FACT SHEET

Climate Change and Wildfires

July 2024

Accelerating climate change, largely from the burning of fossil fuels, makes wildfires bigger, hotter, and more frequent (Climate Atlas of Canada n.d.). With Canada warming twice as fast as the global average (Government of Canada 2019), and home to more than a quarter of the world's boreal forests, the country is experiencing this consequence of global heating firsthand. Canada experienced its most destructive wildfire season ever in 2023, with fires consuming 16.5 million hectares—more than double the previous record and nearly seven times more than the historical average (Natural Resources Canada 2024).

Our research finds that to keep Canadians safe, governments must play both defence and offence—protecting people and ecosystems while accelerating the transition away from fossil fuels to limit further heating (Sawyer et al. 2022).

Climate change makes wildfires worse

- While forest fires are naturally occurring disturbances that contribute to the health and renewal of many forest ecosystems (Canadian Council of Forest Ministers 2019), fires are burning hotter and wilder as the climate warms, causing much greater destruction.
- Wildfire activity is increasingly frequent across Canada (Hanes et al. 2018). The area burned in 2023 was more than six times the historical average (Canadian Interagency Forest Fire Centre 2024).
- Climate change more than doubled the likelihood of extreme fire weather conditions in Eastern Canada in 2023 (World Weather Attribution 2023).
- An overheating climate is making Canadian summers hotter and windier, with more erratic rainfall, including less summer rain in some regions (Bush and Lemmen 2019; Gifford et al. 2022).
- Fire season is starting earlier, is lasting longer, and is harder to contain (Climate Atlas of Canada n.d.; Natural Resources Canada 2024b; Natural Resources Canada 2022). Zombie fires are even beginning to smoulder through the winter (Shingler 2024).
- Lighting strikes become more frequent as the climate warms (McKabe 2023). Ninety-three per cent of the area burned in Canada in 2023 was from fires ignited by lightning; only 7 per cent by human-ignition (Jain et al. 2024).
- Elevated wildfire risk means that, whatever the cause, fires catch, spread, and get out of control much more easily.

Wildfires are damaging people's health and wellbeing

- The smoke from wildfires can spread thousands of kilometres (NASA Earth Observatory 2015), requiring school closures and causing other disruptions while threatening the health of millions of people (Lin 2023), particularly children, seniors, and people with heart or lung disease.
- Hot-burning wildfires release dangerous levels of particulate matter into the air, which is associated with an increased risk of issues like heart disease, cardiovascular disease, lung cancer, and brain cancer (Egyed et al. 2022; Korsiak et al. 2022).
- Heavy smoke takes a significant toll on the Canadian healthcare system. A single week of wildfire smoke in June 2023 was estimated to have cost Ontario over $1.2 billion (Sawyer et al. 2023) in health impacts such as premature deaths, increased hospital visits, and health emergencies.
- Poor air quality from smoke hits the most vulnerable the hardest (Government of Canada, 2022). The impacts of smoke are even more serious for groups like children, seniors, pregnant people, and those who work outdoors.
- Smoke from larger and more frequent wildfires is exacerbating asthma across parts of Western Canada (Matz et al. 2020), and the aftermath of climate-related fires and floods takes a significant toll on mental health (Belleville et al. 2019).
- Wildfires can destroy homes and communities, devastate fragile ecosystems, and threaten economic security. These effects have been linked to post-traumatic stress disorder, depression, anxiety, and suicidal thoughts (Hayes et al. 2022).

Worsening wildfires are making life more expensive

- Wildfires can destroy property, homes, and entire communities, driving up insurance costs and making life more expensive (Gerety 2024; Vaillant 2024).
- The cost of wildfire protection has risen by about $150 million per decade since the 1970s (Government of Canada 2024). These costs exceeded $1 billion for six of the last 10 years.
- The 2016 wildfire in Fort McMurray, Alberta, cost an estimated $9 billion in direct and indirect physical, financial, health, and environmental impacts (Alam et al. 2019). It triggered the largest evacuation in Canadian history, destroying more than 2,400 structures and displacing 85,000 people.
- Wildfires impact key sectors of the economy, including the forest industry, one of Canada's largest employers (Lindsay and Pelai 2024). Wildfires can disrupt forestry operations and reduce the amount of timber available, hurting workers and forest-dependent communities in the process. During the 2017 wildfires in British Columbia, 40 forestry companies were temporarily shut down (Ministry of Environment and Climate Change Strategy 2019).

