

**People, Property, and Public Safety:  
A History of Natural Hazard Management in Ontario**

Ontario's natural wealth has, in some respects, always been a double-edged sword for its citizens. On the one hand, it has provided the people of Ontario with a variety of economic and recreational opportunities, such as mining, forestry, camping, hiking, hunting, and fishing, which have played a central part in shaping the province's history. Conversely, Ontario's massive, diverse ecological landscape has at times fostered conditions which have threatened the very livelihoods of those who reside within its border, namely in the form of forest fires, floods, erosion, and pathogens spread by animals. Indeed, while the advantages accruing from the province's natural bounty have undoubtedly outweighed the challenges it often presents, the government of Ontario has nonetheless been forced to grapple with those challenges on countless occasions over the years. Since 1972, the provincial government has relegated responsibility for protecting the public from natural hazards to the Ministry of Natural Resources (MNR), renamed the Ministry of Natural Resources and Forestry (MNRF) in 2014.<sup>1</sup> During the past fifty years, the MNRF has faced many environmental and administrative challenges in its effort to shield Ontarians from a multitude of natural hazards, and in doing so it has emerged as a world leader in dealing with these types of problems.

The public administration of natural resources in Ontario dates back to the sixteenth century. The Crown ownership of land, water and forests is part of the province's colonial legacy, having been transmitted from Europe by both the French and British monarchies as they began establishing settlements across North America. This principle held that all of the natural resources found within the new colonies, including the territory that would eventually become the province of Ontario, would remain the property of the Crown and their use would be

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<sup>1</sup> "Ontario Ministry of Natural Resources adds forestry to its title," *CBC News*, 14 July 2014, <http://www.cbc.ca/news/canada/sudbury/ontario-ministry-of-natural-resources-adds-forestry-to-its-title-1.2706127> (accessed 21 May 2017).

regulated by various laws and policies designed to manage them in the public interest.<sup>2</sup> By the late 1820s, after centuries of relatively limited oversight, Upper Canada (predecessor to modern-day Ontario) established the Department of Crown Lands. From the outset, the Department was concerned primarily with fostering the development of both farming and the forest industry in Upper Canada, but within a matter of decades it had expanded the scope of its duties to include mining, fisheries, and Indigenous relations.<sup>3</sup>

The pressing need to protect the public from natural hazards became readily apparent to the provincial government by the mid-to-late nineteenth century. However, this issue was initially framed rather narrowly as a matter of “forest protection.” Broadly speaking, this referred to “the prevention and control of all factors which cause damage to the forest,” including “fire, disease, insects, other forms of animal life (such as mites, mammals and birds) and unfavourable atmospheric conditions.” Unsurprisingly, forest fire prevention and control was the first of these hazards to garner serious attention from both the Ontario government and the province’s citizens. In 1851, for example, a major fire devastated the Ottawa Valley after a piece of burning paper from a discharged musket went adrift and set the area ablaze. After a number of other fires sprung up across Ontario (including one in the early 1870s which resulted in the death of six railway surveyors), in 1878 *An Act to Protect Forests from Fire* was passed, leading to the establishment of the province’s first two fire districts that same year. Within seven years the

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<sup>2</sup> H.V. Nelles, *The Politics of Development: Forests, Mines, and Hydro-Electric Power in Ontario, 1849-1941* (McGill-Queen’s University Press, 2005), 2-3; Mark Kuhlberg, *In the Power of the Government: The Rise and Fall of Newsprint in Ontario* (Toronto: University of Toronto Press, 2015), 22.

<sup>3</sup> Richard S. Lambert and Paul Pross, *Renewing Nature’s Wealth: A Centennial History of the Public Management of Lands, Forests, and Wildlife in Ontario, 1763-1967* (Toronto: Ontario Department of Lands and Forests, 1967), 49-53; 91-102.

