

CLIMATE CHANGE AND LOCAL GOVERNMENT: The Changing Risk Environment

By Glenn McGillivray, Managing Director and Dan Sandink, Research Coordinator, Institute for Catastrophic Loss Reduction

Over the past 20 years, there has been growing evidence that the climate is changing. Its impact is noticeable internationally, nationally, and locally. In the past year-and-a-half alone, we have been witness to the most costly weather-related disaster globally and the second most costly weather-related disaster nationally. Across Canada, many jurisdictions are also noticing more severe weather than in the past.

Clearly, climate change no longer means just a slight rise in average temperature—it is beginning to have major impacts on how we live. In fact, many believe the wheels are already in motion for the environment to become much more harsh. If the changes experienced over the last two decades are any indication, there is much that needs to be done to prepare for more extreme weather in the future.

Weather-related disasters and losses are on the rise

Worldwide, economic costs, insured losses, property damage, displaced people, injuries, and deaths are all on the rise. Twenty years ago, average yearly insured losses caused by severe weather were USD 3.7 billion and economic losses USD 29.4 billion (inflation adjusted for constant 2004 dollars based on a five year moving average). Contrast that with 2004, a then-record, with USD 46 billion in insured natural catastrophe losses and USD 123 billion in economic losses; and 2005, the costliest year on record, with USD 78 billion in insured losses and USD 230 billion in economic losses.

Global natural disaster losses

(ICLR, based on data from Munich Re)

The past year has demonstrated our vulnerability to Mother Nature. Most notably, Hurricane Katrina captured international attention with its effect on the Gulf Coast and, especially, the City of New Orleans.

Munich Re reports that the nine warmest years on record occurred between 1995 and 2005.

Globally, many weather-related events have breached points well outside the norm. According to NASA, 2005 was the hottest year in a century. Munich Re reports that the nine warmest years on record occurred between 1995 and 2005, and the US-based Insurance Information Institute points out that seven of the ten most expensive hurricanes in US history occurred between August 2004 and October 2005.

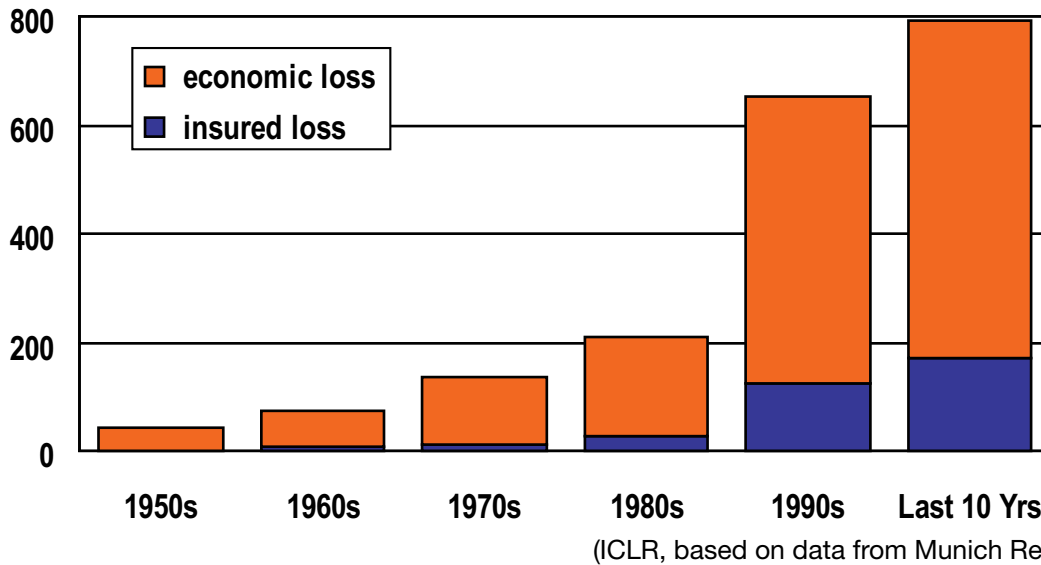
Canadian municipalities are not immune

Canada has not been untouched by recent severe weather extremes. In August 2005, the Greater Toronto Area (GTA) was hit with the most expensive natural catastrophe in Ontario history, the second most costly ever for the country. Heavy rains breaching the 100-year event level (153 mm and, by some accounts, as much as 175 mm) washed away infrastructure, flooded basements, and damaged cars with falling trees and rising flood waters. What's more, two tornadoes set down in the Salem/Fergus, Ontario area, damaging several properties. A tornado warning was also issued for Toronto, a rarity. All in all, the event caused more than CAD 500 million in insured losses.