- The accumulating impacts of global heating, including bigger and more frequent wildfires, are raising the cost of living in Canada from lost jobs, reduced economic activity, and tax hikes to pay for disaster recovery and infrastructure repairs. The additional climate change impacts between 2015 and 2025 alone will cost the average household $700 per year, and will continue to increase moving forward (Sawyer et al. 2022).

Governments can act to protect communities and slow further heating

- Scientists have warned that the consequences of climate change will only get worse as the concentration of heat-trapping gases in the atmosphere increases (IPCC 2022). Governments around the world, including Canada's, must act immediately to reduce greenhouse gas emissions and limit global warming.
- Because the impacts of climate change are already here and getting worse, communities and governments must work together to adapt and prepare for increased fire risks today.
- Federal and provincial governments can promote fire resilience by limiting development in areas at high risk of wildfires, strengthening building codes and regulations (for example, building with fire-resistant materials), and improving forest and vegetation management through prescribed burns and other measures to help reduce fuel available to burn near at-risk communities (Bénichou et al. 2021).
- Alberta and British Columbia's FireSmart programs are examples of initiatives that help communities and individuals reduce their fire risk (FireSmart Alberta 2024; FireSmart B.C. 2024).

Indigenous Peoples are disproportionately impacted, and leading on solutions

- Indigenous communities in Canada have used controlled fire as traditional land management practice since time immemorial. Supporting these cultural burning practices can help reduce the risk of out-of-control wildfires (BC Wildfire Service 2022).
- Eighty per cent of majority-Indigenous communities in Canada are located in fire-prone regions (Asfaw et al. 2019).
- More than 42 per cent of wildfire evacuations have been from majority-Indigenous communities (Webber and Berger 2023).
- Between 1980 and 2021 in Canada, 16 communities (Christianson et al. 2024) were evacuated five or more times, and all but two of those were First Nations reserves.

Resources

- Public Health Risk Profile: Wildfires in Canada (Public Health Agency of Canada 2023)

- The Cost of Wildland Fire Protection (Natural Resources Canada 2024c)
- Flame Wars: Misinformation and Wildfire in Canada's Climate Conversation (Climate Action Against Disinformation 2024)
- Canadian Wildland Fire Information System (2024)
- Forest Fires and Climate Change (Climate Atlas of Canada n.d.)
- Reporting Extreme Weather and Climate Change: A Guide for Journalists (World Weather Attribution 2024)

Experts available for comment and background information on this topic:

- **Ryan Ness** is Director of Adaptation Research at the Canadian Climate Institute and the lead researcher on the Institute's Costs of Climate Change series (Eastern Time, English and French).
- **Sarah Miller** is Research Lead in Adaptation at the Canadian Climate Institute (Pacific Time, English).

For more information or to interview an expert, please contact:

Claudine Brulé
Communications and Media Relations Specialist
cbrule@climateinstitute.ca
(514) 358-8525

References

Alam, Rafat, Shahidul Islam, Eric Mosely, Sean Thomas, Virginia Dowdell, Dawn Doel. 2019. *Rapid Impact Assessment of Fort McMurray Wildfire*. Institute for Catastrophic Loss Reduction and MacEwan University. https://www.iclr.org/wp-content/uploads/2019/08/Rapid-Impact-Assessment-of-Fort-McMurray-Wildfire.pdf

Asfaw, Henok Workeye, Sandy Lake First Nation, Tara K. McGee, and Amy Cardinal Christianson. 2019. "A qualitative study exploring barriers and facilitators of effective service delivery for Indigenous wildfire hazard evacuees during their stay in host communities." *International Journal of Disaster Risk Reduction*, 41, 101300. https://doi.org/10.1016/j.ijdrr.2019.101300

BC Wildfire Service. 2022. “How cultural burning enhances landscapes and lives.” May 5. https://blog.gov.bc.ca/bcwildfire/how-cultural-burning-enhances-landscapes-and-lives/

Bénichou, Noureddine, Masoud Adelzadeh, Jitender Singh, Islam Gomaa, Nour Elsagan, Max Kinateder, Chunyun Ma, Abhishek Gaur, Alex Bwalya, and Mohamed Sultan. 2021. *National Guide for Wildland-Urban Interface Fires*. National Research Council Canada. https://doi.org/10.4224/40002647