Crown Lands Department had hired nearly forty fire rangers, but, on the whole, Ontario's fire control system during this period was quite primitive.<sup>4</sup>

As the twentieth century progressed the Ontario government adopted more sophisticated methods of forest fire protection, and even began to develop similar mechanisms to combat other natural hazards. In the summer of 1916, for instance, the township of Matheson suffered the most destructive fire in the province's history; it decimated approximately 1,300 square miles of land and killed over 200 people. Predictably, the magnitude of this tragedy "focused public attention on the shortcomings of the fire protection system, and provoked a demand for its overhaul." Thus, in 1917, the government of Ontario passed the *Forest Fires and Prevention Act*, marking the birth of the province's modern fire control system. This led to the appointment of a provincial forester and expert staff who were charged with enforcing the new legislation, as well as to the adoption of new technologies (i.e., aircraft in the 1920s) and strategies. What followed was a period of steady improvement in the realm of forest protection in Ontario. Likewise, at the same time the Department of Lands and Forests (DLF) enhanced its efforts to control insect pests and forest diseases, though these hazards did not really pose a threat to the safety of Ontario's citizens in the same way that fires did.<sup>5</sup> Nonetheless, by the late 1960s it had become clear to the DLF, the provincial government, and the broader public "that forest protection, besides protecting the vast lumber and pulpwood resources of the Province, has a vital role to play in

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<sup>4</sup> Ibid., 202-205.

<sup>5</sup> Ibid., 210-216, 223-239, 313-314; "Northern Ontario Fires Take Terrible Toll: Number of Dead May Reach 200 and Many Are Injured," *The Globe and Mail*, 31 July 1916, page 1; Dan Johnston, "The Ecological History of Forest Fires in Ontario," *Forestory* 4, no. 1 (Spring 2013), [http://www.ontarioforesthistor.ca/files/fhso\\_news1\\_vol\\_4\\_iss\\_1\\_spring\\_2013.pdf](http://www.ontarioforesthistor.ca/files/fhso_news1_vol_4_iss_1_spring_2013.pdf), 1-2.

promoting soil and water conservation, recreational and health provision, and preservation of fish and wildlife habitat.”<sup>6</sup>

In the years that followed, this environmentalist mentality would be strengthened by scientific, social, and political developments that fundamentally altered how Ontario dealt with both its natural resources and the hazardous conditions they often presented. Indeed, the rise of the environmental movement in the 1960s had a major impact on government policy across the Western world, and the province of Ontario was deeply affected by this trend.<sup>7</sup> Consequently, as part of its renewed commitment to progressive resource stewardship, in 1972 the Ontario government created the MNR through a merger of the DLF and the Department of Mines and Northern Affairs.<sup>8</sup> As its new title implied, the MNR was to be charged with an extensive mandate, one that included responsibility for safeguarding Ontarians from dangerous environmental conditions. This proved to be no easy task, but the Ministry was able to use its knowledge and experience to effectively confront these problems.

Throughout its history, the MNR has worked closely with Ontario’s Conservation Authorities (CA) when dealing with natural hazards, a partnership which has been instrumental to its success in handling these issues. Formally established in Ontario in 1946, CAs are local, community-based public sector organizations that carry out resource management programs across the province, specifically focusing on watershed protection. Among their wide range of duties, CAs deal with flood and erosion control, offer guidance to municipalities in managing natural hazards, and “regulate development and other activities in areas affected by water-based

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<sup>6</sup> Lambert and Pross, 223.

<sup>7</sup> Mark S. Winfield, *Blue-Green Province: The Environmental and Political Economy of Ontario* (UBC Press, 2012), 21.

<sup>8</sup> *The Ministry of Natural Resources Act, 1972*, Statutes of Ontario 1972, Chapter 4, 67-71; “Public concern growing on environment: Davis,” *The Globe and Mail*, 24 August 1971, page 5.

natural hazards through a permit process.”<sup>9</sup> Conservation authorities also have a unique organizational structure. Each of Ontario’s 36 CAs is composed of a number of municipalities working together within a particular watershed, and is overseen by a board of directors that consists of different municipal representatives. Furthermore, CAs are governed by the *Conservation Authorities Act, 1946*, legislation which is administered by the MNR. The Ministry provides CAs with technical advice, policy direction, and funding for natural hazard management and research. In return, CAs help the MNR and the people of Ontario reduce the potential damages that can be caused to land, property, and human health by floods, erosion, ice, and more.<sup>10</sup>

During its first decade of existence, the Ministry dealt with various natural hazards, the most demanding of which was, of course, forest fires. Typically caused by either lightning or human activity, forest fires are actually “an environmental necessity for the perpetuation of the forest in its natural state.”<sup>11</sup> That being said, forest fires can often destroy property and threaten human life, and therefore cannot simply be ignored. From 1972 to 1976, this particular problem was delegated to the Forest Fire Control Branch of the MNR’s Field Services Division, and the Branch was never short of work during these years. The 1974 fire season, for instance, was the worst in Ontario since 1961, with over 1,600 fires burning 1,294,800 acres of land and forest.<sup>12</sup> The following year, the number of fires in the province totalled 3,146, breaking a 39-year-old

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<sup>9</sup> “Conservation Authorities,” *Government of Ontario*, <https://www.ontario.ca/page/conservation-authorities> (accessed 22 May 2017).

