Smoke from Their Fires: Or, Environment and Region in Canada and the Upper Midwest

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In June 2023, I conducted research throughout northern Wisconsin and the western Upper Peninsula for a week and a half. To help lower costs, I stayed in backcountry cabins and tent camped in state parks for most of the trip. For almost a week, I breathed the thick smoke from the Canadian wildfires burning thousands of miles away. Driving along the south shore of Lake Superior, I looked out across the lake—or, at least, tried to—and realized that I was not seeing a thick blanket of fog, as is common on the big lake in the morning, but a dense blanket of smoke. So dense was this smoke that, in some places, it reduced my visibility to less than one hundred feet, and the thick smoke did not begin to dissipate for approximately seventy-five miles farther inland, near Manitowish Waters, Wisconsin. Wildfires blazing thousands of miles away across an international border produced far-reaching consequences that extended well beyond the burn.

If environments play an instrumental role in cultural creation and regional identity, how, then, could the increasing reality of wildfire smoke transform regional conceptions of the Upper Midwest? In this article, I discuss historical conceptualizations of the Upper Midwest, propose new frameworks for thinking about the region as a transnational space, and use the understudied byproduct of wildfires—their smoke—as a means to better understand the environmental realities of the region in the face of an uncertain climate future.

Ecologically, the U.S. Upper Midwest and Canadian interior have much more in common than not. The Great Lakes, their countless waterways, forests, glacial outcroppings, and vast prairies are shared characteristics that define both the Upper Midwest and what might be considered the Canadian Midwest. Unlike the more heavily militarized U.S.-Mexico border, the U.S.-Canadian border possesses a far different physical infrastructure, and for much of the

Upper Midwest it is either open water or a mowed strip seemingly cutting through the middle of a forest.[1] Native peoples in the region historically inhabited both sides of the international boundary; birds migrate along seasonal flyways that have historically teemed with waterfowl hunters; the northern hardwood forests sprawling from west of Lake Superior to Quebec and New England make both nations into what the biologist John Pastor characterized as a "land of Christmas trees and maple syrup."[2] Such romantic descriptions aside, both regions engaged in the extractive industries of the fur trade, logging, and large-scale agriculture, all of which contributed to the dispossession of Indigenous and First Nations peoples. Still today, oil and its necessary infrastructure links the United States and Canada like sutures, and still at the widely publicized cost of Native peoples.[3] While much of both United States and Canadian history is conceptualized through an east-west trajectory, which is itself inherently settler-centric, reorienting it along a south-north axis brings to light new questions with which to interrogate the similar, and sometimes even shared, pasts of both nations.[4]

"The End of the World": Historical Conceptualizations of the Region

The Midwest has experienced a resurgence in regional interest over the past decade. This is likely for a number of reasons, not least of which is the region's political value containing several crucial swing states.[5] It is also perhaps the most ambiguous U.S. region, and people have been asking "Where is the Midwest?" for more than a century, oftentimes never fully reaching a definite conclusion. In 2023, the *Middle West Review* and Emerson College Polling launched a study on Midwestern identity, polling more than eleven thousand individuals across twenty-two states by asking the simple question: "Do you live in the Midwest?" The results indicated a classic core of the Midwest centering on the Great Lakes and Great Plains; however, a number of respondents in West Virginia, Tennessee, Arkansas, Oklahoma, Colorado, Wyoming, Montana, and Idaho also responded "yes." According to the data, more than half of the respondents from Wyoming and more than 60 percent of those in Oklahoma believe they live in the Midwest (Fig. 1).[6] The poll, however, was limited to the United States, and indicated that, unlike other regions in the United States, what many consider the Midwest is exceedingly variable in terms of both geography and ecology. And yet, the Upper Midwest is something distinct from the broader region. Traveling northward through the Midwest, the Corn Belt of Iowa and south-

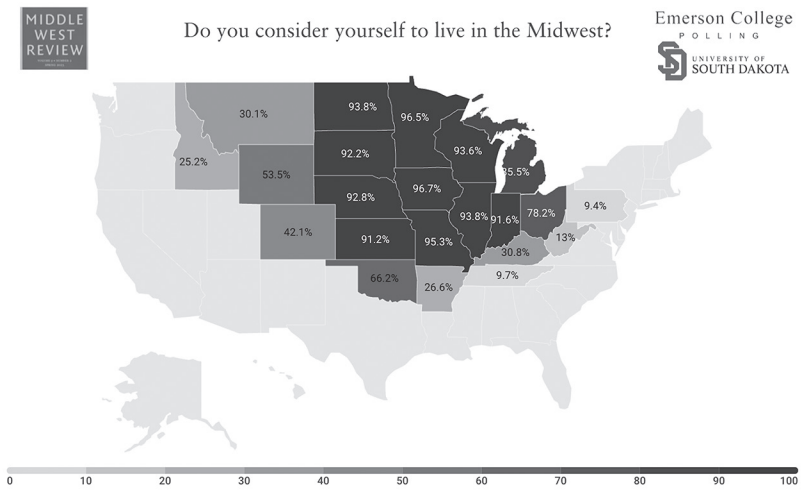

Fig. 1. Poll results for "Do you live in the Midwest?" Source: *Middle West Review*-Emerson College Polling.

ern Minnesota yields to the deciduous Big Woods, which in turn blend into the mixed forests farther north before ultimately arriving in Canada's boreal forest, forming what the geographer Gregory S. Rose characterized as "a distinctive Northern Borderland subregion that includes most of Michigan, Wisconsin, and Minnesota."[7] Large influxes of immigrants settled in the northern borderland during the late nineteenth century alongside nearly all of the Indigenous reservations in Michigan, Minnesota, and Wisconsin.[8]

If the Midwest is a geographically amorphous place, the Upper Midwest is, perhaps, even more so. In 1826, Superintendent of Indian Affairs Thomas L. McKenney traveled from Washington, DC to the interior of northwestern Michigan Territory and back, describing his journey throughout the region. In the vicinity of the American Fur Company post at Fond du Lac, near present-day Duluth, Minnesota, McKenney encountered a "remote point, so in the heart of the interior, and surrounded as it is by solitude and the lakes, feels to me, in more respects than one, as if it were . . . *the end of the world*."[9] To McKenney, the region was a dark, foreboding place that was something wholly different from other parts of the Territory. In 1848, Reverend Sherman Hall, a missionary at La Pointe, on Wisconsin's Lake Superior shore since the early 1830s, wrote a letter to his wife, Lydia, describing the excitement animating the town. "Don't you think we have got pretty near the place where they jump off [for California]?" Hall asked. "But they talk here about going to

[the] West," he continued, "I am inclined to think sometimes that it is not a little difficult to determine where the west is." Hall not only captured what has become a major historiographical discussion animating the fields of Western and Midwestern history in his observation, but observed the fluidity of what constituted "the West" as it seemingly transformed before his eyes. After all, Hall explained, "Wisconsin was a territory a few months ago, but now it is a state, and our place is included with it."[10] The discovery of gold in California might have created a new western frontier, but the Upper Midwest, even as it transitioned from territory to statehood, remained but one of a series of western borderlands.[11]

The Upper Midwest remained as ambiguous as ever—or, perhaps even more so—into the twentieth century with the hardening of national borders. The American geographer Almon Ernest Parkins described the entire Great Lakes region as an "irregular and somewhat indefinite area."[12] William Lawson Grant, a Canadian historian, wrote only a few years after Parkins that, "If to-day we were to divide North America into three nations, no one would give Canada the boundaries which she has at present . . . Geographically, each part of our country is more closely bound to some part of the United States than it is to its neighbouring part of Canada."[13] John D. Voelker, a lawyer and author from the Upper Peninsula who wrote under the pseudonym Robert Traver, wrote that "The U.P. is a wild, harsh, and broken land . . . a jumble of swamps and hills and rocks and endless waterways . . . perhaps more nearly allied with Canada by climatic and geological affinity; with Wisconsin by the logic of geography; but a region which, by some logic beyond logic, finally wound up as part of the state of Michigan."[14] From a social standpoint, the anthropologist Eric Wolf has also pointed to the contingency of westward expansion and the very real possibilities of "a polyglot Floridian Republic, a Francophone Mississippian America, a Hispanic New Biscay, a Republic of the Great Lakes, a Columbia—comprising the present Oregon, Washington, and British Columbia."[15] The political borders bounding the Upper Midwest are not only unnatural, but were, for much of the region's history since the arrival of Europeans, altogether unlikely.

