollution Surveillance (NAPS)

The [National Air Pollution Surveillance \(NAPS\) Program](#) is the main source of ambient air quality data in Canada. The NAPS program, which began in 1969, is comprised of nearly 260 stations in 150 rural and urban communities reporting to the Canada-Wide Air Quality Database (CWAQD) and is managed by Environment and Climate Change Canada (ECCC) in collaboration with provincial, territorial and regional government networks. The NAPS programs supports a wide range of initiatives, such as the Air Quality Health Index (AQHI).

PurpleAir Citizen Science data

The [API - PurpleAir](#) is a web service that allows users to obtain air quality data for particulate matter (PM_{2.5}) reported by PurpleAir sensors. This is an extensive dataset going back to early 2016. Data are gathered from low-cost air quality sensors hosted by communities, professional scientists, curious members of the public or concerned citizens across Canada. PurpleAir provides access to high resolution air quality data.

These low-cost sensors are not subject to the same rigorous testing, standardization and maintenance as the Federal Equivalent Monitors used by the NAPS program. However, data from PurpleAir sensors were analyzed for quality assurance and control to remove bias and integrated into AQmap. [AQmap](#) is an interactive online map that presents PM_{2.5} observations and other smoke-related data across Canada (Nilson & Jackson, 2025). Data from 2023 were compiled by ECCC and provided to Statistics Canada for this analysis. Additional information on methods can be found in the Appendix.

Acknowledgements

We wish to thank our colleagues at Statistics Canada for their valuable contributions throughout the development and writing of this article: Jennie Wang, Jessica Andrews, Lauren Allen, Thomas Anderson, Sylvie Godin, Patrick McLean, Kristina Smith, Tommy Akulukjuk and Annie Turner.

We also wish to thank Environment and Climate Change Canada (ECCC), which, in collaboration with Health Canada, has partnered with provinces and territories; municipal governments; stakeholders from industry, health, environmental and Indigenous organizations; and local health authorities to develop and deliver the Air Quality Health Index (AQHI) for communities across Canada. For more information, see the full list of [Local air quality partners - Canada.ca](https://www.ec.gc.ca/localairquality/partners)

Special thanks to Céline Audette, Sean Kearnan-Carbonneau, Julie Narayan and Brayden Nilson from the Meteorological Service of Canada, ECCC, for their expertise and recommendations on the appropriate use of the Air Quality Health Index (AQHI) and PurpleAir data.

Thank you to John Little, Fire Information Manager – Natural Resources Canada for his extensive knowledge and expertise about the National Burned Area Composite data.

Lastly, we would like to thank the numerous people who reviewed this paper including Paula Arriagada, Thomas Anderson, Alexandria Melvin, Henry Robertson, Julia Sterparn and Krista Chiponski from the Centre for Indigenous Statistics and Partnerships (CISP) and from the Manitoba Métis Federation (MMF).

Wildfire experiences among Indigenous Peoples

by **Lori Hohban, Katharine Strong, Simon Trottier and Hugo Larocque**

Forest fires and wildfires are a regular occurrence in many areas of the country. These fires, while often driven by natural ecosystem processes, pose a threat to communities across the country and have particular impacts on First Nations people, Métis and Inuit.

The aftermath of wildfires often brings financial hardship and emotional distress, including a deep sense of loss tied to environmental destruction and cultural disconnection (Public Safety Canada (PSC), 2024; Public Health Agency of Canada (PHAC), 2024). Wildfires can disrupt traditional ways of life, cultural practices and access to traditional activities such as hunting, fishing, trapping and gathering. Despite being the original stewards of the land, Indigenous Peoples have historically been excluded from decision making in forest management in Canada. Only recently have their traditional fire stewardship practices begun to receive recognition (PHAC, 2024).

In Canada, warmer and drier forest conditions and irregular rainfall driven by climate change are causing longer fire seasons with more frequent and intense wildfires (Canadian Climate Institute CCI, 2026). While forest fires can be a natural process that help with forest regeneration and maintaining healthy ecosystems, climate change is causing hotter and drier conditions that are shifting fire patterns beyond historical fire regimes (Natural Resources Canada (NRCan), 2026).

Unmanaged wildfires can be hazardous, endangering people and their communities, reducing carbon storage, threatening infrastructure, and causing secondary impacts to physical health from smoke (PSC, 2024). Wildfires in Canada are bigger, hotter and more frequent, requiring wildfire agencies to use fire resources earlier and later in the fire season which often stretches their capacity (CCI, 2026). Extreme weather, record high temperatures and dry conditions intensified the 2023 wildfire season (NRCan, 2024).

Mapping the area burned in 2023 by Indigenous identity

Recent fire seasons have been particularly destructive, with the area burned over the last three fire seasons (2023, 2024, 2025) exceeding the 25-year average (Canadian Interagency Forest Fire Centre (CIFFC), 2025). Canada experienced its second worst fire season in 2025, with over 8.9 million hectares burned (CIFFC, 2025). In 2024, 5.3 million hectares were consumed by fires, while the 2023 fire season was easily the most damaging on record, consuming approximately 17.2 million hectares of land across Canada.

Combining information on the 2023 area burned by wildfires and data on Indigenous identity from the 2021 Census of Population helps visualize the proximity of some communities to fires (Map 1, 2 and 3). Eeyou Istchee Baie-James, Quebec, a census subdivision (CSD) with a population of 1,375 First Nations people living off reserve and 70 Métis, had the largest area burned from wildfires in 2023.¹ Wildfires affected about 35,742 km² of the region, comprising 11% of the total CSD area.

Table 1 ranks the top fifteen CSDs by the proportion of area burned relative to the total area of the CSD and presents population data by Indigenous identity. Chum Creek 2 reserve had the highest proportion (91%) of area burned and had a population of 20 First Nations people. Fox Lake 162 reserve in Alberta experienced devastating wildfires in 2023, with 83% of the region's total area burned and had a population of 2,245 First Nations people and 15 Métis residents according to the 2021 Census. People living in Fox Lake 162 reserve were evacuated due to wildfires in 2023. Three hundred structures were destroyed, and 141 families required new homes upon returning to the reserve after the wildfires had subsided (Harrap, 2025).

1. The National Burned Area Composite (NBAC) is a Geographic Information System database and system that calculates the area of forest burned on a national scale for each year since 1972. The system chooses the best available source of data for each burned area and builds a national composite picture.

Table 1
Highest proportion of area burned by wildfire in 2023, by census subdivision and 2021 population by Indigenous identity, Canada

Census subdivision name/ Province or Territory	Burned area square kilometers	Census subdivision area square kilometers	Proportion of burned area within census subdivision percent	First Nations people living on reserve	First Nations people living off reserve	Métis	Inuit living outside Inuit Nunangat	Total population
Chum Creek 2 / British Columbia	2.53	2.77	91.38	20	0	0	0	53
Enterprise / Northwest Territories	275.87	317.69	86.84	0	20	10	0	75 ^E
Fox Lake 162 / Alberta	81.53	98.34	82.90	2,425	0	15	0	2,488
Quaaout 1 / British Columbia	14.14	17.10	82.72	145	0	0	0	284
Sturgeon Lake 154A / Alberta	6.53	8.89	73.49	x	x	x	x	39
Scotch Creek 4 / British Columbia	5.49	8.43	65.10	x	x	x	x	30
Lytton 4E / British Columbia	0.72	1.25	57.61	x	x	x	x	5
Kootenay 1 / British Columbia	44.08	76.86	57.35	135	0	0	0	145
Wallace Hills 14A / Nova Scotia	0.25	0.44	56.91	x	x	x	x	15
Hay River, T. / Northwest Territories	76.65	139.79	54.84	0	685	570	85	3,169 ^E
Hustalen 1 / British Columbia	4.90	9.14	53.63	10	0	0	0	44
Hay River Dene 1 / Northwest Territories	65.12	134.48	48.42	245	0	0	0	259 ^E
Behchokò / Northwest Territories	46.76	103.24	45.29	0	1,445	55	0	1,746 ^E
Moosomin 112B / Saskatchewan	26.19	70.07	37.38	705	0	0	0	715
Turnor Lake 193B / Saskatchewan	1.08	3.13	34.55	400	0	15	0	428

Note: Only the top 15 census subdivisions with the largest proportion of area burned by Indigenous identity are shown. The census subdivision area includes both land and water.

X suppressed to meet the confidentiality requirements of the *Statistics Act*

^E use with caution

Sources: Canadian Forest Service. National Burned Area Composite (NBAC). Natural Resources Canada, Canadian Forest Service, Northern Forestry Centre, Edmonton, Alberta.

[Canadian Wildland Fire Information System](#)

Statistics Canada, Census of Population, 2021.

