Chapter II: Disaster Overview

The Increasing Cost of Disasters and Their Impacts

In Canada, since the inception of the Disaster Financial Assistance Arrangements (DFAA) program in 1970, the Government of Canada has paid more than $3.4 billion in post-disaster assistance to help provinces and territories with the costs of response and of returning infrastructure and personal property to pre-disaster condition.

Not only have disasters become more frequent in recent years, but their impact has become more costly. Communities are facing both dramatic social and humanitarian consequences in the wake of a disaster, as well as sudden economic losses and dislocation.

The cost of a disaster goes up exponentially depending on the population density of the region in which the disaster occurs. Recent Canadian events such as the 2013 Alberta Floods, 2014 Manitoba Floods and the train disaster in Lac-Mégantic, Quebec are examples of this. For instance, in Alberta, the June 2013 flooding was the largest and most expensive natural disaster in its history. The provincial and federal governments are estimated to spend nearly $5 billion to recover and rebuild. As of February 2014, governments have spent $553 million in operating and $40 million in capital spending, including over $425 million in Disaster Recovery Program funding.

In the U.S., Hurricanes Sandy and Katrina have affected more populated areas than disasters in the past. They would not have had such an impact had they moved quickly through the areas, but they moved slowly over the coastal area. With Katrina, the failure of the levee and floodwalls surrounding Lake Pontchartrain caused flooding in New Orleans and its suburbs.

Damage in the Built Environment

Increasingly, communities are becoming more willing to discuss planning and resiliency rather than solely focusing on recovery.

- Worldwide costs of natural disasters have increased steadily from an annual average of losses of $25 million in the late 1980s to $130 billion in the 2000s[1].

- In 2013, Canadian insurance companies paid out a record breaking $3.2 billion to policy holders[2].

- Since 1989, U.S. insurance companies have paid out more than $44 billion in damage claims due to natural disasters[3].

- It is estimated that flood damage is reduced by nearly $1 billion a year through communities implementing sound floodplain management requirements.

- Up to 86 percent of small and medium businesses fail within three years of a major emergency if no preparedness plan is in place[4].

- The North American-based Small Business Majority found that 57% of small businesses have no disaster recovery plan. Out of those that do, 90% spend less than one day a month preparing and maintaining them[5].

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[1] http://globalnews.ca/news/791811/natural-disasters-rising-costs-are-canadas-biggest-public-safety-risk-documents/

[2] www.ibca.ca – January 2104 Media Release

[3] Kliesen, K. L. (1994, April). The Economics of Natural Disasters. Retrieved from http://www.stlouisfed.org/publications/re/articles/?id=1880

[4] http://www.smallbusinessbc.ca/general-business/your-business-ready-emergency

[5] http://www.smallbusinessbc.ca/general-business/your-business-ready-emergency

Canada Disaster Statistics[6]

Data related to human and economic losses from disasters that have occurred between 1980 and 2010:

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No of events:	81
No of people killed:	228
Average killed per year:	7
No of people affected:	168,514
Average affected per year:	5,436
Economic Damage (US$ X 1,000):	13,873,100
Economic Damage per year (US$ X 1,000):	447,519

Types of Disasters and Their Impacts

Disasters can take many different forms and the duration can range from an hourly disruption to days or weeks of ongoing destruction. Below is a list of the various types of disasters- natural, man-made and technological- that can impact a community.

