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Inside this issue:

The birth of an institute <i>cont.</i>	2
The calculus of cat losses	3/4
Slave Lake shows need for national wildfire strategy	5
Earthquakes result in record loss year	6/7
ICLR awards scholarships in seismic research	7
Know your weather alerts	8

The birth of an Institute

By Grant Kelly, Vice President & Chief Economist, PACICC, former manager, IBC's catastrophic loss mitigation project

In late 1996 member insurers of the Insurance Bureau of Canada (IBC) decided that the insurance industry needed to more actively promote measures that protect homes and businesses across Canada. This would build on recent IBC work to ensure that the industry was financially prepared for a major earthquake.

To lead this initiative, IBC established a Committee of Chief Executive Officers, chaired by Terry Squire, CEO of the Co-operators. Other industry leaders that volunteered their time to this Committee included: Howard Moran, Commercial Union; Bill Green, Federated Insurance; Gregg Hanson, Wawanesa; and David Wilmot, Frankona.

I was assigned the task of assisting Paul Kovacs in providing IBC staff support to the Committee.

IBC staff presented the CEO Committee with a number of options to promote investments in catastrophic loss reduction. Among the options considered included (and this list is not comprehensive):

- Public education campaigns to invest in specific safety products;
- Lobby for tax credits to encourage homeowners to make investments that would make their homes more disaster-resilient;
- Consider exclusions on homeowners insurance to reduce insurance risk;

- Strengthen building codes;
- Improve municipal building code enforcement;
- Invest in improved weather forecasting; and,
- Encourage governments to invest in improving infrastructure in Canadian cities.

A presentation that captured the Committee's interest came from the President of the Insurance Institute for Property Loss Reduction (now known as the Insurance Institute for Business and Home Safety), Mr. Eugene Lecomte. IIPLR was the organization founded by the U.S. insurance industry to promote investment in loss mitigation. Mr. Lecomte described his Institute's signature program to promote the building of new homes that are more resilient to damage from severe weather and earthquakes. Interest in the program grew following extensive losses due to Hurricane Andrew in 1992.

From these discussions, the CEOs made the important decision that a dedicated, research-based and sustained effort to protect Canadians was needed. With this decision, ICLR was born and staff began preparing a business plan for the approval of IBC's Board of Directors. That plan was approved in the summer of 1997. In that first year, more than 80% of IBC's member insurers agreed to be members of ICLR. The IBC CEO Committee became ►

the new ICLR Board of Directors.

Paul Kovacs was appointed Executive Director. Tracy Waddington and Alan Pang joined ICLR shortly thereafter and together formed the core of ICLR in those early years.

These 3 people were responsible to implement ICLR's work in the 4 key result areas outlined in the business plan. They were:

Build safer communities

Identify and promote cost-effective approaches so new structures can be built and existing structures retrofitted to better withstand future catastrophes.

Establish safety partnerships

Provide a forum for the insurance community and concerned allies to work together to reduce the human and financial cost of natural disasters, and to act as a resource for the study of nature's perils.

Enhance industry awareness

Promote awareness within the insurance community of effective disaster risk management practices through targeted research and dissemination of information.

Promote consumer awareness

Enhance, through the Insurance Bureau of Canada, consumer awareness of the benefits of prevention as a means of reducing loss due to catastrophes.

With these 4 key result areas, the CEO Committee provided a focused path that ICLR continues to follow.

The Institute's first major project was with Emergency Preparedness Canada (EPC), the federal government's emergency response agency. EPC asked ICLR to hold 5 workshops across

Canada to document gaps in Canada's emergency response framework. Following these workshops ICLR documented our country's strength in disaster preparedness and response. However, the participants of these workshops reported that our national effort to reduce the impact of natural disasters was, at best, sporadic and uncoordinated. This should only be remedied by developing a National Disaster Mitigation Strategy. ICLR presented this report to the Government of Canada in the fall of 1998. This report resulted in an announcement by Prime Minister Jean Chretien that EPC would develop a National Mitigation Strategy.

This initial success raised awareness about risk reduction within the disaster management community and its researchers. In 1999, universities that sought to partner with the insurance industry approached ICLR. These universities were seeking to make a proposal for the Ontario Challenge Fund. This was a pool of money that the Ontario provincial government set aside to encourage applied research at universities. Under this program, if a university matched every dollar contributed by the private sector into a dedicated research project, the province would match with an additional dollar. It meant that \$1 of money from the insurance industry could, under this program, result in \$3 of research at an Ontario university since ICLR had been established as arms length from IBC, yet still managed by Canada's insurers.