<sup>10</sup> *The Conservation Authorities Act, 1946*, Statutes of Ontario 1946, Chapter 11, 49-65; “Conservation Authorities of Ontario,” *Conservation Ontario*, <http://conservationontario.ca/about-us/conservation-authorities> (accessed 22 May 2017).

<sup>11</sup> “Forest fire,” *The Canadian Encyclopedia*, <http://www.thecanadianencyclopedia.ca/en/article/forest-fire/> (accessed 7 June 2017).

<sup>12</sup> *The Ministry of Natural Resources: Annual Report* (1975), 19.

record, but luckily the Ministry was able to keep burned-over area to under 42,000 acres.<sup>13</sup> This record was broken once again in 1976 when 3,985 fires ravaged the province, especially the northwestern portion.<sup>14</sup> Then, in February 1978, as part of a major internal reorganization and in an effort to better coordinate its firefighting activities, the MNR established the Aviation and Fire Management Centre (AFMC) through an amalgamation of the Forest Fire Control and Air Services Branches.<sup>15</sup> Just like its predecessors, the AFMC, centred in the city of Sault Ste. Marie, combatted fires by imposing restriction orders under the *Forest Fire Prevention Act*; using aircraft to monitor and suppress fires; developing and improving forest fire suppression technology and equipment; and offering training and educational courses to both its staff and the public on forest fire detection and prevention. Within a matter of years, the AFMC would become known as “the nerve centre for forest fire control in Ontario.”<sup>16</sup>

Although less sensational than forest fires, the MNR also devoted much energy toward controlling flood damage across Ontario during the 1970s. Floods can be caused by a variety of natural phenomena, including heavy rainfall, melting snow, and ice jams, and have been known to damage property and even injure and kill people and wildlife.<sup>17</sup> In 1975, the provincial government designated the MNR as the “lead Ministry’ ... to co-ordinate the response of the Government of Ontario for flood emergencies.” The MNR thereafter appointed a Provincial Co-ordinator and established a flood emergency program for Ontario.<sup>18</sup> However, while the Ministry monitored numerous flooding situations throughout this decade, they were never severe enough

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<sup>13</sup> *The Ministry of Natural Resources: Annual Report* (1976), 20.

<sup>14</sup> *Ministry of Natural Resources: Annual Report* (1977), 24.

<sup>15</sup> *Ministry of Natural Resources: Annual Report* (1978), 26.

<sup>16</sup> *Ministry of Natural Resources: Annual Report* (1989), 14.

<sup>17</sup> “Floods,” *Government of Ontario*, <https://www.ontario.ca/page/floods> (accessed 7 June 2017).

<sup>18</sup> *Ibid.*, 24.

to warrant a declaration of an emergency.<sup>19</sup> This can at least in part be attributed to the various precautionary measures taken by the MNR to prevent and minimize the potential damage caused by floods. In 1977-78 alone, for example, it granted 221 location approvals for the building of private dams and other similar structures under *The Lakes and Rivers Improvement Act*, an increase of 13 per cent from the previous year.<sup>20</sup> In terms of publicly-owned water control systems, each year the Ministry helped construct and maintain dams, bridges, docks, and water distribution systems across the province, including major repairs to the Kakabeka Falls Bridge, located west of Thunder Bay above the second highest waterfall in Ontario, in 1979.<sup>21</sup>

Likewise, lessening the impact of erosion damage occupied a considerable part of the MNR's natural hazard protection mandate throughout this decade, particularly along the shore of the Great Lakes. Erosion can be broadly defined as a process by which a landscape is gradually degraded and worn away, typically by water, wind, ice, and/or gravity. Human activities, such as agriculture and forestry, can also contribute to erosion. Over time, it can lead to landslides and floods which endanger humans, property, and the environment.<sup>22</sup> In 1973, the MNR reported that it would be expanding the scope of its public erosion control services due to "increased erosion and flooding resulting from a combination of high water levels on the Great Lakes and several severe storms" that had occurred during the previous year.<sup>23</sup> Two years later, in collaboration with the federal government, the Ministry released the Ontario-Canada Great Lakes Shore Damage Survey Technical Report. The main purpose of the survey was to compile information detailing the extent of the damage that had occurred over 1972 to 1973, and to offer preliminary

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<sup>19</sup> *Ministry of Natural Resources: Annual Report (1979)*, 35.