Table 2 shows the CSDs with the largest populations by Indigenous identity that were impacted by wildfires in 2023. Halifax had the largest number of First Nations people living off reserve, Métis and Inuit living outside Inuit Nunangat, but the area burned covered 8.60 square kilometres, comprising 0.15% of the total CSD area.

Among the top five CSDs with the largest population of Inuit living outside Inuit Nunangat, Hay River, T., Northwest Territories, had the largest proportion of area burned, at 55%. No burned areas were identified in CSDs in Inuit Nunangat during the 2023 wildfire season (Map 3). However, Inuvik had 18 days of high and very high health risk caused by poor air quality, likely from wildfires in the Northwest Territories, northern Alberta and British Columbia.

Table 2
Burned area for the top five census subdivisions with the largest Indigenous population in 2021, by Indigenous identity, Canada, 2023

Census subdivision name/ Province or Territory	Burned area square kilometres	Census subdivision area	Proportion of burned area within census subdivision percent	Population by Indigenous identity number	Total population
First Nations people living on reserve					
Norway House 17 / Manitoba	0.04	83.32	0.05	5,230	5,390
Garden Hill First Nation / Manitoba	0.08	97.69	0.08	3,045	3,054
Peguis 1B / Manitoba	0.05	311.17	0.02	2,935	3,053
Fox Lake 162 / Alberta	81.53	98.34	82.9	2,425	2,488
Waskaganish / Quebec	1.18	508.11	0.23	2,415	2,536
First Nations people living off reserve					
Halifax / Nova Scotia	8.60	5,928.56	0.15	8,385	439,819 ^E
Prince George / British Columbia	0.02	330.41	0.01	6,625	76,708
Kamloops / British Columbia	0.01	316.75	0.00	5,460	97,902
Wood Buffalo / Alberta	3,357.61	66,436.14	5.05	4,355	72,326
Kelowna / British Columbia	6.58	261.41	2.52	3,395	144,576
Métis					
Halifax / Nova Scotia	8.60	5,928.56	0.15	6,780	439,819 ^E
Prince George / British Columbia	0.02	330.41	0.01	4,395	76,708
Kelowna / British Columbia	6.58	261.41	2.52	4,170	144,576
Kamloops / British Columbia	0.01	316.75	0.00	4,020	97,902
Wood Buffalo / Alberta	3,357.61	66,436.14	5.05	3,170	72,326
Inuit living outside Inuit Nunangat					
Halifax / Nova Scotia	8.60	5,928.56	0.15	505	439,819 ^E
Wood Buffalo / Alberta	3,357.61	66,436.14	5.05	280	72,326
Fort Smith / Northwest Territories	5.14	112.95	4.55	110	2,248 ^E
Hay River, T. / Northwest Territories	76.65	139.79	54.84	85	3,169 ^E
Pessamit / Quebec	0.02	257.20	0.01	80	2,428

Note: Only the top five census subdivisions with the highest number of Indigenous people, by Indigenous identity, are shown in this table. The census subdivision area includes both land and water.

^Euse with caution

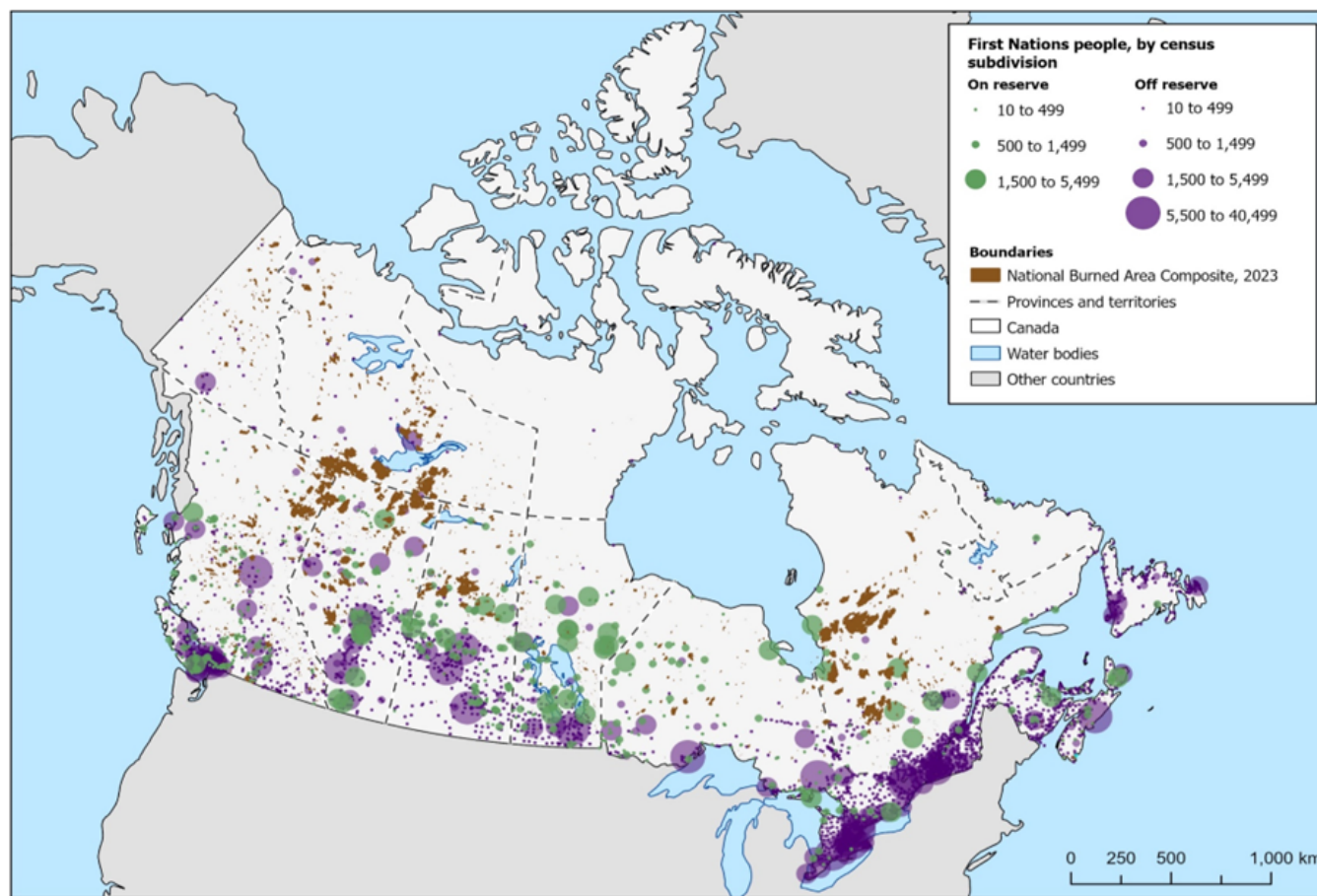
Sources: Canadian Forest Service. National Burned Area Composite (NBAC). Natural Resources Canada, Canadian Forest Service, Northern Forestry Centre, Edmonton, Alberta.

[Canadian Wildland Fire Information System](#)

Statistics Canada, Census of Population, 2021.