In conceptualizations of where the Midwest starts and stops, Canada rarely—if ever—figures in. But why should Canada, or at least parts of the Great White North, not be included in regional conceptualizations? After all, people along the Minnesota-Ontario boundary, for instance, have more cultural affinity to one another than, say, a Wisconsinite to an Idahoan, Oklahoman, or West Virginian, or even a northern Minnesotan to a southern

Minnesotan.[16] While that makes sense from a border culture perspective, it makes even more sense from Indigenous and environmental perspectives. In some ways, breaking beyond the imaginary of national borders is a decolonial process in itself.

One way to think beyond national borders is through the environments that often transcend them. Environments play large roles in cultural creation and the formation of regional identities; the historian Dan Flores, for instance, argued that the "human sense of place has everything to do with a shared sense of history."[17] On the northern Great Plains, for instance, the historian Molly Rozum has shown how intimate, longstanding relationships with a given environment create "the roots of sense of place," and how these shared environmental experiences and understandings transcended the U.S.-Canadian boundary to create a border culture predicated upon regional identity. As Rozum explains, "Nationalist historiographies have obscured shared *continental* experiences rooted in similar historical climates and natural environments central to regional experience in both nations."[18] The identities forged from living in and sharing environmental experiences often traverses political borders, producing regional commonalities based upon the natural environment that belies differences in the nation-state. These environmentally based regions are called ecoregions (Fig. 2).[19]

Smoke could provide an interesting perspective toward better understanding environmentally based conceptions of place moving into our fiery future. If these ecoregions are conceptualized by their respective ecologies, however, what if we were to consider transient smoke as part of those ecologies? How might climatological changes affect these transnational environments, and how will nation-states cooperate (or not) on environmental legislation that transcends political boundaries? Historically, wildfire smoke was a rural issue, while industrial pollution was an urban issue; regardless of the source, however, smoke has historically been a defining characteristic of lived environments.[20] As the historian Mica Jorgenson has explained, "As smoke drifts from the forests into nearby communities and distant urban centers, it becomes the medium through which most people experience forest fire. Rather than as evacuees or firefighters, most of us are recipients of the particulates drifting into densely populated spaces."[21] If environmental experiences contribute to placemaking and regional affinities, so, too, does sensory experiences. Wildfires and their palls are incredibly disorienting sensory events: survivors wrote of heated, smoky air choking them and stinging their eyes; of hearing pine trees "four foot on the stump . . . cracking like cannons" and the incredible

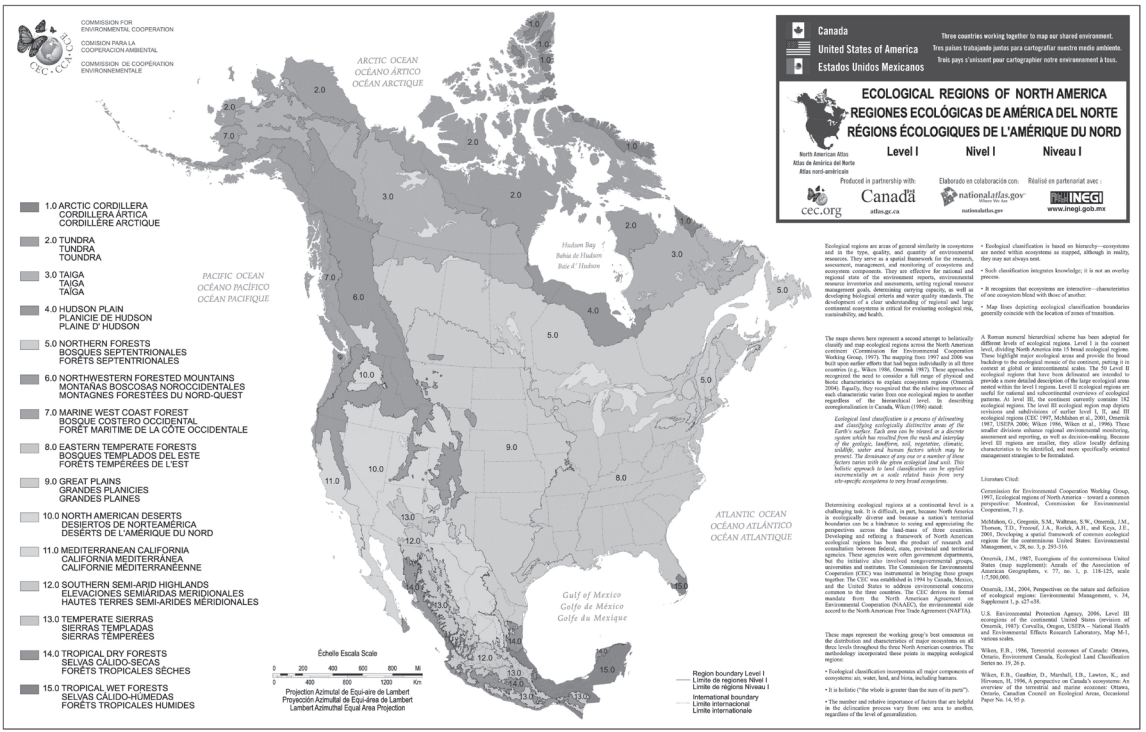

Fig. 2. The Upper Midwest conceptualized in this article roughly corresponds with a portion of the Northern Forests (5.0) region on the Level I Ecological Regions of North America Map.

roar of firestorms bearing down on a city; of midnight darkness occurring at midday; and, of course, of death and material loss.[22] "Smoke," according to Jorgenson, "highlights the connectivity between people and land because it physically connects people to distant environments they may only understand in abstraction."[23] Increasing megafires, however, will blur that rural-urban divide, with palls from distant wildfires mingling with industrial pollutants to create even unhealthier urban air. The shifting smokescapes of North America influence environmental conceptualizations of place, including the organization of time, materially affecting how both humans and non-humans alike in smoky regions structure their days.[24]

"As If All the World Were Burning Up": The History of Fire in the Upper Midwest

A little more than a century ago the Western Great Lakes were the seat of North American fire with Michigan, Minnesota, and Wisconsin producing four of the five deadliest wildfires in recorded world history between 1871 and 1918 (Fig. 3). All of these fires were, for the most part, byproducts of the logging industry that left sawdust and slash in its wake; all four of them occurred in either September or October, in what were the driest parts of the year, and, while devastating, were not sustained burns. Today, however, North American wildfires can burn year-round, and are themselves not typically byproducts of a singular industry, but a marker of land management decisions coupled with anthropogenic climate change writ-large.[25] Yet, smokescapes are not new phenomena, but instead, as the historian J.R. McNeil argued broadly about twentieth-century environmental change, "a matter of scale and intensity."[26] Catastrophic wildfires have mostly left the Upper Midwest, but wildfire smoke lingers.

