

# Appendices

## Appendix 1 (NHC 2015)

Category	Winds (1-min sustained winds in mph, kt, and km/h)	Summary	People, livestock, and pets	Mobile homes	Frame homes	Apartments, shopping centers, and industrial buildings	High-rise windows and glass	Signage, FENCES, AND CANOPIES	Trees	Power and Water	Example
1	74–95 mph	<i>Very dangerous winds will produce some damage</i>	People, livestock, and pets struck by flying or falling debris could be injured or killed.	Older (mainly pre-1994 construction) mobile homes could be destroyed, especially if they are not anchored properly as they tend to shift or roll off their foundations. Newer mobile homes that are anchored properly can sustain damage involving the removal of shingle or metal roof coverings, and loss of vinyl siding, as well as damage to carports, sunrooms, or lanais.	Some poorly constructed frame homes can experience major damage, involving loss of the roof covering and damage to gable ends as well as the removal of porch coverings and awnings.	Some apartment building and shopping center roof coverings could be partially removed.	Windows in high-rise buildings can be broken by flying debris.	There will be occasional damage to commercial signage, fences, and canopies.	Large branches of trees will snap and shallow rooted trees can be toppled.	Extensive damage to power lines and poles will likely result in power outages that could last a few to several days.	Hurricane Dolly (2008) is an example of a hurricane that brought category 1 winds and impacts to south Padre Island, Texas.
	64–82 kt										
	119–153 km/h										
					Unprotected windows may break if struck by flying debris. Masonry chimneys can be toppled. Well-constructed frame homes could have damage to roof shingles, vinyl siding,	Industrial buildings can lose roofing and siding especially from windward corners, rakes, and eaves. Failures to overhead doors and unprotected windows will be common.	Falling and broken glass will pose a significant danger even after the storm.				

2	96–110 mph 83–95 kt	<i>Extremely dangerous winds will cause extensive damage</i>	There is a substantial risk of injury or death to people, livestock, and pets due to flying and falling debris.	Older (mainly pre-1994 construction) mobile homes have a very high chance of being destroyed and the flying debris generated can shred nearby mobile homes. Newer mobile homes can also be destroyed.	soffit panels, and gutters. Failure of aluminum, screened-in, swimming pool enclosures can occur.	Poorly constructed frame homes have a high chance of having their roof structures removed especially if they are not anchored properly. Unprotected windows will have a high probability of being broken by flying debris. Well-constructed frame homes could sustain major roof and siding damage. Failure of aluminum, screened-in, swimming	There will be a substantial percentage of roof and siding damage to apartment buildings and industrial buildings. Unreinforced masonry walls can collapse.	Windows in high-rise buildings can be broken by flying debris. Falling and broken glass will pose a significant danger even after the storm.	Commercial signage, fences, and canopies will be damaged and often destroyed.	Many shallowly rooted trees will be snapped or uprooted and block numerous roads.	Near-total power loss is expected with outages that could last from several days to weeks. Potable water could become scarce as filtration systems begin to fail.	Hurricane Frances (2004) is an example of a hurricane that brought category 2 winds and impacts to coastal portions of Port St. Lucie, Florida with category 1 conditions experienced elsewhere in the city.
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Category	Winds (1-min sustained winds in mph, kt, and km/h)	Summary	People, livestock, and pets	Mobile homes	Frame homes	Apartment, shopping centers, and industrial buildings	High-rise windows and glass	Signage, FENCES, AND CANOPIES	Trees	Power and Water	Example	
3	111–129 mph	<i>Devastating damage will occur</i>	There is a high risk of injury or death to people, livestock, and pets due to flying and falling debris.	Nearly all older (pre-1994) mobile homes will be destroyed. Most newer mobile homes will sustain severe damage with potential for complete roof failure and wall collapse.	Poorly constructed frame homes can be destroyed by the removal of the roof and exterior walls. Unprotected windows will be broken by flying debris. Well-built frame homes can experience major damage involving the removal of roof decking and gable ends.	There will be a high percentage of roof covering and siding damage to apartment buildings and industrial buildings. Isolated structural damage to wood or steel framing can occur. Complete failure of older metal buildings is possible, and older unreinforced masonry buildings can collapse.	Numerous windows will be blown out of high-rise buildings resulting in falling glass, which will pose a threat for days to weeks after the storm.	Most commercial signage, fences, and canopies will be destroyed.	Many trees will be snapped or uprooted, blocking numerous roads.	Electricity and water will be unavailable for several days to a few weeks after the storm passes.	Hurricane Ivan (2004) is an example of a hurricane that brought category 3 winds and impacts to coastal portions of gulf shores, Alabama with category 2 conditions experienced elsewhere in this city.	
												Apartment, shopping centers, and industrial buildings
												Frame homes
4	130–156 mph	<i>Catastrophic damage will occur</i>	There is a very high risk of injury or death to	Nearly all older (pre-1994) mobile homes will be	Poorly constructed homes can sustain	There will be a high percentage of structural	Most windows will be blown out of high-rise	Nearly all commercial signage, fences, and	Most trees will be snapped or uprooted	Power outages will last for weeks to possibly	Hurricane Charley (2004) is an example of a	
												People, livestock, and pets