Map 1

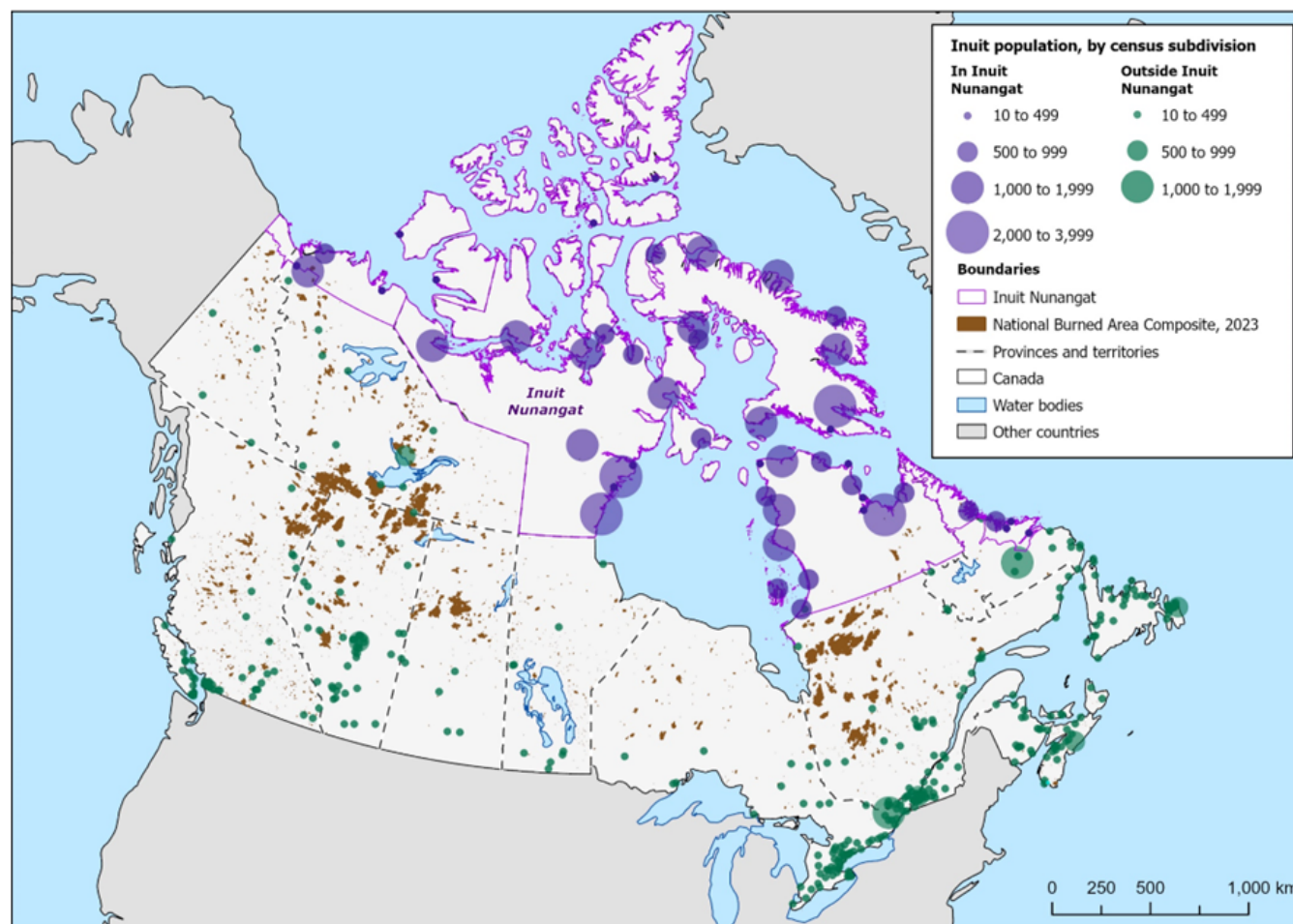
Area burned by wildfires in 2023 and First Nations people living on and off reserve in 2021, by census subdivision



Sources: Canadian Forest Service. National Burned Area Composite (NBAC). Natural Resources Canada, Canadian Forest Service, Northern Forestry Centre, Edmonton, Alberta. <https://cwflis.cfs.nrcan.gc.ca/>
 Statistics Canada, Census of Population, 2021.

Map 2

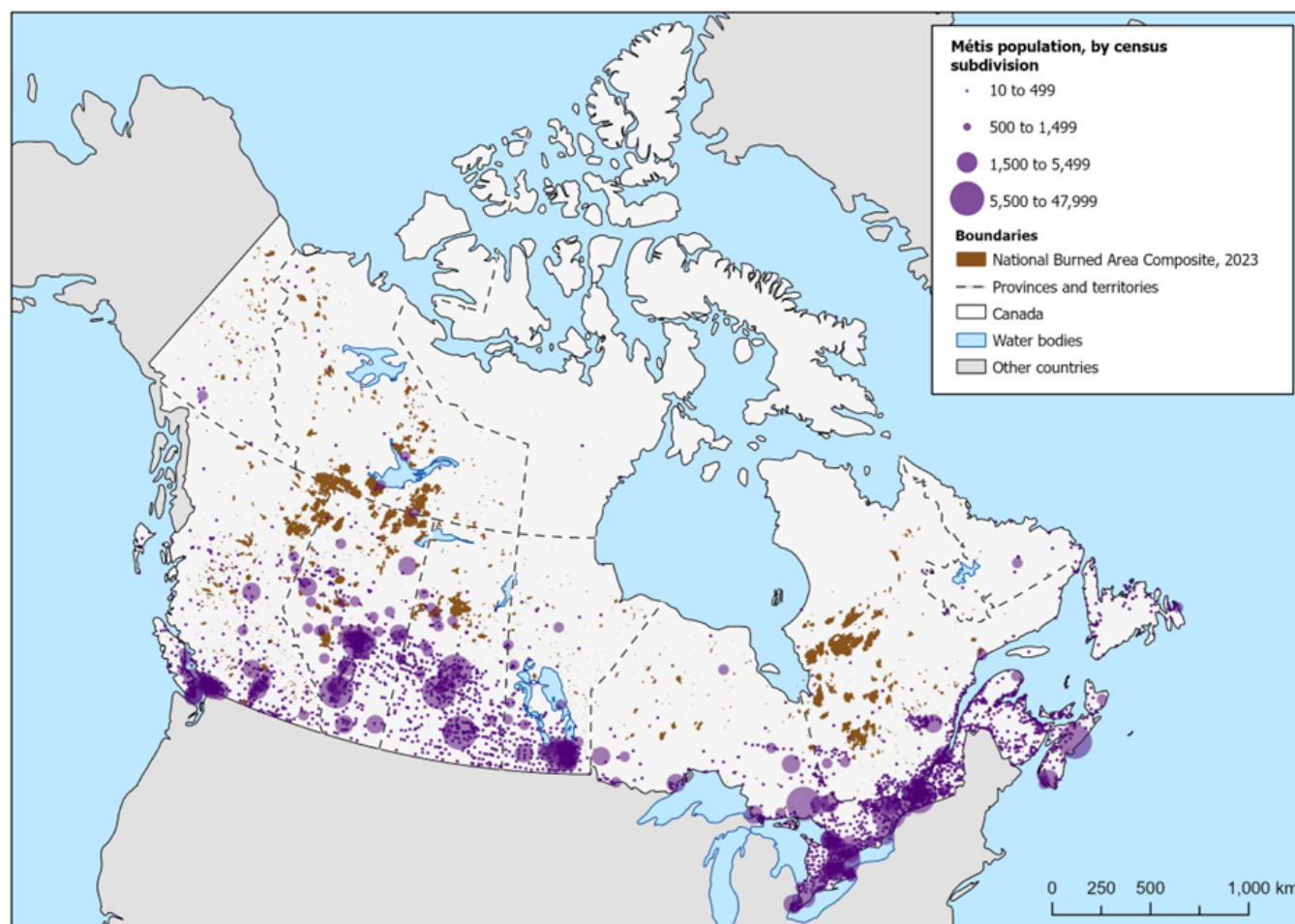
Area burned by wildfires in 2023 and Inuit population living in and outside Inuit Nunangat in 2021, by census subdivision



Sources: Canadian Forest Service. National Burned Area Composite (NBAC). Natural Resources Canada, Canadian Forest Service, Northern Forestry Centre, Edmonton, Alberta. <https://cwfls.cfs.nrcan.gc.ca/>
 Statistics Canada, Census of Population, 2021.

Map 3

Area burned by wildfires in 2023 and Métis population in 2021, by census subdivision



Sources: Canadian Forest Service. National Burned Area Composite (NBAC). Natural Resources Canada, Canadian Forest Service, Northern Forestry Centre, Edmonton, Alberta. <https://cwfis.cfs.nrcan.gc.ca/>
Statistics Canada, Census of Population, 2021.

Indigenous Peoples disproportionately affected by wildfires

Wildfires present significant challenges for all individuals and communities in Canada, with implications for financial, physical, mental and cultural well-being (PSC, 2024). Indigenous communities and individuals tend to be disproportionately impacted by wildfires, which can include loss of access to hunting grounds, trapping lines and reduced opportunities to gather wild plants and berries, which could have long-term consequences (PSC, 2024).

According to the 2021 Census, 5% of the population in Canada self-identified as Indigenous (First Nations, Métis and Inuit), of whom 40.6% are First Nations people living on reserve. Though comprising only a small share of Canada's population, just under half (42%) of wildfire evacuations in 2023 were from communities where more than half the population was Indigenous (Christianson et al., 2024). From 1980 to 2021, 16 communities were evacuated at least five times, and all but two were First Nations reserves.

Indigenous Peoples are often evacuated far from home communities and, in some cases, family or extended family members are displaced to separate locations, contributing to additional disruption and psychological stress (PHAC, 2024).