Smoke seasons are not new phenomena in the Upper Midwest: in fact, during the late nineteenth century, smoke was an all-too-common occurrence. In 1871, a fire broke out in the vicinity of the lumber town of Peshtigo, in northeastern Wisconsin. According to eyewitness accounts, it "was a chilly day . . . the atmosphere was remarkably still and filled with a dense, blinding smoke." Despite this, however, "The smoke created no alarm, as the smoldering fires in the pineries about sufficiently accounted for it." Throughout the day, however, the temperature rose and smoke increased, creeping toward the town until by 8:00 pm, with "the smoke almost suffocating in its density," the firestorm erupted on the town.[27] Smoke and haze similarly preceded Michigan's

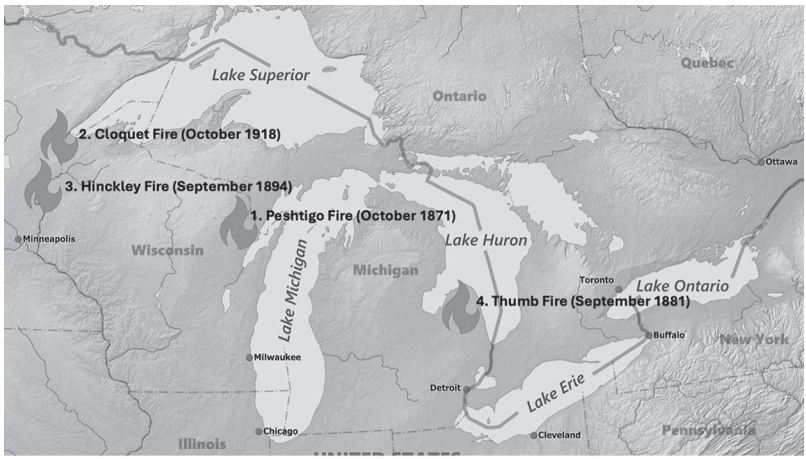

Fig. 3. Map of four of the five deadliest wildfires in world history: 1) Peshtigo, WI, Oct. 1871, killed between 1,500 and 2,500 people; 2) Cloquet, MN, Oct. 1918, killed 453 people; 3) Hinckley, MN, Sept. 1894, killed at least 418 people; 4) Michigan's Thumb Fire in Sept. 1881 killed 282 people.

Thumb Fire a decade later, and "Fires had been burning in Sanilac, Huron, and Tuscola Counties, but no one apprehended any danger" as farmers had begun to set clearing fires as they had every fall.[28] The 1918 Cloquet fire was "hidden by the pall of smoke that had hung heavy over the valley district" before the "fiery tornado [hurled] itself across the countryside."[29] "For three weeks," one Minnesota newspaper reported, "fire has been [smoldering] in numerous places in the woods, and was only awaiting a high wind to be transformed into a flaming destroyer of life."[30] One survivor of the Cloquet fire recalled that "There was smoke everywhere; it seemed as if all the world were burning up."[31] Smoke was such a common occurrence that it was no cause for alarm, attributing to such high death tolls; after all, as a correspondent to the *New York Herald* wrote following his journey to Michigan in the wake of the Thumb Fire, "It may be thought strange that, with forest fires known to be in the vicinity, with the losses of ten years ago remembered, and with other instances daily heard of, any one could be surprised. But there are wood fires yearly; they rarely amount to much."[32]

Smoke from the Upper Midwest fires became definitive experiences extending throughout the broader Great Lakes. In Oshkosh, Wisconsin, southeast of the Peshtigo fire, a young girl named Lizzie wrote to her uncle, John Bell, in New York about the events: "For several days the smoke from the fires all around us, was so thick that you could hardly see across the street . . . At night

Fig. 4. Arthur T. Adams, "After the Great Hinckley Forest Fire, near St. Louis River above Fond du Lac, Minnesota," Hennepin History Museum.

the sky was bright all around us . . . There are numbers of people who think the world is burning up."[33] Smoke from the 1881 Thumb Fire enveloped much of Michigan and the northeastern U.S., where observers hundreds of miles from the blaze inquisitively marveled at the strange yellow skies. The *Boston Globe*, for instance, reported about "Yellow Tuesday," in which smoke from the Michigan fires shrouded the city in a yellow darkness the entire day.[34] In Flint, Michigan, one newspaper reported that "the sun is entirely obscured . . . It is scarcely possible to see the length of a block on account of the smoke."[35] The aftermath of these large fires often resulted in "a black desert overdrawn by smoke as far as the eye could see" (Figs. 4 and 5).[36]

The Thumb Fire broke out on September 5, 1881, with smoke lingering over the Michigan sky for nearly two weeks after it began, with one newspaper stating on September 18 that "At no time since the fires commenced raging has the smoke been so dense and unpleasant this afternoon."[37] The Hinckley Fire of 1894 cast a pall over nearly all of the Great Lakes, affecting the navigation of lake steamers from Duluth to Buffalo and Cleveland.[38] One Cleveland newspaper explained, "steamers no sooner get out of the mouth of the [Cuyahoga] river than they are hidden in the smoke."[39] Dense smoke delayed shipments at best, and, at worst, could result in catastrophic accidents and complete loss with smoke shrouding burned trestles from oncoming trains.[40]

Fig. 5. Hugh McKenzie, "Cloquet and Moose Lake Fire of 1918, Cloquet and Moose Lake, Minnesota," University of Minnesota Duluth, Kathryn A. Martin Library, Northeast Minnesota Historical Collections.

The hazy chaos also made it harder to flee during the fire and hindered the assessment of damages in its aftermath.[41] As one newspaper wrote in the wake of Peshtigo, "The pall of smoke with a strong odor of pine, which hangs over all this region, obscures the sun, often limits your vision to a block's distance, reddens and waters the eyes, and makes one feel gloomy and miserable, is an ever present reminder of a disaster of unprecedented extent and severity."[42] Such was the extent and frequency of the western Great Lakes firescape that by 1895 Otis Staples, a logger operating out of Stillwater, Minnesota, calculated that "I think there has been more pine destroyed by fire than has been cut," a lofty claim considering that from 1880 to the mid-1890s Minnesota alone produced an estimated seventeen billion feet of pine.[43]

If, as fire historian Stephen J. Pyne has conceptualized, the increased burning of fossil biomass during the nineteenth century represented a new era in the Pyrocene, so, too, did the concurrent practice of fire suppression. The Pyrocene is marked not just by the industrial burning of new fuels, but also the hawkish prevention of landscape fires in general, especially ecologically beneficial fires that had been practiced by Indigenous peoples throughout

North America for generations.[44] A major component of early fire policy that developed in the early twentieth century and lingers into contemporary practices is the cost of suppression. Canada is the second largest country in the world, more than a third of which is forested; its vastness cannot be understated in its comparison to the United States, and lacks the resources or labor to effectively combat the eight thousand wildfires that burn annually.[45] The United States is not only smaller but also possesses better infrastructure (i.e. roads) to more efficiently combat wildland fires while many of the fires in northern Canada are in remote, sparsely populated areas with no access.[46] If certain fires are uncontrollable, for instance, the strategy directly draws upon the early twentieth century policy of herding the fires toward "low value" areas and letting them burn.[47] Such out of control fires are becoming only more common as increased fuel loads built up over the last century combine with hotter, drier climates to produce the incendiary ingredients for megafires. The changing fire regime that resulted in fire suppression in both Canada and the United States is one of the many environmental legacies of colonization.[48] And yet, the Canadian megafires are not solely a Canadian issue nor solely a Canadian responsibility: while changing climate and constrained fire management policies have contributed to the change, a principal culprit is the continued settler capitalist extraction of fossil fuels in both the United States and Canada; the U.S., for instance, is the largest consumer of Canada's tar sands, where the heart of its bitumen mining operations are located in northern Alberta's boreal forest, such as Fort McMurray.[49] A multiplicity of factors have created this new fire age, which will require a multiplicity of solutions, not least of which is breaking western society's addiction to fossil fuels. Solely positioning the Pyrocene as a consequence of historical industrial pollution masks the responsibility of corporate investments and leaders to forge policies to combat the issue in the present. As one article argues, "Pointing the finger at natural causes creates a politically convenient crisis narrative that is used to justify reactive disaster laws and policies."[50] Climate change, which occurs naturally but is augmented by anthropogenic actions, becomes an easy scapegoat that allows investors and politicians alike to wash their hands of responsibility.

