The Canadian Field-Naturalist

Book Reviews

Book Review Editor's Note: The Canadian Field-Naturalist is a peer-reviewed scientific journal publishing papers on ecology, behaviour, taxonomy, conservation, and other topics relevant to Canadian natural history. In line with this mandate, we review books with a Canadian connection, including those on any species (native or non-native) that inhabits Canada, as well as books covering topics of global relevance, including climate change, biodiversity, species extinction, habitat loss, evolution, and field research experiences.

Currency Codes: CAD Canadian Dollars, USD United States Dollars, EUR Euros, AUD Australian Dollars, GBP British Pounds.

Conservation and Climate Change

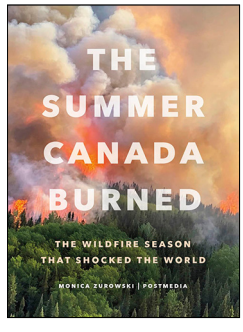
Ignition: Lighting Fires in a Burning World

By M.R. O'Connor. 2023. Bold Type Books. 384 pages, 39.00 CAD, Hardcover, 22.99 CAD, E-book.

The Summer Canada Burned: the Wildfire Season that Shocked the World

By Monica Zurowski and Postmedia. 2023. Greystone Books. 192 pages, 34.95 CAD, Hardcover, 27.99 CAD, E-book.

Wildfires are increasing globally (Koudenoukpo 2023). Reporting on fires, like many ongoing events, is subject to gaps created by news cycles, and it can be difficult for people to obtain an overall view on the extent of wildfire impacts and risks. Two recent books, *Ignition* by M.R. O'Connor and *The Summer Canada Burned* by Monica Zurowski, address these issues from different perspectives, but when read together they provide valuable insights on wildfire causes, costs, and solutions.



Both books begin with succinct descriptions of unprecedented and devastating wildfires. Zurowski, an editor and writer at the *Calgary Herald*, opens *The Summer Canada Burned* with statistics from the 6236 individual fires (18% above the 10-year average) that burned an area of 165 000 km^2 (six times the national average) in Canada during the summer of 2023 (p. 5). In *Ignition*, science journalist O'Connor begins with a description of Australia's 2019 to 2020 fires that burned 185 000 km^2, an area larger than New Brunswick, Prince Edward Island, and Nova Scotia combined (p. 3). From this common beginning the two books diverge in focus. Zurowski concentrates on fire's impacts on communities and individuals and the resources that were required to fight the 2023 summer fires. O'Connor focusses on wildfire strategies in the United States by obtaining wildfire fighting training. She then joins teams that fight wildfires and also set intentional fires as ecosystem management strategies. Using these experiences, O'Connor explores the paradox between fire as a creative force (directed by humans shaping the environment to promote diverse ecosystems and community well-being) versus the destructive force of increasingly powerful fires. Together these books challenge the reader to examine current wildfire fighting and management practices.

In the early 2000s, scientists began to use the term megafire to describe the "large, complex, and intense fires" that open both books (p. 100 *Ignition*). O'Connor explains that megafires are characterized by aerosols that enter the atmospheric boundary between the troposphere and the stratosphere. This boundary, labelled the tropopause, varies in its distance above the Earth, from 18 km above the equator to six km above the polar regions (SKYbrary 2024).

Michael Fromm, a U.S. Naval Research Laboratory meteorologist and physicist, told O'Connor he refers to clouds generated from these fires as pyrocumulonimbus or pyroCBs. PyroCBs are important because they are the precursors to the fire tornados that make megafires so dangerous. Fromm's team began investigating this phenomenon in 1998 after tracing aerosols observed over Sweden back to a fire in Canada's boreal forest. The first pyroCB in Australia was observed in 2003 and was accompanied by fire tornados with winds over 181 km/h. PyroCBs were subsequently viewed in western Russia in 2010 and South America and Africa in 2018. In *The Summer Canada Burned*, Mohammad Reza Alizadeh, a climate scientist at Massachusetts Institute of Technology and McGill University, explains to author Zurowski that climate change contributes to the common characteristics preceding megafires, including drought, high temperatures, low humidity, and strong winds.

Zurowski points out that the resources needed to fight megafires are unprecedented. For example, as early as 12 May 2023, the extent of the year's fires had already exceeded the ability of Canada's domestic firefighters and military personnel to contain them. Fortunately, Canada was able to call on firefighters from the United States, Spain, Mexico, South Africa, France, Australia, New Zealand, Portugal, Brazil, and South Korea. The costs of fighting these fires included evacuations for more than 120 000 Canadian homes, sheltering sites for evacuees, management of automobile traffic in areas with few exit routes, helicopters for remote community evacuations, and resources to handle the needs of farm animals and pets. Commercial and personal financial losses came from the destruction of businesses and homes, but also from interruptions—often lasting more than a month—in business and personal incomes caused by the evacuations. O'Connor emphasizes that wildfires that become megafires are amorphous and have unpredictable behaviours that differ from structural fires. Therefore, additional training for firefighters is required that focusses on handling situations where fires burn faster than expected, turn back, and restart. Firefighters need to learn how to set backfires and build individual safety zones. Implementing these strategies requires preparation and leaders with scientific knowledge and experience who can interpret and predict changes in weather and how it will affect fire behaviour.