		<p>people, livestock, and pets due to flying and falling debris.</p>	<p>destroyed. A high percentage of newer mobile homes also will be destroyed.</p>	<p>complete collapse of all walls as well as the loss of the roof structure. Well-built homes also can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Extensive damage to roof coverings, windows, and doors will occur. Large amounts of windborne debris will be lofted into the air.</p>	<p>damage to the top floors of apartment buildings. Steel frames in older industrial buildings can collapse. There will be a high percentage of collapse to older unreinforced masonry buildings.</p>	<p>buildings resulting in falling glass, which will pose a threat for days to weeks after the storm.</p>	<p>canopies will be destroyed.</p>	<p>and power poles downed.</p>	<p>months. Long-term water shortages will increase human suffering. Most of the area will be uninhabitable for weeks or months.</p>	<p>hurricane that brought category 4 winds and impacts to coastal portions of Punta Gorda, Florida with category 3 conditions experienced elsewhere in the city.</p>
<p>113–136 kt 209–251 km/h</p>	<p>Windborne debris damage will break most unprotected windows and penetrate some</p>	<p>Fallen trees and power poles will isolate residential areas.</p>								

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Category	Winds (1-min sustained winds in mph, kt, and km/h)	Summary	People, livestock, and pets	Mobile homes	Frame homes	Apartments, shopping centers, and industrial buildings	High-rise windows and glass	Signage, FENCES, AND CANOPIES	Trees	Power and Water	Example
5	157 mph or higher	<i>Catastrophic damage will occur</i>	People, livestock, and pets are at very high risk of injury or death from flying or falling debris, even if indoors in mobile homes or framed homes.	Almost complete destruction of all mobile homes will occur, regardless of age or construction.	protected windows. A high percentage of frame homes will be destroyed, with total roof failure and wall collapse. Extensive damage to roof covers, windows, and doors will occur. Large amounts of windborne debris will be lofted into the air.	Significant damage to wood roof commercial buildings will occur due to loss of roof sheathing. Complete collapse of many older metal buildings can occur.	Nearly all windows will be blown out of high-rise buildings resulting in falling glass, which will pose a threat for days to weeks after the storm.	Nearly all commercial signage, fences, and canopies will be destroyed.	Nearly all trees will be snapped or uprooted and power poles downed.	Power outages will last for weeks to possibly months. Long-term water shortages will increase human suffering. Most of the area will be uninhabitable for weeks or months.	Hurricane Andrew (1992) is an example of a hurricane that brought category 5 winds and impacts to coastal portions of cutler ridge, Florida with category 4 conditions experienced elsewhere in south Miami-Dade County.
	137 kt or higher 252 kph or higher			Windborne debris damage will occur to nearly all unprotected windows and many	Most unreinforced masonry walls will fail which can lead to the collapse of the buildings. A			Fallen trees and power poles will isolate residential areas.			



## **Appendix 2: Focus Group Discussion Themes and Questions**

### ***Demographic***

*The purpose of this section is to understand the structure and composition of the studied population.*

- Age bracket
- Education level
- Employment status
- Job satisfaction
- Single/Married/Relationship
- Members in the household and relationship with them
- Type of dwelling
- Years in Canada
- English language proficiency

### ***Theme 1: Risk Exposure***

- Exposure to risk (river, power plant, railway, chemical plant etc.)?
- Level of safety

### ***Theme 2: Vulnerability***

- Personal experienced with hazardous event
- Importance of preparedness for unforeseen hazards
- In case of emergency, do you have the resources to cope?
- Main and most frequent source of transportation
- Challenges faced as an immigrant

### ***Theme 3: Resiliency/Capacity***

- Health status
- Disability if any
- List of items at home to cope with an emergency
- Awareness of community programs that are beneficial to my healthy living, happiness, and safety
- Participate in cultural events within the community
- Sense of belonging within the community

- Importance of socializing
- Interest in local government
- Interest in voting in municipal elections
- Satisfaction with municipal political representatives