A watershed year in North American wildfire history was 1950. The Chinchaga Fire of northern Alberta and British Columbia remains the largest single fire in North American history, burning between 3.5 and 4.2 million acres.[51] Smoke traveled from far western Canada to the Atlantic seaboard and beyond to Europe; no one could fathom that what they were seeing was from a fire

thousands of miles away. Initially, observers attributed the phenomenon to atomic explosions, Soviet attacks, alien invasions, or "a supernatural power angry with the world."[52] One Michigan newspaper reported that "The [weather] bureau estimated [the smoke] was ten miles thick . . . from fires 1,000 miles away in northern Alberta, Canada . . . The New York weather forecaster said he never had heard of such a thick layer of smoke over such a wide area."[53] As fires became larger into the twentieth century, they became disassociated from smaller, local agricultural fires in the fall and, instead, large fire events across the border—and their smoke—became defining aspects of the Upper Midwest for a longer portion of the year.[54]

The onset of earlier fire seasons, especially on the Canadian prairie, is the byproduct of not only summer droughts, but also decreasing snowfall, which supplies a significant portion of the region's annual precipitation and is an important factor in North America's fiery future. In 2023, for instance, Minneapolis experienced a winter much more akin to a typical Kansas City winter.[55] This trend seemed to hold for much of the Upper Midwest, as unseasonably high temperatures and trace amounts of snow through December meant not a white Christmas, nor even a brown Christmas, but in many areas, a *green* (grass) Christmas. Looking forward, the bulk of temperature increases due to climate change in the Upper Midwest will be due to noticeably warmer winters, not necessarily hotter summers, and this will cause less snowfall and, potentially, drier conditions.[56]

While particularly deadly because of their timing and location, the four Upper Midwest fires discussed in this section were all comparatively small to today's megafires. Peshtigo burned nearly 1.3 million acres, the Thumb Fire burned one million, Hinckley burned 160,000 acres, and Cloquet burned more than 250,000 acres.[57] At the turn of the twenty-first century, Canada averaged 8,500 fires per year that burned 6 million acres, with extreme fire seasons burning more than 18.5 million acres. Canada also spent well over $500 million annually to mitigate its wildland fires, largely to no avail.[58] The Canadian fires of 2023 burned 45 million acres across the entire country.[59]

Conclusion: "I Wonder if These Fires Will Ever Stop"

The 2023 fire season was the worst in recorded North American history. For nearly all of May and June 2023, Minnesota claimed the worst air quality in the U.S. for several days during that period. From June 26 to 30, 2023, the

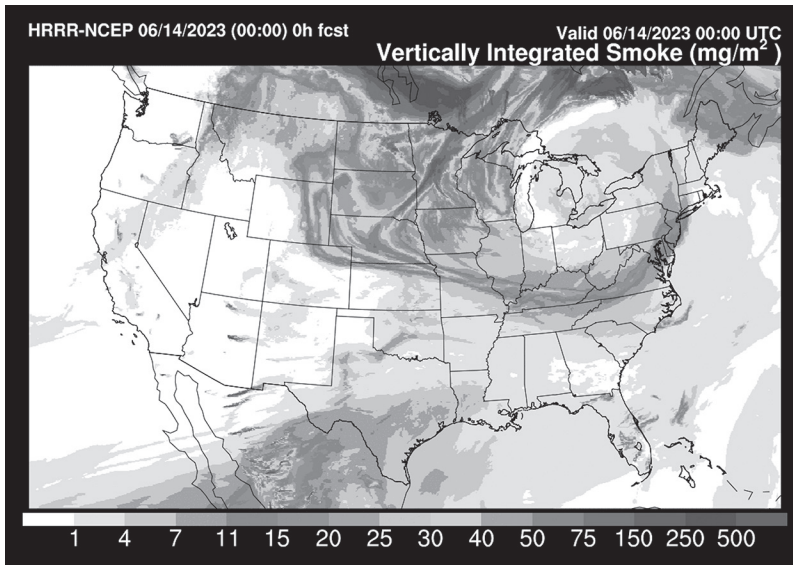

Fig. 6. Satellite image of vertically integrated smoke cascading down into the Midwest on June 14, 2023. National Oceanic & Atmospheric Administration.

Wisconsin Department of Natural Resources air monitoring network tested "some of the highest concentrations of particulate matter ever recorded in the state" (Fig. 6).[60] According to the fire historian Stephen J. Pyne, "Smoky days have mutated from seasonal nuisances to the public health crises of megapalls. Metropolises well distant from flame can suffer the consequences of inextinguishable burning."[61] Between 1981 and 2010, Calgary averaged twelve smoke hours per year; the last decade has given Calgary four years with more than three hundred smoke hours.[62] With data going back to 1953, 2014 marked the first year in which Calgary experienced more than one hundred smoke hours in a single year; 2023 gave the city a new record of 499 smoke hours (Fig. 7). Wildfire smoke is particularly concerning because it is comprised of more fine particulates (2.5 microns or smaller) than industrial emissions, which can more easily bypass filters and bodily defenses.[63] In 2023, more than one hundred million people in North America experienced poor or altogether dangerous air quality from wildfire smoke.[64] In 2024, medical professionals are beginning to compile data on the health effects of the 2023 fire season, with research suggesting correlations between increased smoke exposure and pulmonary events due to hearts working harder under more strenuous conditions.[65] Longer-term

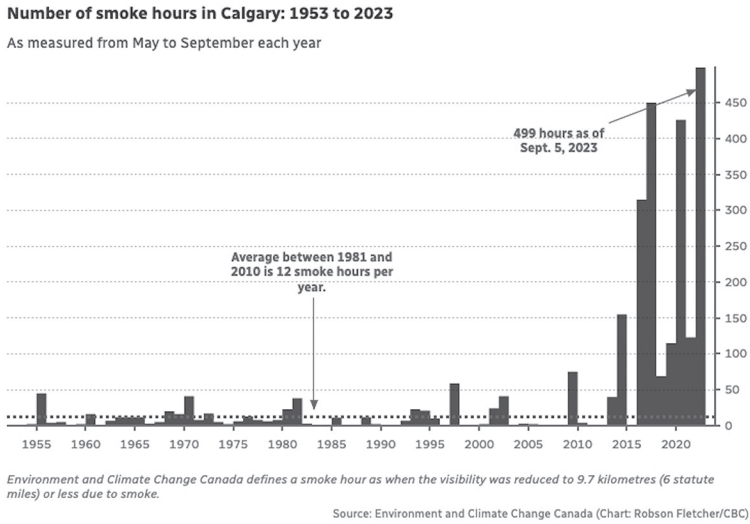

Fig. 7. Chart showing number of smoke hours in Calgary between 1953 and 2023.

studies have shown a direct correlation between chronic wildfire smoke exposure and increased suicide rates, and can lead to heightened risks of cancer and neurological problems.[66]