Two partnership proposals were seriously considered. They were from University of Toronto's School of Environmental Studies and University of Western Ontario's (UWO) School of Engineering. Both proposals would have resulted in

significantly increasing the research capacity of ICLR. However, the difference that led to the current partnership with UWO is that insurers would retain a majority of ICLR's Board of Directors and control of the Institute.

The partnership with UWO gave ICLR access to Dr. Alan Davenport and the UWO's Boundary Layer Wind Tunnel. This group was recognized as world leaders in wind engineering. Dr. Davenport was one of Canada's most successful engineers and his knowledge and expertise was invaluable to ICLR.

The relationship with UWO has allowed the Institute access to a network of academic experts across Canada and leveraged the investment of the insurance industry into millions of dollars in research.

ICLR has gone on to build a world class research institute focused on providing a science base for Canada's insurers to promote actions to reduce risk of loss due to water, wind, earthquake and wildfire. 🐾



The calculus of cat losses

2009, 2010 and 2011 will go down as the first time ever the Canadian insurance industry has experienced three consecutive years of billion-dollar catastrophe losses, and buyers of reinsurance could stand to be aware of two reinsurance products.

**By Glenn McGillivray, Managing Director
Institute for Catastrophic Loss Reduction**

In recent years, the world has been in the midst of an exceptionally active period for natural catastrophe losses – the last two globally, the last three in Canada.

First quarter 2010 saw the devastating earthquakes in Haiti (January 12) and Chile (February 27). Later in the year (September 2) Christchurch, New Zealand would be hit by a magnitude 7.

But the record insured losses set in 1Q2010 would prove to be shortlived, as Christchurch would be hit by yet another quake (February 21, 2011). Though less powerful than the first (it was a M 6.3) the quake proved devastating as it razed structures weakened by the first event. So while the first quake took no lives, the 2011 event claimed 181 souls. Insured damage has been estimated in the USD 9- to 12 billion range.

Similar to the one/two punch that came with Haiti and Chile in 1Q2010, came the left jab/right hook with the second Christchurch quake, and the Japan earthquake/tsunamis event of March 11. That event claimed more than 15,000 lives and triggered insured losses of approximately USD 40 billion.

In addition to the seismic activity in 2011, (re)insurers have had to contend with a spate of spring tornadoes in the United States with insured losses estimated as high as USD 25 billion; Hurricane Irene losses, also estimated at up to USD 7 billion; other miscellaneous hurricane losses; wildfire events in Texas and elsewhere; and typhoon losses in Asia, among others.

All told, 2011 sits in first place for losses due to natural

catastrophes, with USD 105 billion in insured losses and USD 380 billion in economic losses, according to Munich Re. The previous worst annum – 2005, the year of Katrina, Rita and Wilma - has slipped to second place with USD 101 billion in insured losses and USD 220 billion in economic losses.

The notable thing about many of the records set in 2011 is that they were met before the year was half-up. This was the case both globally and for Canada as well.

The year will go down as the worst on record for Canadian insurers since 1998, the year of the ice storm. The May 15 wildfire in Slave Lake, Alberta triggered insurance claims of \$700 million, marking the second most expensive insured natural catastrophe in Canadian history and the most expensive wildfire in Canada by far. Storms in Ontario in March; in Ontario and Quebec in April; spring flooding and hail, tornadoes and wind in the Prairies; a tornado in Goderich, Ontario on August 21; and Hurricane Irene all put Canadian insured catastrophe losses up over the \$1 billion mark, and the year is not yet over.

Blip, trend or the new normal?

While the Canadian insurance industry experienced a \$1 billion-plus catastrophe year in 2005, the next three years – 2006, 2007 and 2008 – proved quiet. Then in 2009, the industry experienced another billion-dollar year, again repeated in 2010. Thus, 2009, 2010 and 2011 will go down as the first time ever that the Canadian insurance industry has

experienced three consecutive years of billion-dollar catastrophe losses.

As result of this string of cat activity, two reinsurance products have factored in to many discussions between insurer, reinsurance intermediary and reinsurer as of late, and are worthy of brief discussion here.

Play it again...

The first product relates to reinstatement covers. At renewal, insurers not only have to make decisions about first event cat covers, they must also decide whether to purchase reinstatement cover(s) as well. Reinstatements afford the company another 'go-ground' on their first event covers should they "blow through" their limits before the year is up.