### **Appendix 3<sup>1</sup>: Questionnaires to Assess the Impact of the CTLC Pilot Project in Pakistan**

#### Questionnaire for CTLC Graduates

- Which one of the following would you select?
- Does the course help you in your daily life?
- What do you believe about getting support from your family and friends in moving forward?
- What was the attitude of your parents and friends when you told them that you wanted to do something for yourself and your family?
- Select any one which you think is appropriate and suits your thinking:
- Are you using computer skills in your daily life learned from this course?
- If you are offered a job in another city what will be your reaction?
- If you wanted to do anything to achieve something in your life and you think you are 100% right but your family discourages you, what would be your next step?
- What is your opinion about getting support of parents/husband/brother for women to move forward?
- You are helpful for girls like yourself; who don't have eagerness and potential to do something in life.
- Has this course changed your personality?
- Has this course changed your way of life?
- Select any one which you think is appropriate.
- *Questionnaire for Parents/Relatives (as Respondents) of the CTLC Graduates*
- Do you think that the level of confidence of your daughter/sister/relative has increased after this course?
- What is the learner's level of confidence after this course?
- Do you observe any change in her attitude and behavior?
- Do you feel any change in her knowledge and information?
- Can she now speak up and express herself? Select any one which you think is appropriate and suits your thinking:
- Is there any change in her motivation and commitment towards her studies after this course?
- Is she sensitive and demanding about her rights?

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- Can she take initiatives independently?
- Do you think that without your support she can move forward and grow?
- Do you think she can achieve her goals in life?
- Is she utilizes her time productively and positively after this course?
- Does she now motivate and guide her younger brother/sister after this course?
- Is there any change in her capabilities, abilities, intelligence?
- Has she become a source of inspiration for other girls in your surrounding/family after this course?
- What do you think about C.T.L.C?

#### Appendix 4: Disaster Myth and Reality (Alexander 2002)

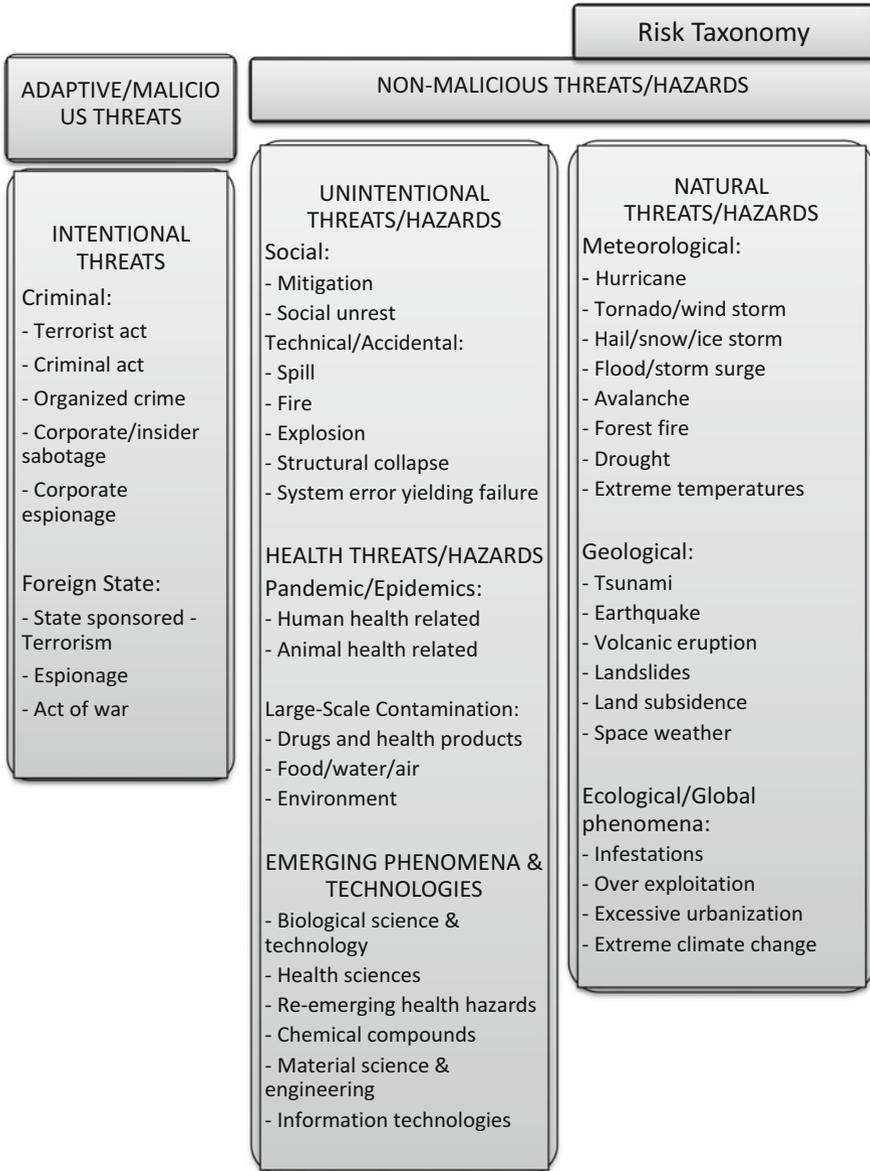
- *Myth: After a disaster, survivors tend to be dazed and apathetic.*
  - **Reality:** Survivors rapidly get to work on the clear-up. Activism is much more common than fatalism. In the worst possible cases only 15–30% of victims show passive and dazed reactions.
- *Myth: Looting is a common and serious problem after disasters*
  - **Reality:** The phenomenon of looting is rare and limited in scope. It mainly occurs when there are strong preconditions . . . as when a community is already deeply divided.
- *Myth: Disasters give rise to spontaneous displays of antisocial behavior.*
  - **Reality:** Generally, they are characterized by great social solidarity, generosity and self-sacrifice, perhaps even heroism.
- *Myth: Any kind of aid and relief is useful after disaster, provided that it is supplied quickly enough.*
  - **Reality:** Hasty and ill considered relief initiatives tend to create chaos. Only certain types of technical assistance, goods and services will be required. Not all useful resources that existed in the area before the disaster will be destroyed. Donation of unusable materials or manpower consumers' resources of organization and accommodation that could more profitably be used to reduce the toll of the disaster.
- *Myth: People will flee in large numbers from a disaster.*
  - **Reality:** Usually there is a “convergence reaction” and the area fills up with people. Few of the survivors will leave and even obligatory evacuations will be short-lived.