Unprecedented wildfire seasons are not becoming a new normal, if there ever was such a thing. Instead, the climate scientist Michael Mann explains, "It continues to get worse. If we continue to warm the planet, we don't settle into some new state. It's an ever-moving baseline of worse and worse."[67] The 2023 fire season was beyond anything any experts could have anticipated, and more closely resembled climate models and computer simulations for what the fire seasons might look like in several decades. While the fires in Alberta and western Canada more closely aligned with projections for the 2030s and 2040s, eastern Canada was especially incendiary, experiencing an extreme fire year that was more in line with midcentury projections. Much of the smoke that plagued the Northeast, for instance, was from fires in Quebec and eastern Ontario, places that typically experience wetter seasons and do not normally have large fire events.[68] If, as Canadian fire scientist Mike Flannigan considered, the Canadian east is burning far more than expected, what is to stop the northeastern U.S. from combusting as well?[69] As early as the late-1960s, less than half a century following the clearcutting of the Upper Midwest's forests, much of the area had been reforested, leading R. Keith Arnold, Dean of the University of Michigan's School of Natural Resources, to

make a similar observation. Arnold argued that "Michigan has not experienced [explosive wildfires] in more than fifty years. Yet such a situation could occur at any time."[70] "The Lake States," Arnold explained, having been reforested and insulated from burning, "have the potential for fire disaster equal to or greater than the disasters that swept Michigan in 1871 and 1881."[71] Increasing droughts may shift the scope of fire farther east into typically temperate regions with relatively high rainfall, such as the 2016 drought-induced fires in eastern Tennessee.[72] Without better fire management practices, big fires may even return to the Upper Midwest's forests as Arnold predicted more than fifty years ago.

"I wonder if these fires will ever stop," Lizzie ominously, if not altogether prophetically, wrote to her uncle from Peshtigo's smokescape in 1871.[73] To Lizzie and many others residing in the Upper Midwest during the late nineteenth century, the smoky realities of today may not appear altogether different. Many in the region lived their lives under a seasonal shroud of smoke due, in large part, to the logging industry, but also the practice of burning agricultural fields in the late summer and early fall. While the blanket of smoke remains, its origin is quite different. Instead of smaller, localized fires covering a district or even a broader region in smoke, smoke from today's megafires engulfs continents, overspreads hemispheres, and traverses oceans. Some, for instance, suspected the Great Smoke Pall of 1950 to have nearly encircled the globe.[74] While smoke has historically been one of the many defining characteristics of the Upper Midwest's transnational environment, the regional affinities of smokescapes have greatly enlarged.

Hayden L. Nelson is a PhD candidate in History at the University of Kansas where he specializes in environmental and Indigenous history. He studies historical environments in the contexts of capitalism, colonization, and climate change, and he is particularly interested in exploring the ways in which those historical forces and their legacies overlap with one another. His dissertation, tentatively titled "The North Woods: An Environmental History from the Pleistocene to the Pyrocene," investigates the ways in which both human and non-human actors interacted with and transformed the transnational forested region of the western Great Lakes and Upper Mississippi watersheds from the end of the Wisconsin glaciation to the beginnings of industrial logging.

NOTES

1. In fact, much of the U.S.-Canadian border is marked with transnational parks and natural areas, highlighting shared environments and the stark contrast of its patrol compared to the U.S.-Mexico border. As Victor Konrad and Heather N. Nichol explain, "the

parks, reserves and government lands directly at the border, or close to it, are found along the entire Canada-U.S. border, in every state and province, and comprise hundreds of units accounting for almost one-quarter of the borderline mileage." Victor Konrad and Heather N. Nichol, *Beyond Walls: Re-Inventing the Canada-United States Borderlands* (Burlington, VT.: Ashgate Publishing Company, 2008), quote on 220, for more on the environment along the borderline, see 217–255.

2. John Pastor, *What Should a Clever Moose Eat?: Natural History, Ecology, and the North Woods* (Washington, DC: Island Press, 2016), 2.

3. An excellent work on U.S.-Canadian energy relations is Daniel Macfarlane, *Natural Allies: Environment, Energy, and the History of U.S.-Canada Relations* (Montreal: McGill-Queen's University Press, 2023). There has been widespread coverage of these numerous instances, the most infamous recent occurrences being the Dakota Access Pipeline in the U.S. and the tar sands in Canada. See, for instance, Jennifer Huseman and Damien Short, "'A Slow Industrial Genocide': Tar Sands and the Indigenous Peoples of Northern Alberta," *The International Journal of Human Rights*, 16, no. 1 (2012): 216–237; Jim Robbins, "Canada's Indigenous Bands Rise Up Against a Tar Sands Pipeline," *Yale Environment 360*, Dec. 3, 2015; "Canadian and US Tribes Band Together to Fight Alberta Oil Sands Pipelines," *The Guardian*, Sept. 22, 2016; "US, Canada Native Groups to Join Dakota Access Pipeline Fight," *VOA News*, Sept. 23, 2016; Leah Donnella, "The Standing Rock Resistance is Unprecedented (It's Also Centuries Old)," *NPR*, Nov. 22, 2016; Robert Allen, "Hundreds of Mirror 'Shields' Used in Standing Rock Art," *Detroit Free Press*, Dec. 5, 2016; "NoDAPL Legacy: A Pivotal Moment of Togetherness for Indigenous Peoples," *KXNews* (Bismarck, North Dakota), May 17, 2021; Leyland Cecco, "'They're Destroying Us': Indigenous Communities Fear Toxic Leaks from Canada's Oil Industry," *The Guardian*, April 23, 2023.

4. Much of the scholarship on the U.S.-Canadian borderlands has tended to focus on the region extending from the Northern Plains to the Pacific Coast or the Northeast; that which does focus on the transnational Midwest typically focuses on the Great Lakes themselves. For more on the literature of the U.S.-Canadian borderlands, see, for instance, Konrad and Nichol, *Beyond Walls*; Sterling Evans, ed., *The Borderlands of the American and Canadian Wests: Essays on Regional History of the Forty-Ninth Parallel* (Lincoln: University of Nebraska Press, 2006). For the Midwest as a nexus of east-west and north-south trajectories, see Kristin Hoganson, "Meat in the Middle: Converging Borderlands in the US Midwest," in *Farming Across Borders: A Transnational History of the North American West*, ed. Sterling Evans (College Station: Texas A&M University Press, 2017), 26–63.

5. Michigan, Minnesota, and Wisconsin are all swing states. For instance, Donald Trump won Wisconsin and Michigan each by less than one percent in 2016; in 2020, Joe Biden won Wisconsin by less than one percent and Michigan by less than three percent. Hillary Clinton won Minnesota by less than two percent in 2016, but Joe Biden won Minnesota by more than seven percent in 2020. Over the past six presidential elections since 2000, Wisconsin has been decided by less than one percent in four of them, with the Democratic nominee winning five times and the Republican nominee once. For a good overview on the politics of northern Minnesota, specifically, but which could speak to the Upper Midwest more generally, especially conflicts between extractive economies and

environmentalism, see Erik Kojola, *Mining the Heartland: Nature, Place, and Populism in the Iron Range* (New York: NYU Press, 2023).

6. "Middle West Review and Emerson College Polling Launch Largest-ever Study on Midwestern Identity," Emerson College Polling, accessed Aug. 1, 2024, https://emersoncollegepolling.com/middle-west-review-and-emerson-college-polling/.

7. Gregory S. Rose, "The Northern Borderland as an Environmentally, Agriculturally, and Culturally Distinctive Subregion of the Midwest in the Late 1800s," in *North Country: Essays on the Upper Midwest and Regional Identity*, eds. Jon K. Lauck and Gleaves Whitney (Norman: University of Oklahoma Press, 2023), 66.