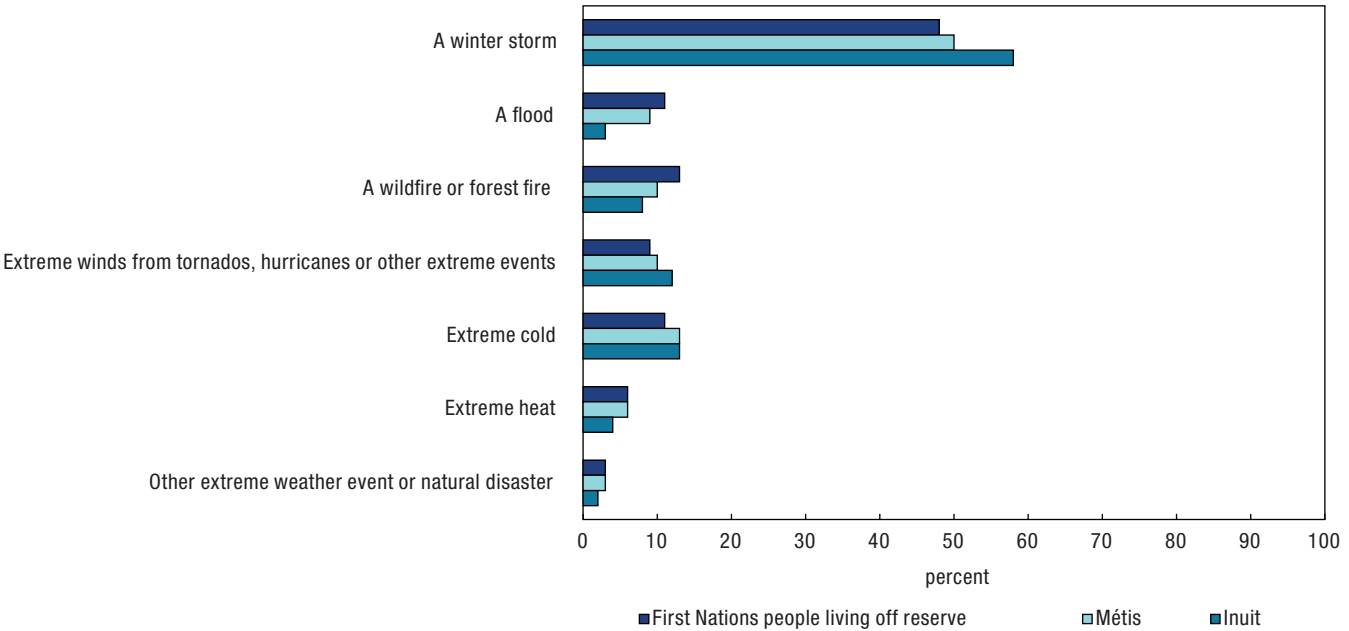
Due to Canada’s colonial history with Indigenous Peoples, such as the residential school system, displacement can intensify social, mental well-being and health challenges for Indigenous communities (PSC, 2024). These impacts may become more prevalent given the projected increase in the frequency and duration of wildfires in Canada associated with climate change (NRCan, updated 2026).

Wildfires were among the top four most frequently reported extreme weather events for Indigenous Peoples

Wildfires were a commonly reported extreme weather or natural disaster event that caused severe disruption to Indigenous Peoples’ daily activities (Chart 1), according to the Survey Series on First Nations people, Métis and Inuit - Emergency Preparedness and Extreme Weather (SSFNPMI-EPEW). For each extreme weather or natural disaster event type that people had ever experienced, including winter storms, floods, wildfires or forest fires, extreme wind events (e.g., hurricanes or tornados), extreme cold or extreme heat and other events, there were no significant differences between First Nations people, Métis and Inuit. This suggests that all three Indigenous groups have similar experiences of extreme weather or natural disaster events.

Among these events, wildfires or forest fires were the second most commonly reported event among First Nations people and the third among Métis. In 2024, 13% of First Nations people and 10% of Métis reported that a wildfire had caused the most severe disruption to their daily activities. For Inuit, wildfires were the fourth most impactful event, with 8% ranking them as the most disruptive.

Chart 1
Extreme weather event or natural disaster that resulted in the most severe disruption to daily activities, First Nations people living off reserve, Métis and Inuit, aged 15 years and older, Canada, 2024



Note: “Other extreme weather event or natural disaster” includes an earthquake, a drought, a storm surge or tsunami, landslide or avalanche.
Source: Statistics Canada, Survey Series on First Nations People, Métis and Inuit - Emergency Preparedness and Extreme Weather, 2024 (5410).

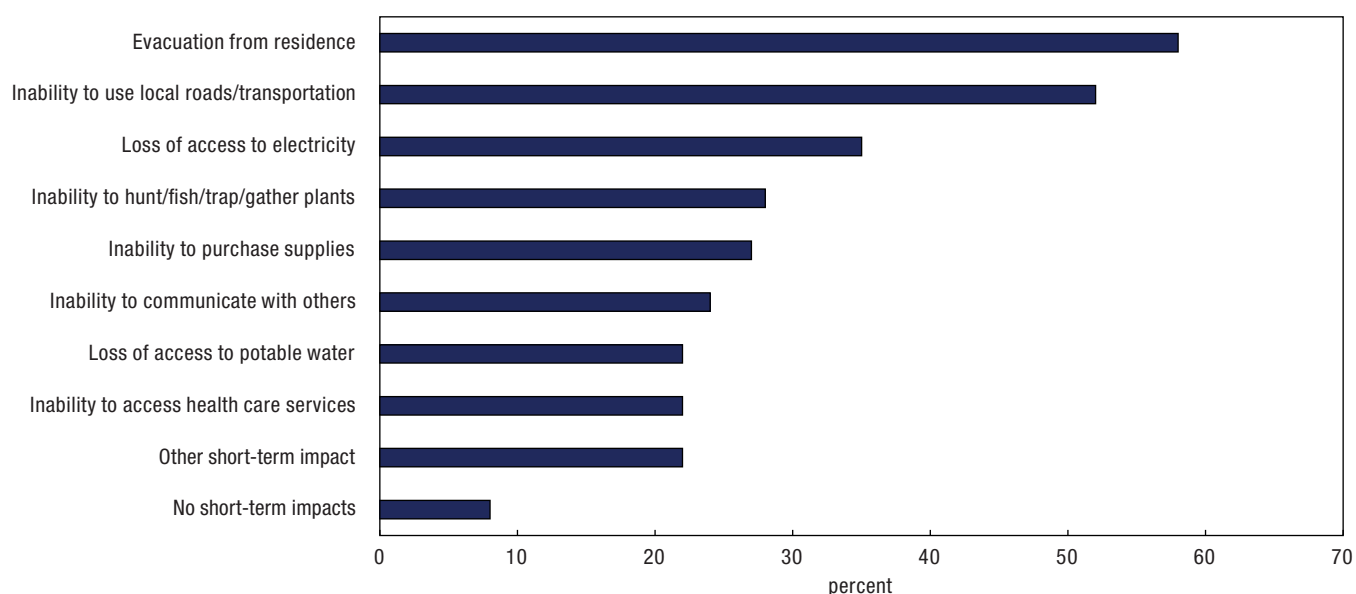
Evacuation, inability to use local roads or transportation and loss of access to electricity were the top three short-term impacts from wildfires

Understanding the impacts of wildfires is critical to ensuring that disaster response is inclusive and equitable for Indigenous Peoples. The 2024 SSFNPMI-EPEW collected information on short-term and long-term impacts from the extreme weather or natural disaster event that had caused the most severe disruption to daily activities in the respondents' lifetime.² For this analysis, only those respondents who reported that wildfires had caused the most severe disruption in their lifetime were considered.

In 2024, more than half of Indigenous Peoples reported having experienced short-term impacts, like evacuation from their residence (58%) and an inability to use local roads or transportation (51%). Among the list of short-term impacts shown in Chart 2, results for evacuation and inability to access local roads were significantly different than the other short-term impacts. This implies that these two impacts caused the most severe disruptions to daily activities compared to the other types of impacts.

Chart 2

Reported short-term impacts ever experienced from a wildfire or forest fire by First Nations people living off reserve, Métis and Inuit, aged 15 years and older, Canada, 2024



Note: Only those who reported that a wildfire or forest fire had caused the most severe disruption in their lifetime are included.

Source: Statistics Canada, Survey Series on First Nations People, Métis and Inuit - Emergency Preparedness and Extreme Weather, 2024 (5410).

Inability to hunt, fish, trap or gather plants was the top long-term impact among Indigenous Peoples

Among the list of long-term impacts shown in Chart 3, the inability to hunt, fish, trap or gather wild plants (27%) ranked as the top long-term impact experienced by Indigenous people who had reported that a wildfire had caused the most severe disruption to daily activities in their lifetime.