Belleville, Genevieve, Marie-Christine Ouellet, and Charles M. Morin. 2019. "Post-traumatic stress among evacuees from the 2016 Fort McMurray wildfires: exploration of psychological and sleep symptoms three months after the evacuation." *International Journal of Environmental Research and Public Health*, 16(9), 1604. https://doi.org/10.3390/ijerph16091604

Bush, E., and D. S. Lemmen, editors. 2019. *Canada’s Changing Climate Report*. Government of Canada. https://changingclimate.ca/CCCR2019/chapter/4-0/

Canadian Council of Forest Ministers. 2019. “Natural Disturbances.” https://www.ccfm.org/healthy-forests/natural-disturbances/

Canadian Interagency Forest Fire Centre. 2024. “Wildfire Graphs: Annual area burned in Canada.” https://ciffc.net/statistics

Canadian Wildland Fire Information System. 2024. “Monthly and Seasonal Forecasts.” Natural Resources Canada. https://cwfis.cfs.nrcan.gc.ca/maps/forecasts

Christianson, Amy Cardinal, Lynn M. Johnston, Jacqueline A. Oliver, David Watson, David Young, Heather MacDonald, John Little, Bruce Macnab, and Noemie Gonzalez Bautista. 2024. "Wildland fire evacuations in Canada from 1980 to 2021." *International Journal of Wildland Fire*, 33(7). https://doi.org/10.1071/WF23097

Clarke, Ben, and Friederike Otto. 2024. “Reporting extreme weather and climate change: A guide of journalists.” World Weather Attribution.

https://www.worldweatherattribution.org/reporting-extreme-weather-and-climate-change-a-guide-for-journalists/

Climate Action Against Disinformation. *Flame Wars: Misinformation and Wildfire in Canada's Climate Conversation.* June 11. https://caad.info/analysis/reports/flame-wars-misinformation-and-wildfire-in-canadas-climate-conversation/

Climate Atlas of Canada. n.d. "Forest Fires and Climate Change." https://climateatlas.ca/forest-fires-and-climate-change

Egyed, Marika, Phil Blagden, et al. 2022. "Air Quality." In P. Berry & R. Schnitter (Eds.), *Health of Canadians in a Changing Climate: Advancing our Knowledge for Action*. Government of Canada.

FireSmart Alberta. 2024. "About FireSmart Alberta." https://firesmartalberta.ca/about/

FireSmart B.C. 2024. "About FireSmart B.C." https://firesmartbc.ca/

Gerety, Rowan Moore. "How does a tiny mountain town, burned to the ground, come back." New York Times, March 12. https://www.nytimes.com/2024/03/12/travel/lytton-fire-canada.html

Gifford, Robert, Craig Brown, Carrie Baron, Denni Clement, Natalya Melnychuk, Harry Nelson, Luke Sales, and Dave Spittlehouse. 2022. British Columbia Chapter in *Canada in a Changing Climate: Regional Perspectives Report*. Government of Canada. https://changingclimate.ca/regional-perspectives/chapter/5-0/

Government of Canada. 2019. "Canada's climate is warming twice as fast as global average." Press release. April 2. https://www.canada.ca/en/environment-climate-change/news/2019/04/canadas-climate-is-warming-twice-as-fast-as-global-average.html

Government of Canada. 2024. "Cost of Wildland Fire Protection." May 13. https://natural-resources.canada.ca/climate-change/climate-change-impacts-forests/forest-change-indicators/cost-fire-protection/17783

Hanes, Chelene C., Xianli Wang, Piyush Jain, Marc-André Parisien, John M. Little, and Mike D. Flannigan. 2019. "Fire-regime changes in Canada over the last half century." *Canadian Journal of Forest Research*, November 16. https://doi.org/10.1139/cjfr-2018-0293

Hayes, Katie, Ashley Cunsolo, et al. 2022. "Mental Health and Well-Being." In P. Berry & R. Schnitter (Eds.), *Health of Canadians in a Changing Climate: Advancing our Knowledge for Action*. Government of Canada.

IPCC, 2022. *Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* Cambridge University Press. https://dx.doi.org/10.1017/9781009325844

Jain, Piyush, Quinn E. Barber, Steve Taylor, et al. 2024. *Canada Under Fire: Drivers and Impacts of the Record-Breaking 2023 Wildfire Season. ESS Open Archive,* February 28.