Don Callahan, President and CEO of Guy Carpenter Canada, notes: "This was an extraordinary cat year both globally and locally. Slave Lake was an early-year event and it was a patchy sort of loss in that several insurers had major cat claims while others came away largely unscathed. The reinstatements provision, which is generally a component of every catastrophe contract, suddenly became relevant."

He explains: "Essentially, reinstatement provisions trigger an additional premium to the reinsurer equal to the original layer premium, pro-rated by how much the loss bears to the limit of the layer. So if the layer is fully hit, the reinstatement premium is 100 per cent. If only half the layer pays (for example, a \$15 million ground up loss to a \$10 million excess \$10 million layer), ►

then half of the original premium is payable. Reinstatement provisions are designed to be an immediate payback vehicle for the reinsurer and they are also a means of limiting the total amount payable. In exchange, the full limit is reinstated. But usually only once.

“Some insurers had burned their first and second layers at Slave Lake, paid the full reinstatement premium and were sitting with much of the year remaining - including the often-active summer wind and hail season - with a single limit left. If they were to blow these limits in a July storm, their capital would be fully exposed to the layers they had exhausted. Furthermore, reinsurance capacity would be down and the cost of buying a new cover in the middle of the year could potentially be multiples of the original premium. So a few insurers wisely purchased a second reinstatement in April to avoid being in that vulnerable position. I'm not aware of any insurers who chose not to purchase an additional reinstatement and were left exposed after the Alberta hailstorm, but it's possible that there were one or two. We had clients that purchased the reinstatement of the second limit right after Slave Lake and I think they clearly did the right thing. The year was not over.”

Callahan explains that a product that makes the decision-making for reinsurance buyers a lot easier is a simple Reinstatement Protection contract. “With this, an insurer can pay a premium at inception for protection that pays the reinstatement premium in the event of a cat. We also have cat option covers that let a company choose to buy protection at the start of any quarter at a predetermined premium. This can lower the cat retention during the course of the year and provide protection where upper layer reinstatements are exhausted.

We've been working with these sorts of ideas for many years and have tailored a few for savvy clients. I think we will see more interest in this going into 2012.”

Preventing 'death by a thousand cuts'

The second oft-discussed reinsurance product of late is the cat excess aggregation cover. In the cases of 2005, 2009, 2010 and 2011 - there was one large loss event of several hundred million and a collection of other events of various sizes. The big events were usually large enough to trigger cat reinsurance, but many of the smaller events - dubbed 'mini' cats or secondary cats - were not and, thus, were taken net on the balance sheet by many insurers.

One solution to the mini-cat problem can be a product known as an aggregate XS cover, which is explained in detail by CCR's Rob Finnie in CU's November 2010 issue. The need for a reinsurance product to address the mini-cat problem is still in it's infancy, and though it will take time to gain traction, it appears that interest in the product is gaining speed.

Says Callahan:

“Aggregate covers can help in high frequency cat years. These contracts let the insurer choose how many "mini-cats" it can tolerate and once these cats reach a certain aggregation, the reinsurance kicks in, often on a layered basis. So, for example, we might structure an aggregate that pays once cat events greater than \$2 million but less than \$10 million accumulate to a total of \$40 million. From that point forward, the aggregate contract pays for the additional activity subject to its own limits and layering. The idea is to protect the client from aberrational cat frequency. I'm aware of about eight aggregate contracts in this market and I think every one of

them got hit this year. These are obviously proving difficult to price and structure and they are going to be tough to renew. Reinsurers are on the fence as to whether 2011 is an exceptional year or just the new normal.”

Only time will tell

No one can ever say for certain how a year will play out from a cat loss perspective: Is it a 'blip', a trend, or is this the way it's going to be, at least until another 'new normal' rears up? Thus, the decision making surrounding the purchase of cat cover is not always clear or easy.

Yet, it is encouraging to see that reinsurance intermediaries and reinsurers are working closely to ensure that buyers of cat cover have many customizable options and new products available to them to address the uncertainty that comes with managing risk in an age of unpredictable natural catastrophes.

Ultimately, it's okay to be on the fence, as long as there are safety nets in place in case you fall. 🐾

Slave Lake shows need for national wildfire strategy

By Brian Stocks, President, B.J. Stocks Wildfire Investigations Ltd. and Paul Kovacs, Executive Director, Institute for Catastrophic Loss Reduction

In the past, most Canadians have looked upon instances of evacuations and damage from wildfire with more pity than self-consternation.