8. Rose, "The Northern Borderland," 78–83.

9. Original italics. Thomas L. McKenney, *Sketches of a Tour to the Lakes* (Baltimore: Fielding Lucas, Jr., 1827), 320. For more on the isolation and foreboding McKenney felt in the region, see also pages 242 and 278.

10. Sherman Hall to Lydia Hall Burbank, Dec. 6, 1848. Early Protestant Missions of the Lake Superior Country: Letters of Reverend Sherman Hall to Lydia Hall Burbank, Feb. 7, 1831 to Dec. 6, 1848, vol. 3, 47–50. University of Wisconsin-Eau Claire Archives, Eau Claire, Wisconsin.

11. In 1847, some residents of Wisconsin sought to convince Congress to redraw the Wisconsin state boundary, which would have given the northwestern portion of the state—nearly ten counties—to the newly created Minnesota Territory, mostly on the grounds of the region's distance from the government center in Madison. This was, coincidentally, one of the major arguments that residents of western Michigan Territory successfully employed to petition for the creation of Wisconsin Territory in 1836. Joseph Bouron, et. al., "Petition to Congress (Sept. 30, 1847) to redraw the border between the Wisconsin and Minnesota Territories," Sept, 30, 1847. Wisconsin Historical Society, accessed Aug. 1, 2024, https://content.wisconsinhistory.org/digital/collection/tp/id/31039/. For more on the multiplicity of borderlands in antebellum North America, especially efforts to break away from the nation-state, see, for instance, Eric R. Schlereth, "'The Privileges of Locomotion': Expatriation and the Politics of Southwestern Border Crossing," *Journal of American History* 100, no. 4 (March 2014): 995–1020; Andrew C. Isenberg and Thomas Richards, Jr., "Alternative Wests," *Pacific Historical Review* 86, no. 1 (2017): 4–17; Thomas Richards, Jr., *Breakaway Americas: The Unmanifest Future of the Jacksonian United States* (Baltimore: Johns Hopkins University Press, 2020).

12. Almon Ernest Parkins, *The Historical Geography of Detroit* (Lansing: Michigan Historical Commission, 1918), 4.

13. William Lawson Grant, *Ontario High School History of Canada* (Toronto: Ryerson Press, 1922), 2.

14. Robert Traver, *Anatomy of a Murder* (New York: St. Martin's Press, 1958), 12.

15. Eric R. Wolf, *Europe and the People Without History* (Berkeley: University of California Press, 1982), 6.

16. The Minnesota writer Sinclair Lewis marveled at the differences between southern Minnesota and Duluth, describing the journey as a "mild adventure," remarking upon the significant temperature changes between latitudes and the northern Minnesota's envi-

ronment that he found "free and bracing." Letter from Sinclair Lewis to Marcella Powers, May 18, 1944, Duluth Minnesota. Sinclair Lewis Letters to Marcella Powers, 1939–1947. St. Cloud State University Archives, accessed Aug. 2, 2024, https://collection.mndigital.org/catalog/p15160coll1:1688.

17. Dan Flores, "Place: An Argument for Bioregional History," *Environmental History Review* 18, no. 4 (1994): 12. See also Yi-Fu Tuan, *Space and Place: The Perspective of Experience* (Minneapolis: University of Minnesota Press, 1977), 4–6.

18. Molly P. Rozum, *Grasslands Grown: Creating Place on the U.S. Northern Plains and Canadian Prairies* (Lincoln: University of Nebraska Press, 2021), 9. For an excellent discussion on how the environment influenced shared regional identities in the U.S. and Canada, see especially pages 335–362.

19. Some of the earliest conceptualizations of ecoregions appeared in the early 1970s, and was alternatively regarded as bioregions. For early scholarship informing this idea, see, for instance, "Biotic Provinces of the World: Further Development of a System for Defining and Classifying Natural Regions for Purposes of Conservation," *IUCN Occasional Paper* No. 9 (1974). As the field of environmental history matured into the 1990s, the concept began garnering more academic attention. See, for instance, Flores, "Place: An Argument for Bioregional History," 1–18; John R. Wunder, "What's Old about the New Western History? Part 2: Environment and History," *The Pacific Northwest Quarterly* 89, no. 2 (Spring 1998): 84–96; Bron Taylor, "Bioregionalism: An Ethics of Loyalty to Place," *Landscape Journal* 19, nos. 1–2 (2000): 50–72; Stephen C. Trombulak and Christopher McGrory Klyza, "The New Natural History," *Natural Areas Journal* 20, no. 3 (2000): 267–272; William L. Lang, "Bioregionalism and the History of Place," *Oregon Historical Quarterly* 103, no. 4 (2002): 414–419; Mark Spence, "Bioregions and Nation-States: Lessons from Lewis and Clark in the Oregon Country," *Oregon Historical Quarterly* 103, no. 4 (2002): 428–438; Sara Dant Ewert, "Bioregional Politics: The Case for Place," *Oregon Historical Quarterly* 103, no. 4 (2002): 439–451. Figure 2 source is: https://www.epa.gov/eco-research/ecoregions-north-america.

20. Mica Jorgenson, "Wild Smoke: Managing Forest Pollution in Northern British Columbia since 1950," *Environment and History* 30, no. 2 (Jan. 2024): 275–276. See also Joel Tarr, *The Search for the Ultimate Sink: Urban Pollution in Historical Perspective* (Akron, OH: University of Akron Press, 1996); Thomas Dunlap and Frank Uekotter, *The Age of Smoke: Environmental Policy in Germany and the United States, 1880–1970* (Pittsburgh, PA: University of Pittsburgh Press, 2009).

21. Jorgenson, "Wild Smoke," 268.

22. For sensory experiences and their influence on history, see Gregory N. Bratman, et al., "Nature and Human Well-Being: The Olfactory Pathway," *Science Advances* 10, no. 20 (May 2024): eadn3028; Melanie A. Kiechle, *Smell Detectives: An Olfactory History of Nineteenth-Century Urban America* (Seattle: University of Washington Press, 2019). For pine trees cracking like cannons, see John Durham, "Interview with John Durham, Crow Wing County, Minnesota," Crow Wing County Historical Society, accessed Aug. 6, 2024, https://collection.mndigital.org/catalog/cwc:1526.

23. Jorgenson, "Wild Smoke," 270.

24. Izzy Ross, "Canadian Wildfire Smoke Just Blanketed the Midwest—Again," *Grist*, May 16, 2024, https://grist.org/wildfires/canadian-wildfire-smoke-just-blanketed-the-midwest-again/.

25. In the Canadian boreal, for instance, so-called "zombie fires" can overwinter by burning organic material underground. Perhaps the most notorious of these was the Fort McMurray fire in northern Alberta that began in May 2016, overwintered, and was not officially exhausted until August 2017. Below the boreal, however, is largely muskeg, thick layers of poorly drained peat, that can allow fire to creep along underground and, when favorable conditions arise, reemerge elsewhere. Increasing drought conditions dry out the peat layer, allowing more fires to linger underground. Rebecca C. Scholten, et al., "Overwintering Fires in Boreal Forests," *Nature* 593 (2021): 399–404; Wenxuan Xu, et al., "Overwintering Fires Rising in Eastern Siberia," *Environmental Research Letters* 17 (2022): 045005.

A. Bonn, British Ecological Society, eds., *Peatland Restoration and Ecosystem Services: Science, Policy, and Practice* (Cambridge: Cambridge University Press, 2016); Colleen M. Sutheimer, et al., "Historical Fire Regimes in North American Hemiboreal Peatlands," *Ecology* 498 (2021): 119561, 1–10.

26. J.R. McNeill, *Something New Under the Sun: An Environmental History of the Twentieth-Century World* (New York: W.W. Norton & Co., 2000), 4.