<sup>20</sup> *Ministry of Natural Resources: Annual Report (1978)*, 23.

<sup>21</sup> *Ministry of Natural Resources: Annual Report (1979)*, 34.

<sup>22</sup> "Erosion," *National Geographic*, <https://www.nationalgeographic.org/encyclopedia/erosion/> (accessed 7 June 2017).

<sup>23</sup> *Ministry of Natural Resources: Annual Report (1973)*, 26.

recommendations aimed at more effective shoreline management. By the end of the decade, the MNR was actively adopting many aspects of the report, including conducting regular ground profiles at about 165 permanent erosion stations along the Great Lakes.<sup>24</sup> The Ministry also “assumed the task of defining and mapping shoreline hazard areas ... which was utilized by many municipalities to define hazard designations within official plans.”<sup>25</sup>

The 1980s were, in many respects, a formative decade for the MNR, and this can be clearly seen in how it handled the natural hazards it faced during this period. Despite the budget cuts it suffered, worldwide economic instability, and declining concern for environmental issues among the general population that characterized the early 1980s, the Ministry nevertheless remained committed to carrying out sound resource stewardship in Ontario.<sup>26</sup> Not only did it push forward with different types of ground-breaking research and management programs, it even launched a fresh public relations campaign intended to encourage the province’s citizens to become involved with its activities through volunteer work, open houses on policy direction, and more.<sup>27</sup> All of these forces combined to have a positive impact on both the MNR as an organization and on Ontario’s natural resource base, which benefitted from, among other things, the considerable strides that were made in developing systems to control forest fires, flooding, and erosion across the province. Indeed, because of these developments, the Ministry managed to effectively combat these sorts of environmental threats on more than one occasion.

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<sup>24</sup> Wendy Leger and Richard Greenwood, “State of Lakes Ecosystems Conference, 1996: Background Paper (December 1997),” *Government of Canada*, <http://publications.gc.ca/collections/Collection/En40-11-35-5-1997E.pdf>, 13; *Ministry of Natural Resources: Annual Report* (1979), 34-35.

<sup>25</sup> Patrick L. Lawrence, “Great Lakes Shoreline Management in Ontario,” *The Great Lakes Geographer* 2, no. 2 (1995), [http://geography.uwo.ca/research/the\\_great\\_lakes\\_geographer/docs/Volume%202/7\\_Lawrence.pdf](http://geography.uwo.ca/research/the_great_lakes_geographer/docs/Volume%202/7_Lawrence.pdf), 4 (accessed 7 June 2017).

<sup>26</sup> Winfield, 34.

<sup>27</sup> *Ministry of Natural Resources: Annual Report* (1981), 5; *Ministry of Natural Resources: Annual Report* (1982), 4.

The year 1980 witnessed one of the worst forest fire seasons in Ontario's history, pushing the MNR to modernize and improve upon its fire management systems over the course of the decade. By the season's end, a total of 1,779 fires had ravaged 560,740 hectares of the province's lands and forests, with some of them even threatening the safety of citizens in nearby communities. At its height, up to 3,600 people were on active fire suppression duty in what was later described as a "superhuman effort."<sup>28</sup> Consequently, four years later it implemented a new fire management system which made each of its five regional fire centres directly responsible for fire control in its own area, whereas previously this had been the duty of each MNR district. It was believed that "assigning firefighting responsibility according to region, rather than by district, has made forest fire management throughout Ontario better co-ordinated and more flexible."<sup>29</sup> Technological advancements were also a key component of the Ministry's new forest fire management program. In 1987, for instance, it introduced the Ontario Fire Management Software System, which was installed at its five regional centres to provide crucial information that would help predict and fight future forest fires.<sup>30</sup> The MNR also developed a computer simulation model that replicated the different types of forest fires that occur in Ontario and proved "useful in planning the acquisition of air tankers and the future use of air tankers, transport aircraft, and firefighters, for initial attack purposes."<sup>31</sup> Thanks in large part to the Ministry's ground-breaking efforts, Ontario soon emerged as a world leader in forest fire control. In fact, in the mid-1980s the province agreed to provide technical firefighting expertise to the

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<sup>28</sup> *Ministry of Natural Resources: Annual Report* (1981), 7.