Many municipalities in Alberta were flooded (not once, but twice) from two massive storms in June 2005 that occurred less than a week and a half apart. The storms caused an estimated CAD 300 million in insured damage. Also, on April 28, as much as 100 mm of rain fell across Quebec and New Brunswick at a time when snowmelt was already stressing storm sewer systems and watersheds. According to Environment Canada, Montreal received 390 mm of rain in 2005, about 145 per cent more than the average. Insured damage approached CAD 60 million.

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Global natural disaster losses



Communities in Atlantic Canada observed several record snowfall events in the early part of the year, as well. What’s more, a November 9 tornado in Hamilton, Ontario, tore the roof off a school and left several homes uninhabitable.

More recently, at the end of 2006 and early 2007, BC was battered by several successive winter storms which brought down trees, including thousands in Vancouver’s famed Stanley Park—damage projected to impact tourism there. These storms also tore roofs from buildings and triggered an unprecedented boil water advisory. More than 9,300 claims were tallied as a result of the string of storms, totalling more than \$135 million in damage.

Common rarities

There is no shortage of extreme weather events which have affected Canadian municipalities over the last few years. In June 2002 and July 2004, Peterborough, Ontario was hit with floods hitting the 1-in-100 year and 1-in-290 year mark respectively.

In just two years, the city was hit with inundations that statistically should have occurred on average just once every 100 and 290 years.

During the summers of 2004, 2005, and 2006, Hamilton was also hit with significant flood events, return periods of which are estimated to be once in 50 to 100 years for the August 19, 2005 storm (which was part of the same system which hit Toronto) and once in 4 to 10 years for the 2004 and 2006 storms. All three caused many Hamilton homeowners to experience sewer backup and basement flooding. While the first and third of these events proved to be statistically more frequent, the August 19 storm was extreme, generating some impressive metrics

(including reports from the city that the deluge required that more than 1,000 tonnes of shale and debris—64 truckloads—be removed from the Chedoke Golf Course West Inlet).

On a different note, in British Columbia the mountain pine beetle has lunched on stands of trees, the total area of which is larger than the province of New Brunswick, increasing the risk that wildfires could rapidly spread across affected areas. The infestation has begun to extend into the province’s interior urban areas, killing trees in municipal parks and on private property, increasing the risk of trees falling on people, cars and structures, and of power outages. According to Avram Lazar, president of the Forest Products Association of Canada, “The mountain pine beetle would’ve died if we hadn’t had the last 12 winters being the warmest 12 winters on record,” (CBC, October 1, 2006).

The list, unfortunately, goes on.

For details of British Columbia’s Mountain Pine Beetle Action Plan, visit www.for.gov.bc.ca/hfp/mountain_pine_beetle.

Costs increasing

It is not our intention to peg these, and all extreme weather events, directly to climate change. As stated by UBC climate change expert, Dr. Greg Henry, in The Globe and Mail (“Walking in a warmer wonderland”, January 5, 2007), “It’s a matter of scale. The weather is operating daily, and we’re talking climate change in terms of decades, so you can’t link the two of them directly.” However, in its explanation of

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In many Canadian municipalities, individual departments and agencies go it alone when addressing the risks associated with natural hazards, addressing them only within the ‘silo’ of their departments or areas of responsibility.

Figure 1, Munich Re states, “Comparing the last ten years with the 1960s makes the increase in natural catastrophes particularly clear. This applies both to the number of events and to the extent of the losses incurred,” (from Annual review: Natural catastrophes 2005).

So while it cannot yet be categorically stated that individual extreme weather events are increasing directly because of climate change, it can certainly be stated without reservation that the cost of damage from natural disasters is increasing, and has doubled every five to seven years since the 1950s. And the increase in extreme events is consistent with the science of climate change.

Being the order of government closest to the people, municipalities are at ground zero. So the question now is, “Where do local governments go from here?”

What the future may hold

Climate changes projected for the 21st century are likely to result in a range of increased weather hazards and impacts that have very real implications for Canadian municipalities, including:

- Higher maximum temperatures leading to increased incidence of death and serious illness in older age groups and urban poor, as well as increased electric cooling demand and reduced energy supply reliability;
- More intense precipitation events implying increased flood, landslide, avalanche, and mudslide damage causing increased pressure on government and private flood insurance systems and disaster relief;
- Increased summer drying over most mid-latitude continental interiors leading to decreased crop yields, decreased water resource quantity and quality, and increased risk of forest fires;
- Increase in tropical cyclone peak wind intensities, and average and peak precipitation leading to increased risk to human life, risk of infectious disease epidemics, and other impacts.

Based on IPCC 2001 Impacts, Adaptation and Vulnerability.