27. "The Tempest of Fire," *Green Bay Weekly Gazette* (Green Bay, WI), Nov. 4, 1871.

28. "The Trail of Fire," *Detroit Free Press* (Detroit, MI), Sept. 13, 1881.

29. "Death Rate will Reach Over 1,000 with Loss of Property up in Millions," *Leader-Telegram* (Eau Claire, WI), Oct. 15, 1918.

30. "Freaks of Fire Horror Raise Hopes of Refugees," *Star Tribune* (Minneapolis, MN), Oct. 15, 1918.

31. Henry Oberbillig, "Interview with Henry Oberbillig, Crow Wing County, Minnesota, 1939," Crow Wing County Historical Society, accessed Aug. 2, 2024, https://collection.mndigital.org/catalog/cwc:2453.

32. "The Fire Devastation in Michigan," *The Representative* (Fox Lake, WI), Sept. 23, 1881.

33. Letter from "Lizzie," Oshkosh, WI, to John Bell, North Greenbush, Rensselaer County, NY, Oct. 15–23, 1871. Newberry Library, Chicago, IL.

34. "Yellow Tuesday," *Boston Globe* (Boston, MA), Sept. 7, 1881.

35. "Desolation and Death," *Detroit Free Press* (Detroit, MI), Sept. 18, 1881.

36. Gudmund Emanuel Åkermark, "The Cyclone of Fire; or, The Hinckley Fire: A True Description of the Century's Most Gruesome Catastrophe. A Sea of Fire Swallows Up in Several Hours Over 500 People. Horrible Scene of Death. The Fire's Strange Caprices," Charles John LaVine, translator (Minneapolis: Companion Publishing Co., 1894), 56. Figure 4 source is: https://collection.mndigital.org/catalog/hchm:1365. Figure 5 source is: https://collection.mndigital.org/catalog/nemhc:2447.

37. "Desolation and Death," *Detroit Free Press* (Detroit, MI), Sept. 18, 1881.

38. "The Northwest," *Minneapolis Daily Times* (Minneapolis, MN), Sept. 2, 1894.

39. "Navigation Impeded," *The Daily Plainsman* (Huron, SD), Sept. 3, 1894.

40. "Along the South Shore Road," *Chippewa Herald-Telegram* (Chippewa Falls, WI), Sept. 5, 1894.

41. "Governor Burnquist Supervising Relief to Settlers in Burnt District," *The Irish Standard* (Minneapolis, MN), Oct. 19, 1918.

42. "Fires in the Woods and Marshes," *Wisconsin State Journal* (Madison, WI), Oct. 7, 1918.

43. For Staples' quote, see Christopher C. Andrews, *First Annual Report of the Chief Fire Warden of Minnesota for the Year 1895* (St. Paul: Pioneer Printing Press Company, 1896), 167. For the projections of Minnesota's aggregate pine cut since 1880 and annual projections in the early 1890s, see also pp. 118–119; "Lumber Resources of Minnesota," *Mississippi Valley Lumberman* (Minneapolis, MN), Feb. 14, 1896, pp. 14–15.

44. Stephen J. Pyne, *The Pyrocene: How We Created an Age of Fire and What Happens Next* (Berkeley: University of California Press, 2021), 139–141. For more on the history of fire suppression in the United States, see, for instance, Earl W. Loveridge, "The Fire Suppression Policy of the U.S. Forest Service," *Journal of Forestry* (Aug. 1944): 549–554; Stephen J. Pyne, "Flame & Fortune," *Forest History Today* (1996): 8–10; Jack Cohen, "The Wildland-Urban Interface Fire Problem: A Consequence of the Fire Exclusion Paradigm," *Forest History Today* (Fall 2008): 20–26; Lewis F. Southard, "The History of Cooperative Forest Fire Control and the Weeks Act," *Forest History Today* (Spring/Fall 2011): 17–20; McNeill, *Something New Under the Sun*, 232–233.

45. Cordy Tymstra, Brian J. Stocks, Xinli Cai, and Mike D. Flannigan, "Wildfire Management in Canada: Review, Challenges and Opportunities," *Progress in Disaster Science* 5 (Jan. 2020): 100045.

46. Many of these sparsely populated areas are, in fact, disproportionately populated by First Nations people. An estimated 80 percent of First Nations communities in Canada are in areas prone to wildfires and their smoke. Maggie Li, et al., "Air Pollution in American Indian Versus Non-American Indian Communities, 2000–2018," *American Journal of Public Health* 112, no. 4 (April 2022): 615–623; Brieanna Batdorf and Tara K. McGee, "Wildfire Smoke and Protective Actions in Canadian Indigenous Communities," *Atmosphere* 14, no. 8 (2023): 1204; Joan A. Casey, et al., "Measuring Long-Term Exposure to Wildfire $PM_{2.5}$ in California: Time-Varying Inequities in Environmental Burden," *Proceedings of the National Academy of Sciences* 121, no. 8 (Feb. 2024): e2306729121; Henok Workeye Asfaw, Sandy Lake First Nation, Tara K. McGee, and Amy Cardinal Christianson, "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 (Dec. 2019): 101300.

47. Loveridge, "The Fire Suppression Policy of the U.S. Forest Service," 550.

48. For some of the scholarship on the connections between traditional Indigenous fire practices, colonization, and the ecological effects of fire suppression, see, for instance, Evan R. Larson, Lane B. Johnson, Thomas C. Wilding, Kalina M. Hildebrandt, Kurt F. Kipfmueller, and Lee R. Johnson, "Faces in the Wilderness: A New Network of Cross-dated Culturally-Modified Red Pine in the Boundary Waters Canoe Area Wilderness of Northern Minnesota, USA," *Human Ecology* 47 (2019): 747–764; Michelle M. Steen-Adams, Nancy Langston, and David J. Mladenoff, "White Pine in the Northern Forests:

An Ecological and Management History of White Pine on the Bad River Reservation of Wisconsin," *Environmental History* 12, no. 3 (July 2007): 614–648; Raphaël D. Chavardès, Lori D. Daniels, Ze'ev Gedalof, and David W. Andison, "Human Influences Superseded Climate to Disrupt the 20th Century Fire Regime in Jasper National Park, Canada," *Dendrochronologia* 48 (April 2018): 1019.

49. ExxonMobil, who has been one of the heaviest investors in the Canadian tar sands, states on its own corporate page that, "Canada's oil sands are the largest source of foreign oil imported by the United States": "Canadian Oil Sands: A Source of Secure, Accessible and Affordable Energy," *ExxonMobil*, Sept. 17, 2018, accessed Aug. 6, 2024, https://corporate.exxonmobil.com/what-we-do/energy-supply/oil/canadian-oil-sands-a-source-of-secure-accessible-and-affordable-energy#Canada%E2%80%99soilsands. Similarly, the U.S. Energy Information Administration provides statistics indicating that in 2022 Canada supplied 52 percent of U.S. total petroleum imports; the next closest supplier was Mexico at 10 percent: "Oil and Petroleum Products Explained: Oil Imports and Exports," U.S. Energy Information Administration, accessed Aug. 6, 2024, https://www.eia.gov/energyexplained/oil-and-petroleum-products/imports-and-exports.php#:~:text=Petroleum%20imports%20from%20Canada%20have,petroleum%20and%20crude%20oil%20imports. For more on bitumen mining and the Fort McMurray Fire of 2016, see John Vaillant, *Fire Weather: A True Story from a Hotter World* (New York: Knopf, 2023).

50. Emmanuel Raju, Emily Boyd, and Friederike Otto, "Stop Blaming the Climate for Disasters," *Communications Earth & Environment* 3, no. 1 (2022): https://doi.org/10.1038/s43247-021-00332-2.