After all, with the exception of then-record wildfire losses experienced in British Columbia in 2003 - \$200 million in insurance claims - damage to Canadian property and loss of life from wildfires has historically been minimal.

The May 15 wildfire in Slave Lake changed all that, as the blaze triggered preliminary insured losses of an unprecedented \$700 million, making it the second most expensive natural disaster in Canadian history. That's from the loss of one-third of a town of just 7,500 residents. The question is: what if a big fire got into a larger community?

As a result of a strained but reasonably effective and well-coordinated wildfire-fighting infrastructure, plus no small measure of good luck, losses of the magnitude seen fairly regularly in the U.S. and Australia had yet to materialize in Canada. The disconcerting fact, however, is that the conditions which exist in such places as southern California also exist, in large measure, in many parts of Canada. In short, there are hundreds of potential Slave Lakes across the country.

It must be stressed that certain communities in this country have dodged a rather large bullet. Yet several factors are converging to create a perfect storm of sorts, and numerous stakeholders - including disaster managers, first responders, insurers, homeowners and policy-makers - need to head off a potentially bleak future of more and larger wildland/ urban interface fires in Canada.

The good news is that

most of the ground work has already been done.

On June 23, 2004, in Haines Junction, Yukon, the Canadian Council of Forest Ministers (CCFM) identified the need for a new, strategic approach to wildland fire management in Canada; one that is based on a risk-management framework. The council, which is composed of 14 federal, provincial and territorial forest ministers, also created an Assistant Deputy Minister (ADM) level Task Group - co-led by Natural Resources Canada and British Columbia - and charged it with the development of the Canadian Wildland Fire Strategy (CWFS).

In October 2005 at the CCFM meeting in Saskatoon, the ministers signed the CWFS Declaration, expressing their unanimous commitment to a new common vision, shared principles and a proposed path of action to enhance wildland fire management across the country. The ADM Task Group also completed the CWFS Vision, which reviewed the current state of fire management in Canada, identified critical issues and trends and described the desired future state that all agencies will strive to achieve over the next decade.

At that time, the ministers agreed to a 50-50 split of the costs to implement the strategy, which was to receive \$230 million annually for up to 10 years.

The strategy focuses on four objectives:

- public education and policy/ risk analysis related to wildland fires;
- support for FireSmart programs designed to reduce risks associated with the interface between wildland and urban areas;

- emergency preparedness and response capability;
- multi-disciplinary innovation intended to bolster decision support systems.

The bad news is that the CWFS has largely languished since 2005. As a result, the plan has only been implemented on a piecemeal basis. But given what's going on in Alberta and other places in Canada, hopefully there will be momentum toward a federal and provincial ministerial meeting dealing with wildland fire in the very near future.

The plan is ready. It does not have to be developed. The federal government must simply take an active role in carrying the plan forward.

The 2003 wildfires in B.C. - and the damage done in Kelowna in particular - had been viewed by some as simply a one-off event that likely would never happen again. This view has proven wrong.

In one of the most heavily forested countries in the world, where more and more people are choosing to live in built-up areas that abut forests, and with aging firefighting equipment and a changing climate, how many more times can we label as "just a fluke" a large, damaging wildfire before we take decisive action to better manage this hazard now and into the future? 🐾

This item first appeared as an OpEd in the September 28, 2011 Edmonton Journal.

A sequence of devastating earthquakes and a large number of weather-related catastrophes made 2011 the costliest year ever in terms of natural catastrophe losses. At about USD 380bn, global economic losses were nearly two-thirds higher than in 2005, the previous record year with losses of USD 220bn. The earthquakes in Japan in March and New Zealand in February alone caused almost two-thirds of these losses. Insured losses of USD 105bn also exceeded the 2005 record (USD 101bn).

The year in figures

With some 820 loss-relevant events, the figures for 2011 were in line with the average of the last ten years. 90% of the recorded natural catastrophes were weather-related – however, nearly two-thirds of economic losses and about half the insured losses stemmed from geophysical events, principally from the large earthquakes. Normally, it is the weather-related natural catastrophes that are the dominant loss drivers. On average over the last three decades, geophysical events accounted for just under 10% of insured losses. The distribution of regional losses in 2011 was also unusual. Around 70% of economic losses in 2011 occurred in Asia.