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Figure 1

Decade	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	Last 10 Years
Number of Events	21	27	47	63	91	57
Overall Losses	48.1	87.5	151.7	247.0	728.8	575.2
Insured Losses	1.6	7.1	14.6	29.9	137.7	176.0

Losses in US\$ bn (2005 values)

Source: Munich Re

A comparison of the last ten years with the 1960s reveals a dramatic increase

Last 10:60s
2.1
6.6
24.8

FEATURE

Many municipalities have not yet come to the realization that steps must be taken to reduce the impact of weather-related disasters. For communities at risk, the first step in the process is admitting they have a problem.

The good news about reducing risks...

Although we can do little to affect the incidence of weather hazards in the near term (aggressive actions to reduce greenhouse gases will moderate weather extremes over the longer-term), we can reduce our vulnerabilities to these hazards and, hence, limit the impact.

Some communities are proactively reducing their exposures to weather-related hazards, either independently or with help from such organizations as the Institute for Catastrophic Loss Reduction (ICLR). ICLR is working to assist individuals, businesses, and communities to prepare for the worst by reducing their exposures to weather-related hazards. A recent FEMA study estimated that every \$1 spent on adaptation/mitigation measures results in \$4 in future savings.

Unfortunately, many municipalities have not yet come to the realization that steps must be taken to reduce the impact

of weather-related disasters. However, for communities at risk, the first step in the process is admitting they have a problem.

Proactive vs. reactive

Though some local governments are considering the impacts of climate change and incorporating actions into their planning, most continue to react after they are confronted by climate extremes. Most often, such reactions come as a result of a specific major loss event or series of events. Such reactive measures include the striking of independent study panels and committees, as well as the launching of comprehensive strategies to address single weather risks (such as the City of Peterborough's plan to address flooding after the 2004 event) or individual programs (such as backflow valve or downspout disconnect programs).

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Several local governments have launched programs to reduce emissions—both their own and those of their citizens through anti-idling bylaws, for example—and cut electricity consumption by giving out free low-watt light bulbs and offering strings of new LED Christmas lights in exchange for old, high voltage lights, as has been done in Toronto in recent months.

While this list is not meant to be exhaustive (some local governments are doing far more to address climate change), in many cases the above is where any consideration of the issue by local governments has started and stopped.

The recent report by the UK's Stern Commission on the economics of climate change offers praise to municipal leaders and others who have begun to reduce emissions. The report also warns that much larger reductions are needed if the climate is to stabilize in thirty to fifty years. Moreover, adaptation is the key to confront the risk of rising disaster damage over the next few decades. Municipal leaders need to commit to build more resilient communities—communities adapted to prosper in a world that will include more severe weather events.

A comprehensive municipal strategy for adapting to the increasing risk of severe weather will incorporate disaster resilience, adaptation, and sustainability into municipal risk


management, resulting in increased economic vibrancy and prosperity in participating cities. The goals of an adaptation strategy should be to:

- Build municipal capacity for natural hazard risk reduction;
- Protect public and private property from the impacts of natural disasters;
- Establish a disaster resilient economy
- Prevent injuries and death caused by natural disasters.

The approach should establish tools that will help municipalities develop coherent, cross-departmental strategies to increase natural hazards resiliency. In many Canadian municipalities, individual departments and agencies go it alone when addressing the risks associated with natural hazards, addressing them only within the 'silo' of their departments or areas of responsibility. Forums for communication and cooperation will help departments within municipalities share resources and disaster reduction strategies.

Additionally, engaging high-level leadership within a given municipality will ensure that the local government's approach to hazards planning is coordinated across all departments.

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Change must be met with change in order for local governments to be able to prosper in a world that will be less and less forgiving.

By leveraging and maximizing existing local and other resources, including national and international, municipalities should become more resilient to severe weather while using as few resources as possible.

It is becoming increasingly clear that change must be met with change in order for local governments to be able to prosper in a world that will be less and less forgiving.

Glenn McGillivray is Managing Director and Dan Sandink is Research Coordinator for the Institute for Catastrophic Loss Reduction, www.iclr.org. ICLR is an independent, not-for-profit research institute based in Toronto and London, Canada. Affiliated with the University of Western Ontario, the Institute is a world-class centre for multi-disciplinary disaster prevention research. It achieves its mission through the identification and support of sustained actions that improve society's capacity to adapt to, anticipate, mitigate, withstand and recover from natural disasters. 🍂

WANT TO LEARN MORE?

For an emergency manager's take on the IPCC reports, we invite you to read IPCC's Climate Change Science: Explained By Richard Kinchlea.

Kinchlea is Emergency Management Co-ordinator for the City of Hamilton, Ontario, a CCEP Member, and the Volunteer Coordinator at WCDM. He is studying each of the IPCC reports and offering a summary for the benefit of his fellow practitioners. We're delighted to present Richard's Summary of the Paper:

"Climate Change 2007: The Physical Science Basis Summary for Policymakers," by Working Group I of the Intergovernmental Panel on Climate Change (IPCC). For the full article, visit www.CCEP.ca.



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