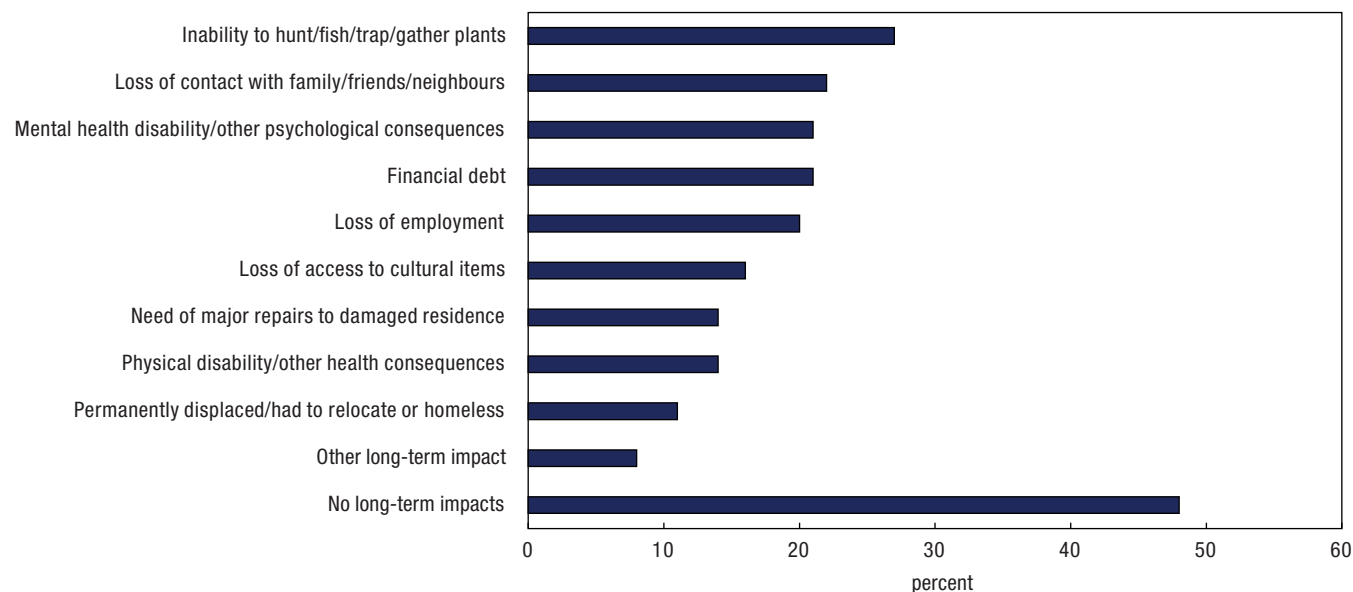
The results for this impact were significantly different compared to the other long-term impacts, highlighting the disruption wildfires can have on traditional activities. Traditional activities are closely linked to emotional health, spiritual well-being, cultural identity and relationships with the land (PHAC, 2024). Hunting, fishing, trapping and gathering wild plants for food or medicines are also linked to food security in Indigenous communities, as these activities supplement store-bought food, may be the main food source, and may also provide a source of income.

2. Short-term impacts are defined as those lasting between three days and six months, while long-term impacts last over six months, based on recommendations from subject-matter experts on extreme weather at Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC).

Loss of contact with family, friends or neighbours was reported as a long-term consequence by 22% of respondents and 21% reported that they suffered a mental health disability or other psychological consequences due to wildfires. This aligns with other research, indicating that Indigenous Peoples evacuated from wildfires can frequently be sent to large cities in Canada, far from home communities, and that family or extended family members can be moved to separate locations, contributing to psychological stress (PHAC, 2024). By contrast, almost half (48%) of Indigenous people reported no long-term impacts lasting longer than six months, suggesting that most of the wildfire impacts experienced are of a shorter duration.

Chart 3

Reported long-term impacts resulting from a wildfire or forest fire for First Nations people living off reserve, Métis and Inuit, aged 15 years and older, Canada, 2024



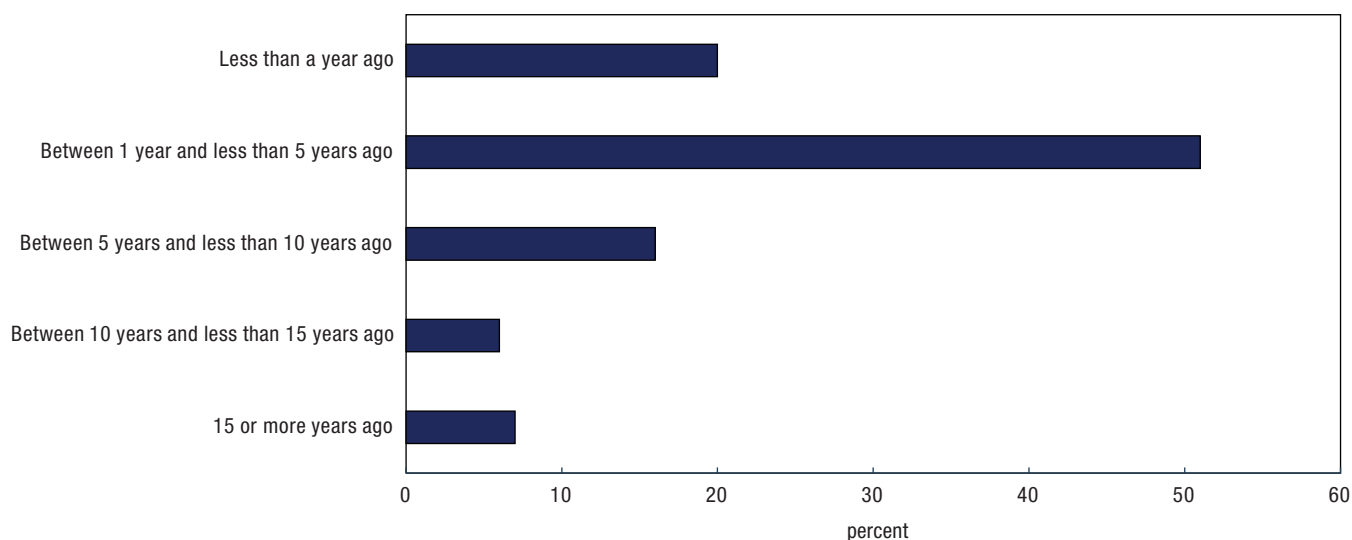
Note: Only those who reported that a wildfire or forest fire had caused the most severe disruption in their lifetime are included.

Source: Statistics Canada, Survey Series on First Nations People, Métis and Inuit - Emergency Preparedness and Extreme Weather, 2024 (5410).

The majority (71%) of Indigenous people who reported that a wildfire was the most severe extreme weather event or natural disaster they had ever experienced reported that the fire took place within the last five years. One-fifth (20%) of these respondents experienced the wildfire within the past year and half (51%) reported that the event happened between one year and less than five years ago (Chart 4). Results for these time periods were significantly different than those for all other time periods. These findings on the timing of wildfire experiences align with the increase in area burned in recent years, including the record 2023 fire season.

Chart 4

Reported time since the severe wildfire or forest fire event took place for First Nations people living off reserve, Métis and Inuit, aged 15 years and older, Canada, 2024



Note: Only those who reported that a wildfire or forest fire had caused the most severe disruption in their lifetime are included.

Source: Statistics Canada, Survey Series on First Nations People, Métis and Inuit - Emergency Preparedness and Extreme Weather, 2024 (5410).

Wildfire smoke poses serious health risks to Indigenous Peoples

Wildfire smoke can cause severe health impacts, which can be more pronounced among Indigenous populations because of disproportionate exposure and longstanding systemic inequities. Wildfire smoke is made up of both organic and inorganic components, with fine particulate matter ($PM_{2.5}$) contributing approximately 90% of the total particulate mass (Vicente et al., 2013). $PM_{2.5}$ is the main threat to public health from wildfire smoke and can travel great distances in the air from the source of the fire (Health Canada, 2020).

Exposure to $PM_{2.5}$ can trigger or worsen respiratory and cardiovascular problems, including asthma attacks, chronic bronchitis, heart attacks and even lung cancer. Rates of these health problems are significantly higher for Indigenous Peoples in Canada than for non-Indigenous people (Hahmann & Kumar, 2022; McGee, 2021). For example, the prevalence of asthma is higher in the Indigenous population than in the non-Indigenous population.

According to the 2022 Indigenous Peoples Survey (IPS), asthma rates for First Nations people were 17%, while they were 15% for Métis and 16% for Inuit (Statistics Canada, 2026). By comparison, the rate of asthma was 9% for the non-Indigenous population, as reported on the 2020 Canadian Community Health Survey (CCHS). Asthma rates in non-Indigenous populations have been relatively stable in recent years—averaging 8% between 2015 and 2020.

A recent population-based study using the 1996 Canadian Census Health and Environment Cohort examined whether residential exposure to wildfires was associated with cancer incidence in Canada (Korsiak et al., 2022). It was found that long-term exposure to wildfire smoke may be associated with an elevated risk of lung cancer and brain tumours.

With wildfire seasons becoming more severe, individuals with respiratory conditions are likely to experience heightened impacts. This risk is particularly pronounced for Indigenous communities, many of which are located in remote areas of Canada (PHAC, 2024).

Rainbow Lake and Hay Lake 209 reserve had the highest number of days with high and very high health risk in 2023

Analysis of air quality monitoring data,³ along with data from the 2021 Census of Population was used to help identify the Indigenous communities and the number of Indigenous people most affected by poor air quality related to wildfires in 2023 (Maps 4 to 7).