Natural Disasters

- Hurricanes and tropical storms
- Floods and flash floods
- Thunderstorms and lighting
- Tornadoes
- Wildfire
- Agricultural diseases
- Earthquakes and sinkholes
- Drought and water shortage
- Extreme heat
- Winter and ice storms
- Emergency diseases (pandemic influenza)
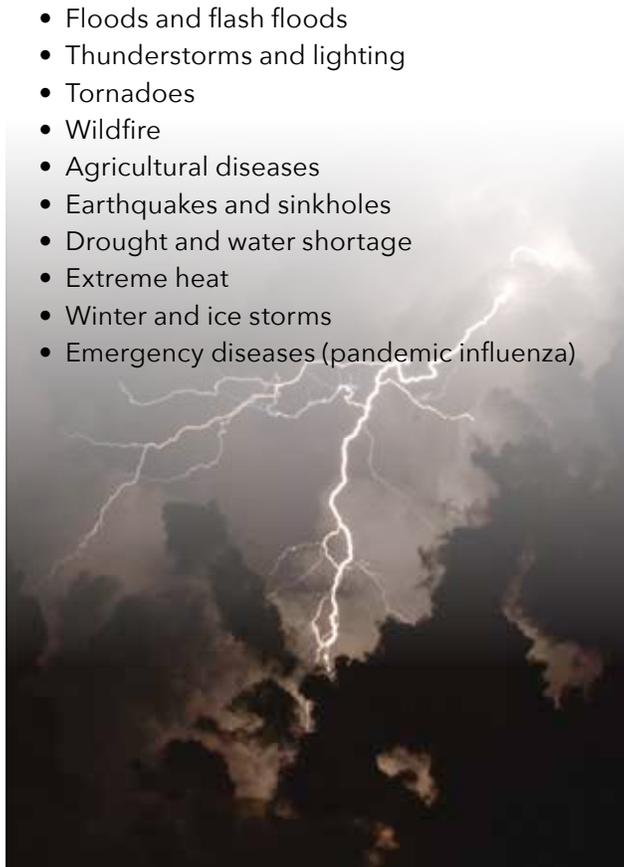
Hurricanes and tropical storms are among the most powerful natural disasters because of their size and destructive potential. Tornadoes are relatively brief but violent, causing winds in excess of 300 km/hr. Both earthquakes and tornadoes strike suddenly without warning. Flooding is the most common natural hazard, and requires an understanding of the natural systems of our environment, including floodplains and the frequency of flooding events. Communities are more vulnerable to wildfires in the event of extreme dry weather conditions or a drought.

Man-Made and Technological Disasters

- Hazardous materials and chemicals
- Building fire
- Power service disruption
- Environmental health
- Terrorism
- Chemical and biological weapons
- Cyber attacks
- Fraud and theft
- Civil unrest
- Radiological emergencies

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[6] http://www.preventionweb.net/english/countries/statistics/?cid=31

Humans can also cause disasters. Hazardous materials emergencies can include situations like chemical spills, groundwater contamination and train explosions similar to the situation in the community of Lac-Mégantic, Quebec in 2013. Workplace fires are more common, causing both significant property damage and loss of life. Communities are also vulnerable to threats posed by extremist groups who use violence against both people and property. High-risk targets include military and civilian government facilities, international airports, large cities and high-profile landmarks. Cyber-terrorism involves attacks against computers and networks done to intimidate or coerce a government or its people for political or social objectives.

Phases of a Disaster

The U.S. National Governor's Association designed a four-phase model to help emergency managers prepare for and respond to disasters, also known as the "life cycle" of comprehensive emergency management: 1) mitigation; 2) preparedness; 3) response; and 4) recovery. The model is useful to frame issues related to disaster preparedness as well as economic and business recovery after a disaster.

MITIGATION	PREPAREDNESS
Pre-Disaster Mitigation Efforts	Education, Outreach and Training Business Continuity and Emergency Management Planning
RESPONSE	RECOVERY
Immediate Response to Stakeholders Establish Business Recovery Centre	Develop and Implement Post-Disaster Economic Recovery Plan

Mitigation

Mitigation involves steps to reduce vulnerability to disaster such as injuries, loss of life and property. This might involve changes in local building codes to fortify buildings; revised zoning and land use management; strengthening of public infrastructure; and other efforts to make the community more resilient to a catastrophic event.

Preparedness

Preparedness focuses on understanding how a disaster might impact the community and how education, outreach, and training can build capacity to respond to and recover from a disaster. This may include business continuity training, pre-disaster strategic planning, and other logistical readiness activities.

Response

Response addresses immediate threats presented by the disaster, including saving lives, meeting humanitarian needs (e.g. food, shelter, clothing, public health and safety), cleanup, damage assessment, and the start of resource distribution.

- **Triage efforts** assess the most pressing emergency issues. This period is often chaotic and can last a month or more, depending on the nature of the disaster and the extent of damage. Federal resources, such as action from the Canadian military (in the case of a major disaster) and non-profit resources such as the Canadian Red Cross, Salvation Army and Samaritans Purse are deployed immediately.

- **Business re-entry** into the economy begins during this phase. Businesses may initially face issues with access to their sites, preliminary damage assessment, and communications with staff, vendors, suppliers, and customers. Ongoing issues may include access to capital and workers, repair of damaged property or inventory, and a diminished customer base. It is often in this phase that the medium- and long-term health of a region's business community will be saved or lost.

- **Business Recovery Centres** are quickly set up in a community to centralize small business resources (e.g., those provided by CRA, Industry Canada etc.), local bank officers, technical assistance providers, and other assistance critical to maintaining business continuity.

- **Federal resources** as well as provincial programs start to arrive; temporary housing goes up; and planning for the reconstruction of damaged infrastructure, facilities, and areas begins. The response phase typically continues through the sixth month, again depending on the nature of the disaster.