51. According to fire historian Stephen Pyne, the Chinchaga Fire's "novelty was one of size, not of kind," ushering in the era of megafires in North America. Stephen J. Pyne, *Awful Splendour: A Fire History of Canada* (Vancouver: University of British Columbia Press, 2007), 61.

52. "A-Bomb? Doomsday? Weird Skies Scare Great Lake Millions," *Toronto Star* (Toronto, Ontario, CA), Sept. 25, 1950; "Alberta Smoke Covers Toronto," *Globe and Mail* (Toronto, Ontario, CA), Sept. 25, 1950; H.S. Hogg, "Blue Sun," *Journal of the Royal Astronomical Society of Canada* 44 (1950): 241–245. For a good overview on what is now known as the "Great Smoke Pall," see also Robert Field, "Revisiting the 1950 Great Smoke Pall," *The Canadian Smoke Newsletter* (Fall 2008): 13–15.

53. *Ludington Daily News* (Ludington, MI), Sept. 25, 1950.

54. In 1961, one Kansas newspaper reported that the drought overspreading the Northern Great Plains was on the verge of becoming a dust bowl and, as a result, "Forest fire towers in northern Minnesota, usually deserted in June, are manned around the clock." *The Fort Scott Tribune* (Fort Scott, KS), June 27, 1961.

55. Sven Sundgaard, "Minnesota Had a Kansas City December: Is This a Sign of the Future?," *Bring Me the News*, Dec. 31, 2023.

56. Coming off of its drouthy 2023, Canada set a record for its warmest winter in 2024, with the months of December, January, and February 5.2 C warmer than the average since 1948. Benjamin Shingler, "Spring is here—after Canada's warmest winter on record," *CBC News*, March 19, 2024.

57. Donald A. Haines and Rodney W. Sando, *Climatic Conditions Preceding Historically Great Fires in the North Central Region*, USDA Forest Service Research Paper NC-34 (St. Paul, MN: North Central Forest Experiment Station, 1969), 2.

58. Stephen J. Pyne, "Burning Border," *Environmental History* 12, no. 4 (Oct. 2007): 960.

59. "Annual Area Burned in Canada dataset," Canadian Interagency Forest Fire Centre, accessed July 5, 2024, https://ciffc.net/statistics.

60. "Wildfire Smoke Impacts," *The Lake Geneva Regional News* (Lake Geneva, WI), May 8, 2024.

61. Stephen J. Pyne, *The Pyrocene: How We Created an Age of Fire, and What Happens Next* (Berkeley: University of California Press, 2021), 121.

62. Smoke hours are defined as the number of hours when visibility is reduced to 9.7 km or less due to smoke.

63. "Particle Pollution," American Lung Association, accessed June 27, 2024, https://www.lung.org/clean-air/outdoors/what-makes-air-unhealthy/particle-pollution.

64. Fay Johnston, et al., "Estimated Global Mortality Attributable to Smoke from Landscape Fires," *Environmental Health Perspectives* 120, no. 5 (2012): 695–701; Rosana Aguilera, Thomas Corringham, Alexander Gershunov, and Tarik Benmarhnia, "Wildfire Smoke Impacts Respiratory Health More than Fine Particles from Other Sources: Observational Evidence from Southern California," *Nature Communications* 12, no. 1493 (2021); Katelyn O'Dell, et al., "Estimated Mortality and Morbidity Attributable to Smoke Plumes in the United States: Not Just a Western US Problem," *GeoHealth* 5, no. 9 (Sept. 2021): e2021GH000457. Studies have also begun to show that how increasing wildfire smoke densities are expected to negatively affect crop yields and livestock health, something particularly concerning for the agricultural Heartland: A. Patrick Behrer and Sherrie Wang, "Current Benefits of Wildfire Smoke for Yields in the US Midwest May Dissipate by 2050," *Policy Research Working Paper* 9953; Greg Cima, "Researchers Analyzing Effects of Wildfire Smoke on Cows: Ongoing Studies in Oregon, Idaho Include Finding Effects on Animal Health, Milk Production," *Journal of the American Veterinary Medical Association News (JAVMANews)*, Nov. 15, 2021; Evan Casey, "Livestock, Wildlife Across Wisconsin Also Face Risks from Canadian Wildfire Smoke," *Wisconsin Public Radio*, July 3, 2023.

65. "Wildfire Smoke Sending More to Hospital with Heart Attacks," *The La Crosse Tribune* (La Crosse, WI), May 16, 2024; Essi M. Havor, et al., "Emergency Department Visits for Acute Myocardial Infarction During the Canadian Wildfires—United States, April 30-August 4, 2024," Epidemic Intelligence Service (EIS) Conference, Atlanta, Georgia, April 23, 2024.

66. David Molitor, et al., "Air Pollution and Suicide in Rural and Urban America: Evidence from Wildfire Smoke," *Proceedings of the National Academy of Sciences* 120, no. 38 (Sept. 2023): e2221621120; Robson Fletcher, "Alberta Has Endured Some of the Worst Air Quality in the World This Week Due to Wildfire Smoke," *CBC News*, May 19, 2023. Figure 6 source is: https://rapidrefresh.noaa.gov/hrrr/HRRRsmokeold/displayMapLocalDiskDateDomainZipTZA.cgi?keys=hrrr_ncep_smoke_jet:&runtime=2023061400&plot_type=trc1_int&fcst=00&time_inc=60&num_times=49&model=hrrr&ptitle=HRRR-Smoke%20Graphics&maxFcstLen=48&fcstStrLen=-1&domain=full&

adtfn=1. Figure 7 source is: https://www.cbc.ca/news/canada/calgary/smoke-calgary-new-normal-499-hours-wildfire-record-season-1.6957299.

67. "Is this a new normal? No, it's a new abnormal," *Star Tribune* (Minneapolis, MN), July 2, 2023.

68. Between 1959 and 1997, the ecoregions comprising the fire zones in eastern Ontario and Quebec, for instance, averaged less than 0.25 percent of their annual area burned, averaging less than 135,000 ha burned per year. The ecoregions comprising the fire zones in Alberta and British Columbia, on the other hand, are much more prone to fire, ranged between 0.4 and 0.75 percent of their annual area burned, or between 240,000 ha and 510,000 ha burned per year. For these fire statistics, see B.J. Stocks, et al., "Large Forest Fires in Canada, 1959–1997," *Journal of Geophysical Research: Atmospheres* 107, no. D1 (December 2002): FFR 5–1-FFR 5–12.

69. "Is this a new normal? No, it's a new abnormal," *Star Tribune* (Minneapolis, MN), July 2, 2023.

70. R. Keith Arnold, "Mass-Fire: The Disaster We Face," *Michigan Conservationist* 37, no. 4 (July/Aug. 1968): 6; Haines and Sando, *Climatic Conditions Preceding Historically Great Fires in the North Central Region*, 18.

71. Arnold, "Mass-Fire," 3.

72. "Is this a new normal? No, it's a new abnormal," *Star Tribune* (Minneapolis, Minn.), July 2, 2023.

73. Letter from "Lizzie," Oshkosh, Wisconsin, to John Bell, North Greenbush, Rensselaer County, New York, October 15–23, 1871. Newberry Library, Chicago, Illinois.

74. The Toronto *Globe and Mail* speculated that the plume could encircle the world; while there is no direct evidence of this occurring, there was an observation of smoke over the Aleutians that could have been from the Chinchaga. "Smoke Cloud Balks Frost, Might Encircle the Whole World," *Globe and Mail* (Toronto, Ont.), Sept. 28, 1950; J.S. Winston, "The Weather and Circulation of September 1950," *Monthly Weather Review* (1950): 177–179. See also Field, "Revisiting the Great Smoke Pall of 1950," 15.