First Nations people living in Hay Lake 209 reserve, Alberta, and Métis living in Rainbow Lake, in northern Alberta, were exposed to 137 days when air quality posed a high or very high health risk in 2023. These two CSDs with Indigenous populations had the highest number of days of poor air quality in 2023 (Table 3).⁴

In addition, Fox Lake 162 reserve experienced 103 days when air quality posed a high or very high risk, affecting both First Nations people living on reserve and Métis.⁵ The high number of days of poor air quality in Fox Lake 162 reserve is consistent with the high proportion of area burned in this CSD in 2023.

Inuit residing in Inuvik experienced 18 days of poor air quality, the largest number of days for Inuit residing inside Inuit Nunangat in 2023 (Map 6). This was likely influenced by wildfires in the Northwest Territories, northern Alberta and British Columbia.

3. Fine particulate matter (PM_{2.5}) is the main threat to public health from wildfire smoke and is the only pollutant considered for this analysis. Daily PM_{2.5} concentration data were obtained from both PurpleAir sensors and Environment and Climate Change Canada (ECCC) reference stations at fixed positions across Canada. Estimates of the number of days of high and very high health risk were calculated for each forecast area during the fire season. Detailed information about the method used to calculate the number of high and very high health risk days can be found in appendix.

4. Air quality warnings are issued for the full forecast area; however, the entire area may not have experienced the same air quality conditions as the fixed point of the station where air quality was measured.

5. Single and multiple responses to the Indigenous identity question are used when reporting data for the three Indigenous groups. Those identifying as both First Nations and Métis can result in counts of Métis shown as living on reserve.

Table 3

Top five census subdivisions with the most days when air quality posed a high or very high health risk, by Indigenous identity, Canada, 2023

Census subdivision name/Province, territory or region	Population by Indigenous identity	Total population	Forecast zone coverage of census subdivision	Days with high and very high air quality health index plus (AQHI+)
	number		percent	number
First Nations people living on reserve				
Hay Lake 209 / Alberta	895	957	100	137
Fox Lake 162 / Alberta	2,425	2,488	100	103
John D'Or Prairie 215 / Alberta	480	702	100	103
Hay River Dene 1 / Northwest Territories	245	259 ^E	98	92
Bushe River 207 / Alberta	485	492	100	82
First Nations people living off reserve				
Fort Smith / Northwest Territories	740	2,248 ^E	100	101
Enterprise / Northwest Territories	20	75 ^E	100	92
Hay River, T. / Northwest Territories	685	3,169 ^E	82	92
Improvement District No. 24 Wood Buffalo / Alberta	695	706	36	91
Dettah, SET / Northwest Territories	180	192	44	89
Métis				
Rainbow Lake / Alberta	15	495	100	137
Fox Lake 162 / Alberta	15	2,488	100	103
John D'Or Prairie 215 / Alberta	10	702	100	103
Fort Smith / Northwest Territories	515	2,248	100	101
Enterprise / Northwest Territories	10	75 ^E	100	92
Inuit living inside Inuit Nunangat				
Inuvik / Inuit Nunangat - Inuvialuit	1,260	3,137	100	18
Kuujuarapik / Inuit Nunangat - Nunavik	600	792	95	14
Paulatuk / Inuit Nunangat - Inuvialuit	275	298	95	8
Tuktoyaktuk / Inuit Nunangat - Inuvialuit	815	937	97	6
Ulukhaktok / Inuit Nunangat - Inuvialuit	380	408	98	6
Inuit living outside Inuit Nunangat				
Fort Smith / Northwest Territories	110	2,248	100	101
Hay River, T. / Northwest Territories	85	3,169 ^E	82	92
Yellowknife / Northwest Territories	690	20,340 ^E	90	89
St. Albert / Alberta	40	68,232	100	87
Edmonton / Alberta	820	1,010,899	100	87

Notes: Only Air Quality Health Index plus (AQHI+) values rated as high risk or very high risk were included as these pose the greatest risk of adverse health effects. The method used to calculate the number of days when air quality posed a high or very high health risk can be found in the appendix. Only the top five census subdivisions with the most days where air quality posed a high health risk is shown, for each Indigenous identity group.

^E use with caution

Sources: National Air Pollution Surveillance Program (NAPS), 2025. National Air Pollution Surveillance (NAPS) Program - [Open Government Portal](#).

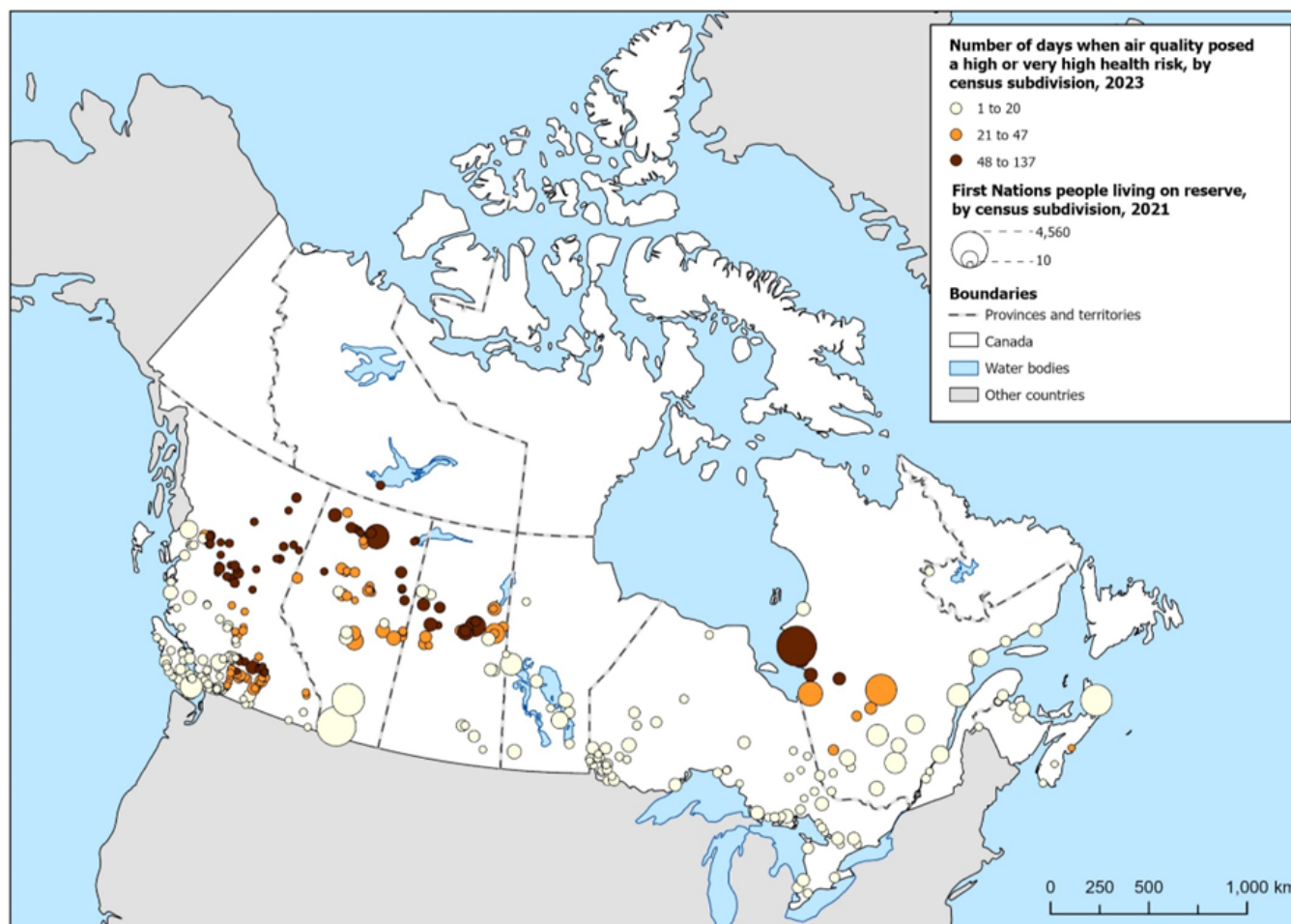
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Map 4

Number of days when air quality posed a high or very high health risk in 2023 and First Nations people living on reserve in 2021, by census subdivision



Notes: Only the reserves with high or very high health risk are shown.

Only Air Quality Health Index plus (AQHI+) values rated as high risk or very high risk were included as these pose the greatest risk of adverse health effects. The method used to calculate the number of days when air quality posed a high or very high health risk can be found in the appendix.