As the response period progresses, focus is shifted from dealing with emergency issues to conducting repairs, restoring utilities, establishing operations for public services (including permitting), and finishing the cleanup process.

It is not uncommon for disasters to reveal a weakened economic development landscape, with significant gaps in regional alignment, organizational capacity, staff, and resources. Economic development agencies and stakeholders may need to rebuild and may need additional staff, capacity building assistance and training.
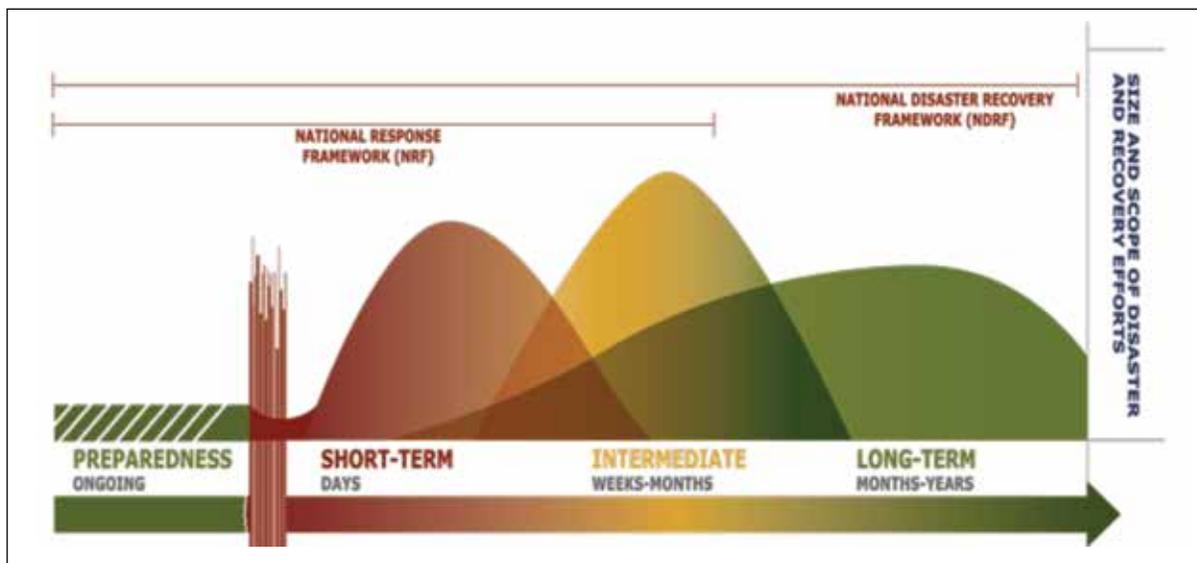
Recovery

Recovery is the restoring of all aspects of the disaster's impact on a community. Communities must access and deploy a range of public and private resources to enable economic recovery. By this time, the impacted region has achieved a degree of physical, environmental, economic, and social stability.

Individuals and businesses move from temporary to permanent homes, while major reconstruction moves forward.

The recovery phase can be broken into two periods. The short-term phase typically lasts from six months to at least one year, while the long-term phase can take decades for the community's economy to return to some sense of normalcy. Long-term financing is critical as businesses adapt to a new environment, sometimes changing their business models. They may need to recruit and train a new workforce and find new customers and vendors. Investment in economic development capacity building becomes essential to foster economic diversification, attain new resources, build new partnerships, and implement effective recovery strategies and tactics.

It is important to understand that long-term business recovery and ultimately resiliency can take years even with strategic management. The following chart from FEMA's *National Disaster Recovery Framework* illustrates this:

For more specific details refer to *Resource Appendix 10*.

The Nature of Disasters

While the provincial and federal governments have a significant role in disaster response and recovery, it is important to remember that all disasters are local. They disrupt the physical, social, and economic landscape of neighbourhoods, towns, cities, counties, and regions. While some disasters such as hurricanes and flooding may provide some level of advanced warning, other events such as tornadoes or a terrorist attack provide little to no warning. They often catch communities off guard, requiring a high level of coordination between all levels of government to respond to the event.

In Canada, emergency management adopts an all-hazards approach to address both natural and human-induced hazards and disasters. These are increasing in both number and frequency across the world, resulting in ever growing human suffering and economic cost. Canada is not immune to these events. Natural and human-induced hazards and disasters have become more prevalent in urban and rural communities. Terrorist attacks on western targets are likely to persist. These events can have profoundly negative effects on Canadians.