<sup>29</sup> *Ministry of Natural Resources: Annual Report* (1984-85), 16.

<sup>30</sup> *Ministry of Natural Resources: Annual Report* (1987-88), 24.

<sup>31</sup> D.L. Martell, R.J. Drysdale, G.E. Doan, and D. Boychuk, "An Evaluation of Forest Fire Initial Attack Resources," *Interfaces* 14, no. 5 (September-October 1984), 20-32.

government of China.<sup>32</sup> The project proved to be quite successful, and was ultimately extended into 1991.<sup>33</sup>

The MNR dealt with a variety of flood management activities across Ontario during the 1980s, allocating millions of dollars to flood-related programs throughout the province each year. It oversaw the construction of flood control projects in places like Wallaceburg, where flooding of the St. Clair River and its associated damages had plagued residents for years until the Ministry approved the completion of the W. Darcy McKeough Floodway in February 1983. Over thirty years after its completion, it still stands as the largest flood diversion project in Ontario, and includes a seven-kilometre long channel, flood and dam control gates, roads and bridges, and land assembly which divert flood waters away from thousands of homes and businesses in Wallaceburg.<sup>34</sup> Similarly, in the early 1980s the Ministry saved approximately 3,000 homes in Thunder Bay from potential flooding catastrophes by building diversions along the Neebing and McIntyre Rivers.<sup>35</sup> Perhaps more than anywhere else in the province, the MNR directed significant attention toward flooding problems along the Great Lakes. The Canada-Ontario Flood Damage Reduction Program, launched by the federal government in 1975, was one way in which the Ministry sought to address this issue. In 1988, dozens of projects and technical studies were undertaken through this program, including an aerial photography and mapping program for the entire Great Lakes-St. Lawrence River system.<sup>36</sup>

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<sup>32</sup> *Ministry of Natural Resources: Annual Report (1984-1985)*, 16-17.

<sup>33</sup> *Ministry of Natural Resources: Annual Report (1989-1990)*, 17.

<sup>34</sup> *Ministry of Natural Resources: Annual Report (1983)*, 34; “W. Darcy McKeough Floodway,” *St. Clair Conservation*, <https://www.scrca.on.ca/flood-and-erosion/w-darcy-mckeough-floodway/> (accessed 15 June 2017).

<sup>35</sup> *Ministry of Natural Resources: Annual Report (1982)*, 9.

<sup>36</sup> *Ministry of Natural Resources: Annual Report (1989)*, 28; “Flood Damage Reduction Program,” *Environment and Climate Change Canada*, <https://ec.gc.ca/eau-water/default.asp?lang=En&n=0365F5C2-1#Section1> (accessed 15 June 2017).

The threat of erosion also presented challenges for the MNR in the 1980s. A prime example of this came in June of 1983, when the Ministry, in collaboration with the Rideau Valley Conservation Authority, executed a \$1.2-million erosion control project in the Green's Creek ravine in Gloucester (near Ottawa). The ravine, which contained a special type of marine sediment soil known as Leda clay, had been gradually eroding over the previous few years, putting over 100 homes, an elementary school, and 450 residents in the area in danger of dealing with a sudden slope failure. The Ministry worked with the local CA to level off the ravine's steep slopes and to install concrete pipes to safely remove surface water.<sup>37</sup> The following year, the City of Thunder Bay found itself in a similar predicament, with erosion along the steep banks of the Kaministiquia River posing a serious risk for about 60 homes and two roads in the area. Once again, the Ministry paired with the Lakehead Region Conservation Authority to execute the Kaministiquia River Erosion Control Project, which included "shoring up the steep banks along an 850-metre section of the river, and then placing rock-filled wire-mesh boxes along the repaired slope to prevent further erosion." Furthermore, it involved "plans to relocate sections of the two roads to reduce the risk to public safety."<sup>38</sup> More generally, in order to prevent future erosion and flood problems, each year the Ministry provided Ontario's CAs with millions of dollars in funding for various projects. In 1988 alone, for instance, it provided \$8.9 million in flood control grants and \$3.5 million for erosion control projects. That same year, it also partnered with the Lower Thames Valley Conservation Authority to launch a five-year, \$12-million initiative to provide flood protection to 719 homes near Chatham.<sup>39</sup>

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<sup>37</sup> *Ministry of Natural Resources: Annual Report* (1984), 13.