Some 27,000 people fell victim to natural catastrophes in 2011. This figure does not include the countless people who died as a result of the famine following the worst drought in decades on the Horn of Africa, which was the greatest humanitarian catastrophe of the year. Civil war and political instability made it very difficult to bring effective aid to the victims.

The earth shakes: 11 March, the Tohoku earthquake

The most destructive loss event of the year was the earthquake of 11 March in Tohoku, Japan, when a seaquake with a magnitude of 9.0 occurred 130 km east of the port of Sendai and 370 km north of Tokyo. It was the strongest quake ever recorded in Japan. The damage from the tremors themselves was relatively moderate thanks to strict building codes. However, the quake triggered a terrible tsunami. The wave devastated the northeast coast of the main island Honshu. In some bays, the wave reached a height of up to 40 metres. Entire towns, roads and railway lines were washed away, hundreds of thousands of houses were destroyed. Some 16,000 people were killed in spite of high protective dykes and an excellent early-warning system. Without these protective installations, the death toll would have been much higher. The tsunami-exposed northeast of Japan is believed to have last been hit by a seismic sea wave of this size in the year 869.

The tsunami led to severe damage at several blocks of the Fukushima 1 nuclear power plant. Some areas within a radius of several kilometres of the plant will remain uninhabitable for a period of many years. Even without considering the consequences of the nuclear accident, the economic losses caused by the quake and the tsunami came to USD 210bn – the costliest natural catastrophe of all time. The share of insured losses may amount to as much as US\$ 40bn.

The fault line that triggered the quake was actually fairly short with a length of 450 km. However, the seabed at the fracture face shifted by 30 to 40 metres. Experts believe that an

earthquake of this strength occurs there once every 500 to 1,500 years. The main shock was followed by thousands of aftershocks, the strongest of which, some 40 minutes after the main shock, had a magnitude of 7.9.

The earth shakes II: The Christchurch earthquake

Before the tsunami catastrophe in Japan, there had been an earthquake of 6.3 magnitude in Christchurch, New Zealand, on 22 February. The notable aspect of this event was that an earthquake of 7.1 magnitude had hit Christchurch just six months earlier. Unfortunately, the seismic waves were amplified due to reflection off an extinct volcano, so that far greater destruction was caused than would have normally been expected with an earthquake of this magnitude. The epicentre was located at a shallow depth and only a few kilometres from the city centre.

The losses were enormous. Numerous old buildings collapsed, and many new buildings were damaged despite the very high building standards. Some residential areas will not be rebuilt. Economic losses came to around USD 16bn, of which approximately USD 13bn was insured.

One day before Christmas, the earth shook again in Christchurch. Over a dozen people were injured following three strong earthquakes. However, in terms of their severity, the quakes were not as bad as the devastating event in February. Consequently, losses for the insurance industry from these aftershocks are expected to be significantly lower. ►

**Weather-related catastrophes:
Floods in Thailand**

The floods in Thailand stand out among the many weather-related catastrophes of 2011. They were triggered by extreme rainfall, which started in spring and peaked in the autumn. Due to its low elevation above sea level, the plain of central Thailand – where the capital Bangkok is situated – is prone to flooding throughout the rainy season from May to October. According to the authorities, this year's floods were the worst for around 50 years. It is presumed that the La Niña natural climate phenomenon was a contributory factor, since the rainy season is often stronger during this phase.

The floods claimed the lives of some 800 people. Not only were hundreds of thousands of houses and vast expanses of farmland flooded, but also seven major industrial areas with production facilities belonging mainly to Japanese groups. A large number of electronic key component manufacturers were affected, leading to production delays and disruptions at client businesses. Approximately 25% of the world's supply of components for computer hard drives was directly impacted by the floods. With economic losses amounting to tens of billions of

dollars, the floods were by far the costliest natural catastrophe in Thailand's history.

**North America: Many storms
but few hurricanes in North
America**

The tornado season was especially violent in the Midwest and southern states of the USA. Several series of storms with numerous tornadoes caused economic losses totalling some USD 46bn, of which USD 25bn was insured. Insured losses were thus twice as high as in the previous record year of 2010. The series of severe weather events can largely be explained by the La Niña climate phenomenon. As part of this natural climate oscillation, weather fronts with cool air from the northwest more frequently move over the central states of the USA and meet humid warm air in the south. Under such conditions, extreme weather events are more probable than in normal years.