Sources: National Air Pollution Surveillance Program (NAPS), 2025. <https://open.canada.ca/data/en/dataset/1b36a356-defd-4813-acea-47bc3abd859b>

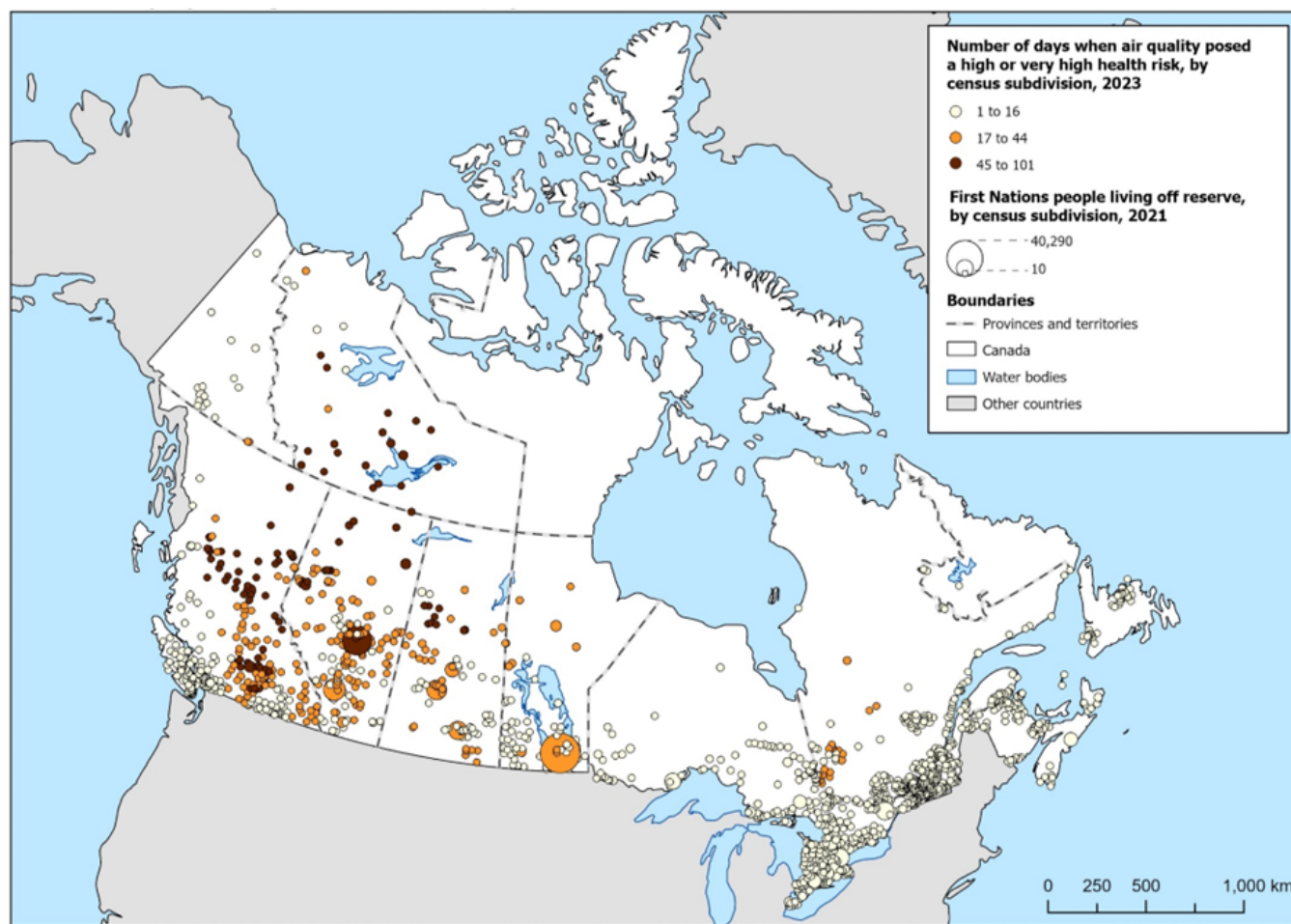
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Statistics Canada, Census of Population, 2021.

Map 5

Number of days when air quality posed a high or very high health risk in 2023 and First Nations people living off reserve in 2021, by census subdivision



Notes: Only the census subdivisions with high or very high health risk are shown.

Only Air Quality Health Index plus (AQHI+) values rated as high risk or very high risk were included as these pose the greatest risk of adverse health effects. The method used to calculate the number of days when air quality posed a high or very high health risk can be found in the appendix.

Sources: National Air Pollution Surveillance Program (NAPS), 2025. <https://open.canada.ca/data/en/dataset/1b36a356-defd-4813-acea-47bc3abd859b>

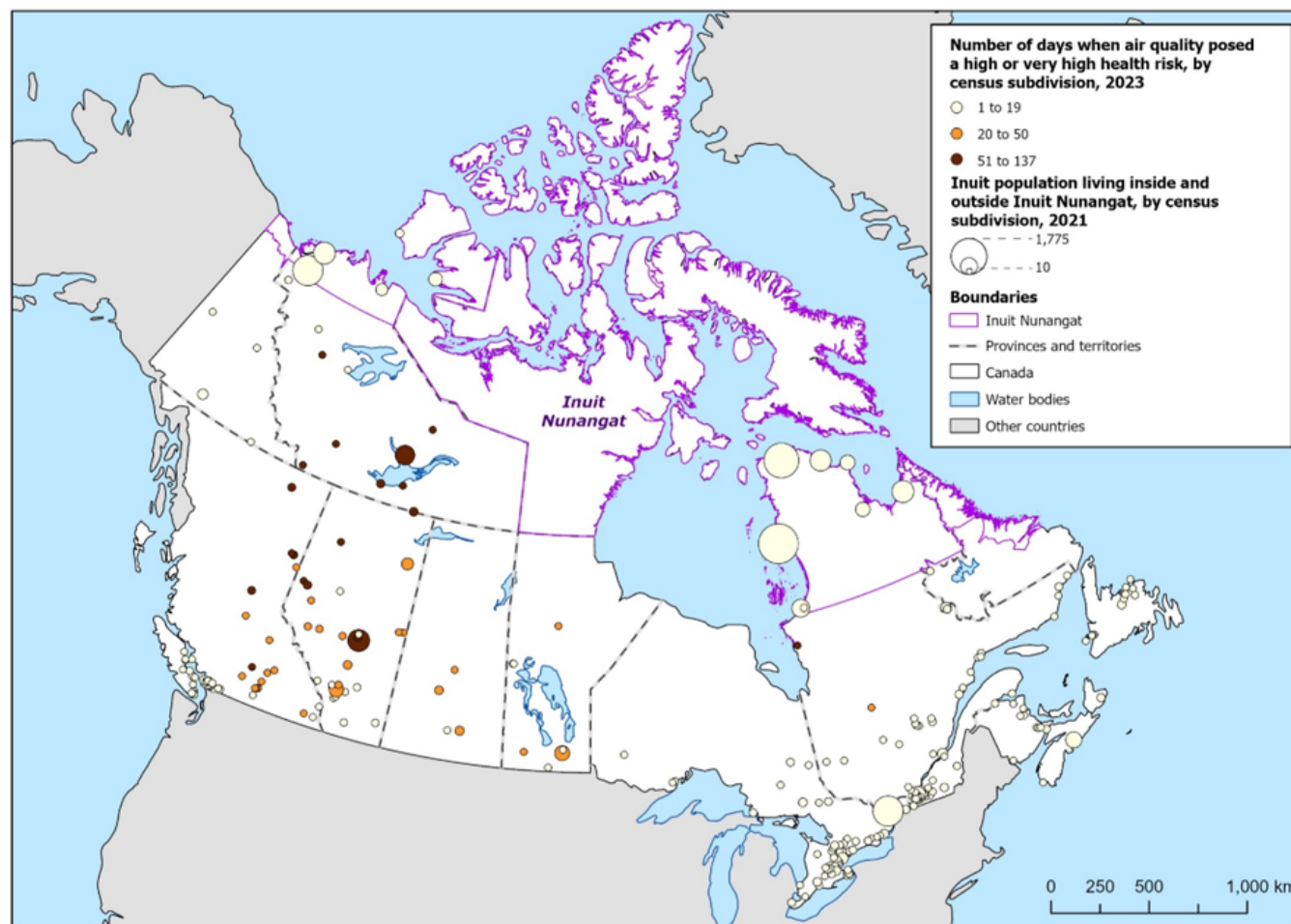
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Map 6

Number of days when air quality posed a high or very high health risk in 2023 and Inuit population in 2021, by census subdivision



Notes: Only the census subdivisions with high or very high health risk are shown.

Only Air Quality Health Index plus (AQHI+) values rated as high risk or very high risk were included as these pose the greatest risk of adverse health effects. The method used to calculate the number of days when air quality posed a high or very high health risk can be found in the appendix.