Most emergencies in Canada are local in nature and are managed by the municipalities or at the provincial or territorial level. Moreover, accumulating risks associated with factors such as increased urbanization, critical infrastructure dependencies and interdependencies, terrorism, climate change, environmental change, animal and human diseases and the heightened movement of people and goods around the world have increased the potential for various types of catastrophes. Such events could transcend geographic boundaries to challenge emergency management, including response.

The ultimate purpose of emergency management is to save lives, preserve the environment and protect property and the economy. The protection of life is of paramount importance. In the broadest sense, emergency management raises the understanding of risks and contributes to a safer, prosperous, sustainable, disaster resilient society in Canada. Emergency management is comprised of four interdependent components as follows:

Prevention and Mitigation– to eliminate or reduce the risk of disasters in order to protect lives, property, the environment, and reduce economic disruption. Prevention/mitigation includes structural measures

(e.g. construction of floodways and dykes) and non-structural measures (e.g. building codes, land-use planning, and insurance incentives). Prevention and mitigation may be considered independently or one may include the other.

Preparedness– to be ready to respond to a disaster and manage its consequences through measures taken prior to an event, for example emergency response plans, mutual assistance agreements, resource inventories and training, equipment and exercise programs.

Response– to act during or immediately before or after a disaster to manage its consequences through, for example, emergency public communication, search and rescue, emergency medical assistance and evacuation to minimize suffering and losses associated with disasters.

Recovery– to repair or restore conditions to an acceptable level through measures taken after a disaster, for example return of evacuees, trauma counseling, reconstruction, economic impact studies and financial assistance. There is a strong relationship between long-term sustainable recovery and prevention and mitigation of future disasters. Recovery efforts should be conducted with a view towards disaster risk reduction.

These four interdependent components may be undertaken sequentially or concurrently, but they are not independent of each other. Emergency management in provincial, territorial and federal (FPT) governments adopts a comprehensive all-hazards approach to coordinate and integrate prevention and mitigation, preparedness, response and recovery functions to maximize the safety of Canadians. Ensuring a strong and seamless relationship across these components and with appropriate emergency management partners is critical to effective emergency management.

Traditionally, emergency management in Canada has focused on preparedness and response. It is now recognized that addressing the modern hazardscape requires FPT governments to deal with specific risks, hazards and vulnerabilities through prevention and mitigation as well recovery measures. Greater attention or investment in prevention and mitigation can prevent disasters or significantly reduce the social, economic and environmental costs and damages when events occur. Forward looking recovery measures allow

communities not only to recover from recent disaster events, but also to build back better in order to help overcome past vulnerabilities.

Effective implementation of the four emergency management components should be informed by robustness, redundancy, self-organization, and efficiency, which are key attributes of community resilience. Neither the emergency management components nor the attributes of community resilience should be seen as static end-states. Community resilience requires an emphasis on adaptability and flexibility guided by the principles outlined in the *Emergency Management Framework for Canada*[7]. For more details, see Chapter VIII on Navigating the Federal System.

Government's Responsibility in Response and Recovery

Local Government

Depending on the severity and magnitude of the disaster, the recovery process is likely to take months and years to bring the community back to some sense of normalcy. While provincial and federal government agencies can bring significant resources to a crisis, local government has the most knowledge of local assets and public management systems, as well as relationships with the impacted constituents.

Residents and businesses look to their local governmental leaders to lead the immediate response efforts as well as to support long-term recovery initiatives, particularly if they have trusted relationships with them. Community and business leaders are also the most invested in the long-term concern of the affected area.

Local government is responsible for providing the first level of response in emergency management. Local government assesses the local situation and activates an Emergency Operations Centre (EOC) following a major incident, which serves as the primary location where key decision makers gather information about the incident in order to manage the entire disaster response, including the facilitation of field operations for emergency service and disaster personnel. If the magnitude of the disaster exceeds the resources of the local community, the local government may request assistance from their provincial or territorial government.

Provincial and Territorial Governments

After a major disaster, the premier of the impacted province and territory plays a key role in determining if the severity and magnitude of the disaster is beyond the capabilities of the province and affected local government and requires federal assistance. As local communities report on damage and impact, their role is to commit resources to assist local jurisdictions in responding to the incident.

This may include activating a provincial or territorial "crisis action team," assessing the situation by determining all the jurisdictions involved in the crisis and how they will be impacted, identifying activities for immediate response, and determining whether or not to activate the Emergency Public Information procedures such as the Emergency Alert System or setting up a joint information centre. Depending on the magnitude of the disaster, the Premier's office may take steps to declare an emergency or disaster and request federal assistance.