<sup>38</sup> *Ministry of Natural Resources: Annual Report* (1985), 23.

<sup>39</sup> *Ministry of Natural Resources: Annual Report* (1988-1989), 29.

While the Canada-Ontario Flood Damage Reduction Program ended in the early 1990s, the principles of the program became the basis for the direction and intent of Ontario's current provincial floodplain management policies and guidelines. These include defining flood hazard limits, preparing floodplain maps and developing land use planning policies as the preferred and most effective approach to hazard mitigation and management. Indeed, the Ministry has moved from an emphasis on structural approaches to a greater focus on keeping people and property out of the flood hazard area through the use of land use planning.

This is accomplished, in part, by the implementation of MNR's flood management program at the municipal level through the Planning Act, Provincial Policy Statement natural hazard guidelines. The ministry has produced a suite of natural hazard technical guides which cover such topics as riverine flooding and erosion, inland lakes, Great Lakes-St. Lawrence flooding, dynamic beaches and hazardous sites.<sup>40</sup> These guides can help planning authorities identify hazardous lands and adopt land use planning mechanisms to prevent risks from inappropriate or unsafe development in these lands.

By the 1990s, the MNR had a long tradition of ensuring the protection of life, property, and resources in Ontario from all kinds of natural hazards. In fact, by this point it had become internationally recognized as a leading innovator in this area, and was often called upon by foreign organizations to offer support in dealing with forest fires and other types of environmental problems. Indeed, two decades of research and program development had allowed the Ministry to "provide timely information about fire and flood emergencies to plan the most effective and efficient means of dealing with them" and "to ensure an on-the-ground emergency-

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<sup>40</sup> "Understanding Natural Hazards," *Ministry of Natural Resources* (2001), 13, [http://www.trentu.ca/iws/documents/GLSLRS\\_UnderstandingNaturalHazard\\_Intro.pdf](http://www.trentu.ca/iws/documents/GLSLRS_UnderstandingNaturalHazard_Intro.pdf) (accessed 3 January 2018).

response capability to protect people and private property, community and public infrastructure and the natural resources upon which Ontario depends.”<sup>41</sup> As the twentieth century drew to a close, the MNR employed 3,200 full-time staff. Its seasonal workforce also peaked each summer at around 2,800 jobs, many of which involved the operation of forest fire attack bases.<sup>42</sup> Armed with a wealth of manpower, knowledge, and experience, the Ministry endeavoured to be well-prepared to face what lay ahead.

Forest fires, as always, remained of the utmost concern to the Ministry throughout the 1990s. In 1990, the AFMC was replaced by the Aviation, Flood, and Fire Management Branch (AFFM), which, as its title implied, dealt with forest fire control, flood forecasting, and the provision of aviation services for the MNR and other provincial ministries.<sup>43</sup> In its first year of operations, the AFFM dealt with a relatively mild fire season, with only 1,614 fires (200 fires fewer than the 20-year average) having been recorded in Ontario that year. The AFFM did not take this turn of events for granted, however, and thus constantly worked to enhance the province’s firefighting capacity as each year passed. This included the modernization of its radio telecommunications equipment, the expansion of its aircraft fleet, and the construction of a new, \$5.7 million aviation maintenance facility in Sault Ste. Marie.<sup>44</sup> The 1991 forest fire season was particularly harsh, forcing the MNR to call upon supplementary personnel from Saskatchewan, Manitoba, and British Columbia to combat major blazes in a number of northern communities.<sup>45</sup> By the end of the decade, the Ministry was taking significant steps to better protect the public from forest fires. In 1999, the Ministry reported that the province’s forest fires have burned an

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<sup>41</sup> *Ministry of Natural Resources: Annual Report (1996)*, 7.

<sup>42</sup> *Ministry of Natural Resources: Annual Report (1998-1999)*, 2.