Sources: National Air Pollution Surveillance Program (NAPS), 2025. <https://open.canada.ca/data/en/dataset/1b36a356-defd-4813-acea-47bc3abd859b>

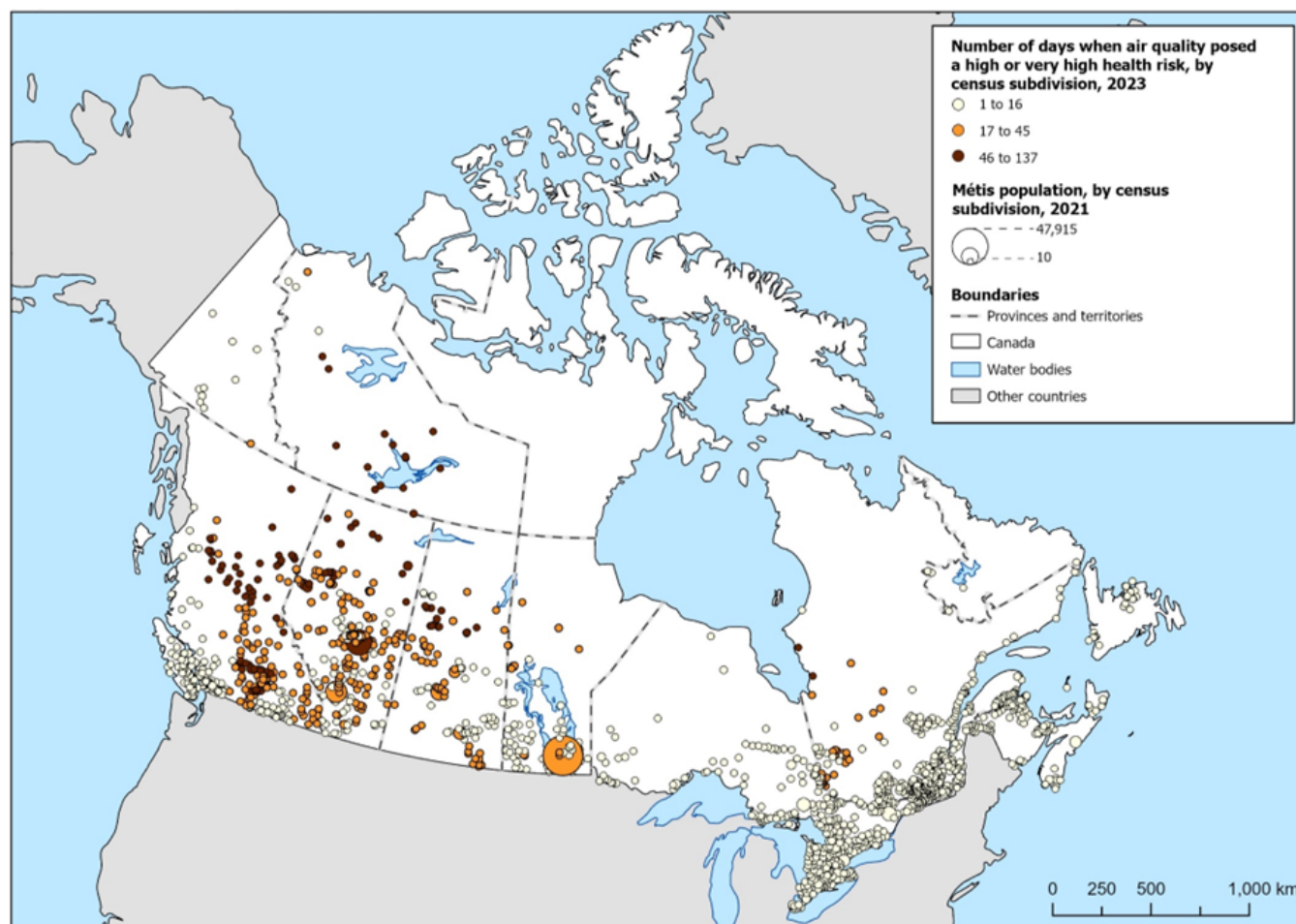
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Statistics Canada, Census of Population, 2021.

Map 7

Number of days when air quality posed a high or very high health risk in 2023 and Métis population in 2021, by census subdivision



Notes: Only the census subdivisions with high or very high health risk are shown.

Only Air Quality Health Index plus (AQHI+) values rated as high risk or very high risk were included as these pose the greatest risk of adverse health effects. The method used to calculate the number of days when air quality posed a high or very high health risk can be found in the appendix.

Sources: National Air Pollution Surveillance Program (NAPS), 2025. <https://open.canada.ca/data/en/dataset/1b36a356-defd-4813-acea-47bc3abd859b>

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Glossary

Asthma: A chronic condition characterized by coughing, shortness of breath, chest tightness and wheezing. Asthma symptoms and attacks usually occur after exercise, exposure to allergens or irritants, or viral respiratory infections.

Census subdivision (CSD): The general term for municipalities (as determined by provincial or territorial legislation) or areas treated as municipal equivalents for statistical purposes (e.g., Indian reserves, Indian settlements and unorganized territories). Municipal status is defined by laws in effect in each province and territory in Canada.

Chronic obstructive pulmonary disease: A chronic and progressive condition characterized by gradual airway obstruction, shortness of breath, cough and sputum production.

Extreme weather event: An occurrence of weather or environmental conditions that is significantly different from normal weather patterns in a given area. Extreme weather events can have a negative impact on the safety and security of the public.

Fire season: The annual period that is conducive for wildland fires to occur and spread, requiring management or organized suppression efforts (NRCan, 2026). The fire season can begin as early as late March and early April and last until the end of October in Canada (NRCan, 2026).

Forecast zone: A geographic area roughly based on weather forecasting zones, which is used to delineate the perimeter around which poor air quality is measured by one or more sensors.

Natural disaster: When weather or environmental conditions affect people to the extent that those involved need assistance dealing with the harm that has occurred to people, and possibly the surrounding property and environment.

Severe disruption to daily activities: When an extreme weather event or natural disaster prevents people from doing their regular daily activities, such as going to school or work; accessing the land, water or ice; hunting; trapping; fishing; preparing meals; or bathing.

Appendix

Method to derive the number of days where the Air Quality Health Index was high and very high health risk and assign these to census subdivisions

The Air Quality Health Index (AQHI) is a scale designed to help quantify air quality health risks in a given region on a scale from 1 to 10+. High and very high AQHI values pose the greatest risk to health: values greater than or equal to 7 are considered high risk and values greater than 10 are considered very high risk. AQHI captures only the short-term or acute health risk (exposure of hours or days at a maximum). AQHI is based on the risk posed by common air pollutants including ground-level ozone, particulate matter and nitrogen dioxide.

As $PM_{2.5}$ is the main driver of poor air quality related to wildfires, an alternative $PM_{2.5}$ only formula, termed AQHI+, was used for this analysis, based on work by Yao, J. et al., (2019). The AQHI+ formula uses the same scale (1 to 10+).

To derive the number of days of poor air quality, daily $PM_{2.5}$ concentration data were obtained from both PurpleAir sensors and National Air Pollution Surveillance (NAPS) reference stations at fixed positions across Canada. While PurpleAir sensor data is less accurate and robust than data obtained from NAPS, the low-cost sensors allow for greater resolution of ground observations nationally.

Hourly $PM_{2.5}$ concentrations were converted to AQHI+ values by dividing the $PM_{2.5}$ concentration (in $\mu g/m^3$) by ten and rounding up to the next whole number. Any AQHI+ values greater than 10 were grouped under “10+.” Hourly AQHI+ values were then classified into risk categories, with adjusted thresholds for PurpleAir sensors to account for the lower precision (High: ≥ 6 to 11; Very high: > 11). The hourly data were used to determine if a given day was counted as having “poor air quality.” To be considered valid, a day needed to meet the following two criteria:

- There were at least 3 hours with a risk category of “high” or “very high.”
- There were at least 20 valid observations of $PM_{2.5}$ concentration within the day.

The number of days during the fire season (March to October) when AQHI+ values from both PurpleAir and NAPS sensors were measured as high and very high was compiled for each ECCC air quality forecast zone. Forecast zones, defined by ECCC, are used to delineate the perimeter around which poor air quality is measured by one or more air quality sensors within it.

Sensor locations were matched to forecast zones using a point in polygon spatial assignment performed in ArcGIS. Using these assignments, daily indicators were created to identify whether at least one sensor within each forecast zone recorded poor air quality on a valid day. Final estimates for the fire season were produced by counting, for each forecast zone, the number of valid days that met the High and Very High AQHI+ criteria.

Note that while air quality warnings based on AQHI+ are issued for the full forecast zone, the entire area may not have experienced the same air quality conditions as the fixed point of the station where it was measured, which is a limitation of the data.

The compiled results on the number of days where the AQHI+ was rated as high or very high risk by forecast zone, was analyzed in ArcGIS Pro, joined to the forecast zone spatial layer, and overlaid on Statistics Canada’s census subdivision (CSD) geography.

There are 1,316 forecast zones and 5,161 census subdivisions. Boundaries of the two geographies do not align in many locations.

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