Beyond the local community, provincial or territorial governments have a responsibility to respond to the emergency needs of its citizens. To do this, each government works in concert with local governments, voluntary agencies, business/industry, and others in the community to develop an all hazards Emergency Operations Plan (EOP). Should the severity of an emergency and/or disaster be at a level that will require a coordination of provincial as well as local government resources, the Premier of a province may declare a state of emergency, activating the province's EOP. Once a state of emergency has been declared, the full resources of the province can be accessed in order to respond to the incident.

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[7] http://www.publicsafety.gc.ca/cnt/rsrcs/pblctns/mrgnc-mngmnt-frmwrk/index-eng.aspx

Federal Government

When disasters cause so much damage that they exhaust all local and provincial resources, it is time for the federal government to play a critical role in disaster relief and recovery.

National Disaster Recovery Framework

Unlike the U.S., Canada does not have a National Disaster Recovery Framework. In the EDRP Summary Report, there is a recommendation that Canada should develop a more coordinated approach between all levels of governments. This could eventually lead to a National Disaster Recovery Framework in Canada.

The U.S. National Disaster Recovery Framework (NDRF) recommends local governments and tribes appoint a Local Disaster Recovery Manager or a Tribal Disaster Recovery Coordinator. One of their responsibilities should include participation in conducting impact or assessment studies. The NDRF sets up six Recovery Support Functions (RSFs) for federal agencies, including one for Community Planning and Capacity Building that is coordinated by FEMA. Among the designated roles of the Community Planning and Capacity Building RSF's many functions is to identify the "range and significance of the disaster's effects on Tribes, regions, and local governments in the impacted area. Additionally, the Infrastructure Systems RSF will participate in coordinating damage assessments when appropriate. Where possible, EDOs should seek to be involved in the assessment process to ensure that business and industry data is properly collected.

Public Safety takes the lead role in coordinating federal resources for immediate response and cleanup, but it also can enlist other departments to provide additional relief support in the early stages of a major disaster.

Public Safety defines partnerships in the following way:

All Canadians are involved in emergency management. Individual citizens, communities, municipalities, and federal, provincial, territorial governments, Aboriginal peoples, emergency first responders, the private sector (both business and industry), volunteer and non-governmental organizations, academia, as well as international organizations and allies may be involved in emergency management. Good partnerships based on effective collaboration, coordination and communication are key components of FPT emergency management systems[8].

For more detailed information on the roles and responsibilities of the federal government, refer to Chapter VIII, Navigating the Federal System.

Role of the EDO-Connecting the Public and Private Sector

Economic development organizations (EDOs) may be a division of local government or may have public officials on their board of directors. In some cases, they are incorporated as a non-profit agency. Regardless of their structure, they serve as an intermediary between local government leadership and the private sector.

A key role for EDOs in the response and recovery stages is to help facilitate effective communication between the public and private sectors. Communication on such important subjects as availability of power, access to transportation networks and facilities, temporary facility space for displaced businesses and other issues is a critical activity in the initial days and weeks after a disaster.

In recent disasters, many U.S. communities are ensuring an EDO representative sits at the EOC to help facilitate this critical communication. This is something Canadian communities should look to replicate. The EDO may also choose to form an economic recovery team, like in the case in Polk County (2004) or Cedar Rapids (2008) as a focal point for information sharing between emergency management personnel, corporate leaders, and local business owners. These economic recovery teams aggregate information on damage to businesses and the local economy, and help to develop long-term strategies for economic recovery. They also may be involved in helping to establish a business recovery centre to serve impacted local businesses.

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8 http://www.publicsafety.gc.ca/cnt/rsrcs/pblctns/mrgnc-mngmnt-frmwrk/index-eng.aspx

While the short-term recovery focus for local government is often on debris removal, permitting as well as restoring power, the community will start to be concerned with activities that bring some sense of normalcy, including the redevelopment of infrastructure and property. As the community moves into phases of long-term recovery, local government plays a critical role in creating a disaster recovery plan for the impacted area with significant involvement by residents, businesses, and other local constituents. It also continues to monitor community impact, identify priority projects and communicate long-term recovery needs to provincial and federal officials, as well as assist with grant compliance for all provincial funding.

Economic recovery is a critical area of focus for recovery as many community leaders have suggested that getting the local economy operational helps to spur community recovery. Without jobs and income, few residents will remain in the affected area. Local businesses need to open their doors as quickly as possible, local workers need access to those facilities, and all of the public services, infrastructure and utilities that help support business activity need to be operational to facilitate the movement of people, goods and services. Local government, utilities, and public safety personnel need to partner with local businesses and their intermediaries to make all of this happen.