Korsiak, Jill, Lauren Pinault, et al. 2022. "Long-term exposure to wildfires and cancer incidence in Canada: A population-based observational cohort study." *The Lancet,* May. https://doi.org/10.1016/S2542-5196(22)00067-5

Lin, Elizabeth Ziying. 2023. "Canadian Wildfire Smoke Associated with Increased Asthma Cases in NYC." *Yale School of Public Health,* October 5. https://ysph.yale.edu/news-article/canadian-wildfire-smoke-associated-with-increased-asthma-cases-in-nyc/

Lindsay, Kate, and Ricardo Pelai. 2024. "Canada needs to get ready for a future fraught with fire: How can the forest sector respond?" Canadian Climate Institute, January 31. https://climateinstitute.ca/canada-fires-forest-sector/

Matz, Carlyn J., Marika Egyed, Guoliang Xi, Jacinthe Racine, Radenko Pavlovic, Robyn Rittmaster, Sarah B. Henderson, and David M. Stieb. 2020. "Health impact analysis of PM2. 5 from wildfire smoke in Canada (2013–2015, 2017–2018)." *Science of The Total Environment*, 725, 138506. https://doi.org/10.1016/j.scitotenv.2020.138506

McKabe, Kirsty. 2023. "How does climate change affect thunderstorms?" Royal Meteorological Society, July 20. https://www.rmets.org/metmatters/how-does-climate-change-affect-thunderstorms

Ministry of Environment and Climate Change Strategy. 2019. *Preliminary Strategic Climate Risk Assessment for British Columbia.* Report prepared for the Government of British Columbia. https://www2.gov.bc.ca/gov/content/environment/climate-change/adaptation/riskassessment

NASA Earth Observatory. 2015. "Canadian Wildfires Produce River of Smoke." June 29. https://earthobservatory.nasa.gov/images/86151/canadian-wildfires-produce-river-of-smoke

Natural Resources Canada. 2022. "Climate Change and Fire." https://natural-resources.canada.ca/our-natural-resources/forests/wildland-fires-insects-disturbances/climate-change-fire/13155

Natural Resources Canada. 2024a. "Canada's record-breaking wildfires in 2023: A fiery wake-up call." May 21. https://natural-resources.canada.ca/simply-science/canadas-record-breaking-wildfires-2023-fiery-wake-call/25303

Natural Resources Canada. 2024b. “Fire Weather.” https://natural-resources.canada.ca/climate-change/climate-change-impacts-forests/forest-change-indicators/fire-weather/17776

Natural Resources Canada. 2024c. “Cost of WIldland Fire Protection.” May 13. https://natural-resources.canada.ca/climate-change/climate-change-impacts-forests/forest-change-indicators/cost-fire-protection/17783

Public Health Agency of Canada. 2023. “Public Health Risk Profile: Wildfires in Canada, 2023.” July 23. https://www.canada.ca/en/public-health/services/emergency-preparedness-response/rapid-risk-assessments-public-health-professionals/risk-profile-wildfires-2023.html

Sawyer, Dave, Ryan Ness, Caroline Lee, and Sarah Miller. 2022. *Damage Control: Reducing the costs of climate impacts in Canada.* Canadian Climate Institute. https://climateinstitute.ca/reports/ damage-control

Sawyer, Dave, Seton Stiebert, and Colin Welburn. 2023. “With the Forest Ablaze, the Health Costs Hit Home”. Canadian Climate Institute, June 26. https://climateinstitute.ca/with-the-forest-ablaze-the-health-costs-hit-home/

Shingler, Benjamin. 2024. “It’s the middle of winter, and more than 100 wildfires are still smouldering.” CBC, February 21. https://www.cbc.ca/news/climate/wildfires-zombie-fires-canada-bc-alberta-1.7119851

Vaillant, John. 2024. *Fire Weather: The Making of a Beast.* Vintage Canada.

Webber, Tammy, and Noah Berger. “Canadian wildfires hit Indigenous communities hard, threatening their land and culture.” Associated Press, July 19. https://apnews.com/article/canada-wildfire-indigenous-land-first-nations-impact-3faabbfadfe434d0bd9ecafb8770afce

World Weather Attribution. 2023. “Climate change more than doubled the likelihood of extreme fire weather conditions in Eastern Canada.” August 22. https://www.worldweatherattribution.org/climate-change-more-than-doubled-the-likelihood-of-extreme-fire-weather-conditions-in-eastern-canada/