<sup>43</sup> “The Corporate History of the Ontario Ministry of Natural Resources, 1827 to 2010,” *Ministry of Natural Resources (2010)*, 170.

<sup>44</sup> *Ministry of Natural Resources: Annual Report (1990-1991)*, 26.

<sup>45</sup> *Ministry of Natural Resources: Annual Report (1991-1992)*, 27.

average of 259,700 hectares per year over the past five years. As a solution, the MNR would acquire “nine new CL-415 waterbombers, the most advanced waterbomber in the world, to improve forest firefighting and increase protection of Northern communities and industries.”<sup>46</sup>

At the same time, the Ministry dealt with plenty of flood and erosion activity during this decade, some of which was caused by sudden, unforeseen weather conditions. As it asserted in its 1996 annual report, “Leading-edge science, computer and satellite technology, and co-operative arrangements already in place, figure prominently in dealing with” different forms of natural hazards, a fact that had allowed the MNR to develop “an international reputation for innovation in this area.”<sup>47</sup> This claim was put to the test in January 1998, when a severe ice storm descended upon portions of Quebec and eastern Ontario in what was one of the largest natural disasters in Canadian history. The storm ultimately resulted in the death of at least 35 people with hundreds more injured, while thousands were temporarily displaced. The total cost of the damage was estimated at \$5.4 billion. During the chaos, nearly 200 MNR personnel helped set up water pumps to prevent flooding, cleared downed trees to help repair workers access power lines, distributed generators to remote farms and homes, used helicopters to provide support in various isolated locations, and more.<sup>48</sup> Of course, the Ministry dealt with many other flooding and erosion issues throughout this decade, but they were generally far less severe in nature. In addition, Ontario’s CAs, in collaboration with the Ministry, also continued to “play a key role in the protection of life and property from the twin threats of flooding and erosion,” namely through flood forecasting and by maintaining over 250 dams across the province.<sup>49</sup>

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<sup>46</sup> *Ministry of Natural Resources: Annual Report (1998-1999)*, 1.

<sup>47</sup> *Ministry of Natural Resources: Business Plan (1996)*, 7.

<sup>48</sup> *Ministry of Natural Resources: Business Plan (1997-1998)*, 3; “Ice Storm of 1998,” *The Canadian Encyclopedia*, <http://www.thecanadianencyclopedia.ca/en/article/ice-storm-1998/> (accessed 17 June 2017).

<sup>49</sup> *Ministry of Natural Resources: Annual Report (1991-1992)*, 13-14.

Since the turn of the twenty-first century, the MNRF (a name it formally adopted in 2014) has continued to improve its natural hazard management techniques. With the province of Ontario facing different environmental dangers on an almost daily basis, the Ministry is always on the lookout for possible threats to public safety and for ways to ensure that citizens, property, and resources are not jeopardized. Using the lessons of the past, it has managed to develop increasingly sophisticated ways of dealing with these issues, whether it be raging forest fires, massive floods or creeping land erosion. While it would be unreasonable to expect that the MNRF keep Ontario completely unscathed by these natural occurrences, it has definitely done an admirable job in recent years of minimizing the impact of these hazards.

The MNRF's modern forest fire management regime integrates an array of technology, scientific knowledge, laws, and policies to form a comprehensive system which seeks to prevent and mitigate the effects that fires can have on Ontario's landscape and its inhabitants. For example, under the *Forest Fires Prevention Act, 1990*, individuals using outdoor fires must follow strict guidelines between the months of April and October, and at any other time of the year need to have a Ministry-issued permit.<sup>50</sup> On a larger scale, the MNRF uses the guidelines outlined in its *Wildlife Fire Management Strategy* in order to uphold public safety while also allowing fire to play its essential role in maintaining healthy ecosystems in Ontario. Updated in 2014, this provincial strategy signifies a shift away from the previous, somewhat stringent zone-based approach (in which the province was divided into different fire zones and monitored accordingly) toward one in which each fire is treated on more of an ad hoc basis and receives a response appropriate to its conditions. It also demonstrates the Ministry's growing interest in

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<sup>50</sup> *Forest Fires Prevention Act, 1990*, Statutes of Ontario 1990, Chapter 24, <https://www.ontario.ca/laws/statute/90f24> (accessed 19 June 2017); "Outdoor fire rules and permits," *Government of Ontario*, <https://www.ontario.ca/page/outdoor-fire-rules-and-permits> (accessed 19 June 2017).

