LEVERAGING STRONG FOUNDATIONS

12 notable advances during 50 years of wildland fire management, research, and innovation

The management of wildland fire in Canada has undergone significant transformation since the 1970s, moving away from a strict fire exclusion philosophy (i.e., prevention and suppression) focused primarily on protecting commercial timber resources to a more holistic, integrated, whole-of-society approach that includes public safety, ecosystem health, cultural use of fire, and community resilience. The following is a selection of foundational advancements that have played a role in establishing the current state of wildland fire management in Canada.

A national science cornerstone: The Canadian Forest Fire Danger Rating System (CFFDRS)

The Fire Weather Index (FWI) System was developed by C.E. Van Wagner and his Canadian Forest Service colleagues in the 1970s and the Fire Behaviour Prediction (FBP) System was released in the early 1990s.

A concerted knowledge exchange effort (e.g., workshops, training courses, field guides) enabled this research to be effectively implemented into operations.

Impact Provided a consistent pan-Canadian danger rating methodology that underpins all aspects of wildland fire tactical and strategic decision-making.

Interagency coordination and resource sharing

1970s Canadian Committee on Forest Fire Control enabled inter-organizational dialogue on research and operations.

Early 1980s Establishment of the MARS (Mutual Aid Resource Sharing) Agreement and the Canadian Interagency Forest Fire Centre (CIFFC).

1989 The Canada-U.S. Wildland Fire Exchange Agreement allowed cross-border deployment of crews and equipment.

1990s onward Resource sharing expands internationally to include multiple countries.

Impact Enabled collaboration and the efficient exchange of firefighting resources across Canadian agencies and internationally during active fire seasons.

Firefighting innovations and standards

1970s–1980s Helicopters became routine suppression tools. CL-215 water-bombers were purchased. Innovations such as the Bambi Bucket, infra-red cameras, and aerial ignition devices were integrated.

1990s onward National standards for firefighter fitness, training, and equipment including quick connect couplings and Nomex PPE.

Impact Increased initial attack effectiveness, sustained action efficiency, and interoperability of equipment across agencies.

Emergency operations coordination

1990s–2000s Widespread adoption of the Incident Command System (ICS), which standardized command, communications, and qualifications.

2000s–2010s Expansion of Wildland-Urban Interface (WUI) operational guidelines and creation of structure protection units.

Impact Enhanced safety; standardization of a scalable and agency transcending operational command and control system.

Computer-based technology development

1970s First computer-generated fire weather calculations.

1990s–2000s Development and implementation of spatial decision-support systems.

1990s onwards New information infrastructure, including automatic weather stations, lightning detection systems, weather models, satellites, and drones.

2010s–2020s Creation of integrated platforms (fuel/behaviour models, weather, values, logistics).

Impact Enabled fast, accurate, evidence-based analysis in support of operational activities and strategic planning.

Expansion of the Wildland-Urban Interface (WUI) and community risk reduction

Late 1980s Early recognition of the growing threat from wildfire to lives and property in Canada.

1980s–2000s Groups and organizations emerge to promote community risk reduction such as local interface committees in BC (1980s) and Partners in Protection (1990s) which became FireSmart Canada (2000s–present) and is now part of the Canadian Interagency Forest Fire Centre (CIFFC).

Impact Risk to communities appeared on government agendas; interdisciplinary partnerships emerged and developed guidelines to help communities protect themselves from wildfire.

Catalytic fire seasons

1976–1982, 1989, 1995, 1998 Highlighted the need for and then stress tested resource sharing.

2003 (Kelowna) Sparked political focus and strategic shifts.

2011–2024 (Slave Lake, Fort McMurray, Lytton, Jasper): National awakening to evacuation complexity, limits of suppression, and economic fallout.

2017–2025 (BC & Canada): Widespread recognition of health impacts, vulnerability of Indigenous communities, and capacity shortfalls.

Impact Policy changes, budget adjustments, enhanced collaboration, and operational upgrades.

Policy and strategy

1980s Parks Canada Management Directive 2.2.4 and Keepers of the Flame formally recognized the ecological role of fire.

1990s onward Numerous internal and external operational and policy reviews by agencies following severe events and fire seasons.

2005, 2016, 2024 The Canadian Wildland Fire Strategy (produced by the Canadian Council of Forest Ministers) was developed and subsequently renewed.

2020s The National Guide for Wildland-Urban Interface Fires (National Research Council) provided guidance to improve fire resilience.

Impact Evolution of policies from fire suppression, to emergency management, to a whole-of-society approach; rationale for expanded participation and new funding.

Media and public risk perception

1990s–2015 WUI fire stories appear in media but concern is short-lived.

2016–2019 Media attention associated with wildfire becomes more sustained.

2021 onward Wildfire becomes entrenched as a recurring national (and international) story.

Impact Ubiquitous awareness of the occurrence and impacts of wildfires, elevated expectations for government action, greater scrutiny of outcomes, and increased support for mitigation.

Indigenous leadership and cultural fire

1970s–80s Seminal publications documenting the Indigenous use of fire by anthropologist Henry Lewis.

1990s First Nations' Emergency Services Society (FNESS) becomes directly engaged in wildland fire management.

2010s Identification of the disproportionate impacts of wildfires on Indigenous communities.

2010s–2020s Growing recognition of the role of cultural burning and importance of co-existence.

2022 The National Indigenous Fire Safety Council is established.

Impact Shift toward inclusive governance, capacity-building, and restoring beneficial fire.

Conferences and workshops

2010s onwards National conference series (Wildland Fire Canada); workshops sponsored by the Institute for Catastrophic Loss Reduction (ICLR), FPInnovations, and the Forest Products of Canada (FPAC).

Impact Increased sharing of new discoveries and best practices; strengthened science–operations linkages.

Fluctuating investment in fire science

1970s–1980s The Canadian Forest Service was the primary research organization in Canada.

1990s Federal budget cuts significantly reduced CFS fire research capacity.

2000s University programs expanded and new research organizations (e.g., FPInnovations) emerged to fill the gaps.

2010s onwards Science capacity increased dramatically due to an influx of new funding and creation of the Western Partnership for Wildland Fire (now Canada Wildfire).

Impact Inconsistent funding disrupted long-term research; some programs were cut or restructured. Occasional boosts advanced research on targeted themes, increased investment in universities, and grew skilled personnel.