Losses from North-Atlantic hurricanes were moderate. However, as in 2010, this was purely by chance. At 18, the number of recorded tropical cyclones in this season was some way above the long-term average (11) and above the

average for the current warm phase with increased hurricane activity since the mid-1990s (15). The number of hurricane-strength storms (6) was in line with the long-term average. However, the number of tropical cyclones that made landfall, especially on the US coast, was very low. Only three named storms, one of them Hurricane Irene, made landfall in the USA. Irene caused economic losses in the Caribbean and USA totalling US\$ 15bn, US\$ 7bn of which was insured.

Another striking feature of this year was that, for the first time ever, U.S. weather agency NOAA categorized a low-pressure system over the Mediterranean as a tropical storm. The low-pressure system Rolf formed on 3 November. It was caused by a ridge of cold air forming over the still warm sea (20 °C). With peak wind speeds of 120 km/h, the storm "01M" made landfall on the French Mediterranean coast before dispersing. The storm produced extreme rainfall along the Cote d'Azur. 🐾

ICLR awards two scholarships in seismic research



As part of its involvement with the Canadian Seismic Risk Network (CSRN), each year ICLR awards two scholarships to student researchers who show promise in the area of earthquake.

This year, scholarships were awarded to Hadi Ghofrani (left), UWO, for his analysis of the 2011 Tohoku earthquake, and Jack Guo (right), UofT, for his work on Canadian guidelines for building retrofits with supplemental damping. 🐾



Be prepared, know your weather alerts

By Geoff Coulson

Warning Preparedness Meteorologist, Environment Canada

Environment Canada's Meteorological Service is Canada's official source for weather forecasts and the only source for severe weather warnings. Our weather forecasters work around the clock every day to monitor weather conditions across the country, track the development and movement of storms and issue timely alerts when hazardous weather conditions occur.

We do this by issuing various special public alerts through the media, as well as through Environment Canada's Weatheradio service, and our Weatheroffice website at: <http://www.weatheroffice.gc.ca>

Environment Canada issues three different types of weather alerts, depending on the severity and timing of the event:

- **Special Weather**

Statements are the least urgent type of alert and are issued to let people know that conditions may develop that could cause concern.

- **Weather Watches** are alerts about weather conditions that are favourable for development of a storm or severe weather leading to potential safety concerns.

- As certainty increases about the probability of development or path and strength of a storm system, a watch may be upgraded to a **Warning**. A

warning is an urgent message that severe weather is either occurring or will occur. Warnings are usually issued six to 24 hours in advance, although some severe weather (such as thunderstorms and tornadoes) can occur rapidly, with less than a half hour's notice.

When a Special Weather Statement is issued by Environment Canada, take notice. Weather Statements are a heads-up regarding a strong potential for a storm, or large areas of dense fog causing poor visibility, or to highlight interesting or rare weather conditions like lightning in February. Special Weather Statements can be accessed directly from Environment Canada's weather website at: http://www.weatheroffice.gc.ca/warnings/sws_e.html

When you see a Weather Watch, you should prepare to take action. Weather Watches give you time to prepare before significant weather arrives at your doorstep. Start monitoring the weather situation more frequently in the coming hours and be prepared to take action in time to avoid the impact of severe weather. In some cases a Watch may be your cue to change plans or activities now, to ensure that the possible severe conditions can be avoided if they occur. In the winter months, this could be a Winter Storm Watch or a Snow Squall Watch.

Once forecasters believe a certain type of severe weather is very likely to occur, they issue a Weather Warning. Whether you hear about a weather warning through the media, on your weatheradio or on the internet, you should take action. Warnings come in many different varieties and can be issued for heavy rain events, heavy snowfalls, powerful winds, violent thunderstorms, freezing rain or hurricanes, to name a few.

To access the latest severe weather watches and warnings in your area, and to be prepared for whatever Mother Nature may have in store, visit: http://www.weatheroffice.gc.ca/warnings/warnings_e.html 

Institute for Catastrophic Loss Reduction

20 Richmond Street East
Suite 210
Toronto, Ontario
M5C 2R9
Tel: (416) 364-8677
Fax: (416) 364-5889
www.iclr.org

Mission
To reduce the loss of life and property caused by severe weather and earthquakes through the identification and support of sustained actions that improve society's capacity to adapt to, anticipate, mitigate, withstand and recover from natural disasters.

The University of Western Ontario
Boundary Layer Wind Tunnel
1151 Richmond Street
London, Ontario
N6G 5B9
Tel: (519) 661-3338
Fax: (519) 661-3339
www.iclr.org