working with various stakeholders, including Indigenous communities, to improve its methods of fire control, as well as its commitment to operating “a fire management program that is mobile, flexible and able to expand when necessary to respond to areas of fire hazard and fire activity.”<sup>51</sup> Regardless, the MNR continues to use aircraft, equipment, fire bases and response centres, and public education to help detect and control these fires, allowing it to maintain a wildfire suppression and containment rate of over 94 per cent every year since 2003.<sup>52</sup> The Ministry has also repeatedly been called upon to help tackle major fires outside Ontario, including the blazes that tragically decimated Fort McMurray, Alberta, in 2016 and, more recently, the wildfire situation in British Columbia in the summer of 2017.<sup>53</sup>

Although flood and erosion management still carries a relatively low public profile in twenty-first century Ontario, the MNR, along with the province’s CAs, have not stopped treating it as a top priority. In recent years, for example, a number of notable flooding events in northwestern Ontario have required the Ministry’s aid. In May 2012, Thunder Bay found itself in a state of emergency when extensive flooding due to heavy rain caused considerable damage to homes and infrastructure, leading the MNR to send help and issue safety warnings to the broader public.<sup>54</sup> The following October, extraordinarily heavy rainfall closed Highway 17 near Wawa for several days, and even led to the Ministry-supported partial evacuation of the

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<sup>51</sup> Ontario Ministry of Natural Resources and Forestry, *Wildland Fire Management Strategy* (Queen’s Printer for Ontario, 2014), 1-4.

<sup>52</sup> “Results-based Plan,” *Ministry of Natural Resources* (2014-2015), 20.

<sup>53</sup> “Ontario MNR to aid Ft. McMurray,” *North Bay Nugget*, 6 May 2016, <http://www.nugget.ca/2016/05/06/ontario-mnr-to-aid-ft-mcmurray> (accessed 28 June 2017); “Forest fires,” *Government of Ontario*, <https://www.ontario.ca/page/forest-fires> (accessed 14 July 2017).

<sup>54</sup> “Thunder Bay flooding causes state of emergency,” *CBC News*, 28 May 2012, <http://www.cbc.ca/news/canada/thunder-bay/thunder-bay-flooding-causes-state-of-emergency-1.1168712> (accessed 3 July 2017); “Thunder Bay flooding prompts national appeal for help,” 30 May 2012, <http://www.cbc.ca/news/canada/thunder-bay/thunder-bay-flooding-prompts-national-appeal-for-help-1.1128151> (accessed 3 July 2017).

Michipicoten First Nation by helicopter.<sup>55</sup> Today, the MNRF and Ontario's 36 CAs also operate a "Flood Forecasting and Warning Program." The CAs work closely with the Ministry's Surface Water Monitoring Centre in observing weather conditions and providing regular updates, a service which aims to help prepare municipal and provincial authorities in the event of a flood.<sup>56</sup>

Evidently, Ontario and its people will never be free from the presence of natural hazards, but in comparison to many places in the world it has been relatively fortunate to have avoided having dealt with more severe incidents. This is at least in part attributable to the work of the MNRF. Intensive research and innovation, increasing public involvement, and productive stakeholder collaboration have been some of the key pillars of its success in this regard. Geography and a bit of luck have certainly been helpful, too. Nonetheless, one cannot overlook the contributions of the Ministry's firefighters, scientists, and policymakers, as well as the province's CAs, in making sure that Ontarians and their livelihoods are protected from unforgiving natural disasters.<sup>57</sup> While the problems of the past – fire, flood and erosion – have remained the same, the Ministry's solutions have clearly changed dramatically, and will continue to do so as new challenges and insights present themselves over time.

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<sup>55</sup> "Results-based Plan," *Ministry of Natural Resources* (2013-2014), 44.

<sup>56</sup> "Flood Forecasting and Warning Program," *Government of Ontario*, <https://www.ontario.ca/law-and-safety/flood-forecasting-and-warning-program> (accessed 17 July 2017).

<sup>57</sup> At time of writing, the Legislature is considering amendments to the Conservation Authorities Act (*Bill 139, Building Better Communities and Conserving Watersheds Act, 2017*) that would provide authorities with more flexibility to address growing environmental pressures, while also improving accountability and oversight.