Wildfires, particularly megafires, have not only financial costs, but also physical and mental health impacts. *The Summer Canada Burned* includes the toll that air quality degradation has on health, noting that New York City and Montréal had at various times the worst air quality in the world in 2023 because of the Canadian fires (pp. 50 and 78). In Ottawa, the fine particulate matter index reached a high of 260 micrograms per cubic metre compared to its average of four to 11 micrograms (p. 68 *The Summer Canada Burned*). *Ignition* delves into the psychology of wildfire fighting, from the highs of beating a fire to the post-traumatic stress disorder (PTSD) that can come from being caught in unpredictable fire events. These events can quickly overtake a firefighter and require sheltering in a personal fireproof tent to wait for rescue. As one firefighter explained, "In the dark, smoky shelter with the heat bearing down, the urge to look outside to see if you should run is almost insuppressible" (p. 124 *Ignition*). Sometimes multiple flame fronts pass before rescue crews arrive. O'Connor explores the symptoms of PTSD resulting from these near-death incidents through interviews with survivors, colleagues, and family members. Both books emphasize that the economic and health consequences of megafires are creating unsustainable pressures on public resources and urge that solutions be explored.

Exploring these solutions in-depth is beyond the stated objective of *The Summer Canada Burned*; they are covered in a cursory manner using quotes from firefighting organizations, politicians, scientists, and the public. *Ignition*, in contrast, has a specific objective to explore how humans have and are using fire as a constructive solution for shaping the environment. Drawing on examples from the Jemez Mountains in northern New Mexico, Hecate Island in British Columbia, and the pine barrens in the eastern United States, O'Connor describes tree-ring fire scarring studies that indicate Indigenous communities across diverse environments altered landscapes for centuries using small and patchy fires. These fires created habitats to support the growth of the specific plants and animals they harvested. Learning from these Indigenous community practices, early settlers often adopted fire as a constructive force. These types of Indigenous practices form the basis for scientific studies conducted today by the Indigenous Ecology Lab at the University of British Columbia (https://www.indigenousecology.com).

Stephen J. Pyne, Arizona State University emeritus professor and author of several publications on fire management, explains to O'Connor that viewing fire as a destructive, rather than creative force began with harvesting timber for profit and the displacement of Indigenous communities from traditional lands. Pyne explains that fire suppression regulations, designed to eliminate all fires regardless of origin, intent, or danger, began to be codified in the mid-1800s as the British developed scientific forestry principles to maximize yields for the lumber industry

in the colonial territories of India, Canada, and Australia. Only in Burma, where locals went on strike, was fire suppression officially renounced.

In the United States, two main proponents of fire suppression were the U.S. Forest Service's first head, Gifford Pinchot, and John Muir, a founder of America's conservation movement. Pinchot adopted objectives to maximize high yields and lumber board feet rather than conserve the diverse forests of Western Larch, Giant Sequoia, Pitch Pine, and Lodgepole Pine that were the results of cultural burning. Yosemite National Park, an area where Indigenous communities had used fire to create a diverse ecosystem over centuries, entered a fire suppression regime under Muir's guidance. Pyne explains, "'Muir understands fire, but he doesn't see it as necessary or useful, he thought it was something that you could remove from the landscape to make it better'" (p. 90 *Ignition*). In the 1940s, the U.S. Forest Service hired psychologist John Shea to investigate the use of fire in the southern United States where cultural controlled burning was legal. He subsequently characterized the belief in controlled burning as the "defensive beliefs of a disadvantaged culture group" (p. 93 *Ignition*). Studies like these coincided with advertising campaigns using Smokey Bear to highlight the importance of fire suppression in reducing wildfires and conserving healthy forests.

O'Connor identifies 1962 as a turning point in the use of fire suppression as the dominant method of controlling fires and managing forests. A sequence of papers, citizen action plans, and reports supporting active fire intervention to restore national park forests to pre-colonial conditions were circulated at scientific and public conferences. As a result, the 1970s became a decade when fire as a constructive force was practiced and researched.

However, during the 1980s fire suppression policies began to dominate again as urban residents near rural areas demanded fire protection, as *Ignition* explains. Two notable prescribed burns that got out of control set back the use of controlled fires for management. A burn in Yellowstone National Park in 1988 and then on Cerro Grande, a mountain in New Mexico, in 2000 led to cuts in fire programs throughout the United States. Nevertheless, isolated cases of controlled fires for ecological management continued in Gila National Forest (southwestern United States), Flint Hills (Kansas), and Yosemite (California). Currently, fire suppression as a fire management policy is beginning to wane as researchers investigate links between climate change and megafires and the use of fire as a constructive force by Indigenous communities becomes better understood.

The legacy of fire suppression is in the background of *The Summer Canada Burned* but very much in the foreground of *Ignition*. However, each book describes recognition among members of the public, conservation groups, and others that controlled burns have a place in fire management and that the role of intentional burning in controlling megafires will be an ongoing process that will vary among ecosystems. Readers interested in a record of the extent and costs of the 2023 fires in Canada will find *The Summer Canada Burned* an important reference. However, the lack of an index hinders the reader in finding their way back to specific topics of interest. *Ignition*, in contrast, is well indexed with an extensive Bibliography and Notes. It presents an in-depth look at the individual, societal, and ecological relationships that humans have with fire while challenging readers to consider how societal objectives influence the definition, direction, and interpretation of science.

Additional perspectives and work on these issues can be found in:

- An article on the North American tree-ring fire-scar network: https://www.fs.usda.gov/rm/pubs_journals/2022/rmrs_2022_margolis_e001.pdf.
- *CBC Ideas*'s two-part podcast series called "Healing the Land": https://www.cbc.ca/player/play/audio/1.7126114 (Part 1) and https://www.cbc.ca/player/play/audio/1.7127150 (Part 2).
- *Hakai Magazine*'s story in May 2024 called "Not Too Wet to Burn": https://hakaimagazine.com/features/not-too-wet-to-burn/.

Literature Cited

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Ross Claytor
Ketch Harbour, NS, Canada