## Appendix 5

Values for *Frequency (F)*, *Consequences (C)*, and *Changing Risk (CR)* for most hazards listed in the HIRA document (HIRA 2012)

Hazard	F	C	CR	Hazard	F	C	CR
Hazardous materials incident	6	6	4	Nuclear facility emergency	2	6	2
Flood	6	5	4	Terrorism/CBRNE	3	4	2
Forest/wildland fire	5	6	4	Windstorm	6	2	2
Freezing rain	5	6	4	Building/structural collapse	5	2	1
Snowstorm/blizzard	6	5	4	Drought/low water	5	2	3
Tornado	5	6	3	Radiological emergency	2	4	1
Drinking water emergency	6	4	4	Cyber attack	2	3	2
Human health emergency	4	6	2	Earthquake	1	6	2
Oil/natural gas emergency	6	4	2	Fog	3	2	1
Explosion/fire	6	3	4	Hail	3	2	2
Geomagnetic storm	3	5	3	Mine emergency	3	2	1
Transportation emergency	5	3	4	Natural space object crash	1	6	1
Agricultural and food emergency	4	3	3	Special event	6	1	1
Dam failure	4	3	3	Lightning	6	1	1
Civil disorder	6	2	3	Energy emergency (supply)	4	1	2
Critical infrastructure failure	6	2	2	Land subsidence	2	2	1
Extreme temperatures	4	3	2	Sabotage	3	1	1
Hurricane	4	3	4	War and international emergency	2	1	2
Landslide	4	3	2	Erosion	1	1	2

# Appendix 6



## Appendix 7

### Risk event scenario description template

<b>Risk event scenario description</b>	
<b>Risk event scenario description</b>	
<b>Risk event name/title:</b>	<i>Baseline description used to evaluate both likelihood and impact. In areas where likelihood and impact should be considered and scored, text should be marked with (L) for likelihood and (I) for impact. This is suggested for text that is embedded in descriptions and not obvious to the reader.</i>
Applicable risk code(s) for the principal constituent threat or hazard (including the category (ies) of the standard AHRA risk taxonomy affected):	<i>Please refer to the AHRA taxonomy, annex 3.</i>
Applicable risk code(s) for the secondary threat (s) or hazards (s) (including the category(ies) of the standard AHRA risk taxonomy affected):	<i>This field is optional and related to risks that have secondary effects, such as floods that occur after a hurricane.</i>
<b>Primary department (for response):</b>	<i>The Federal Emergency Response Plan (2011) describes the primary department as a federal government institution with a mandate related to a key element of an emergency. Several federal government institutions may be designated as primary departments, depending on the nature or severity of the emergency.</i>
<b>Supporting department (for all EM components):</b>	<i>According to the Federal Emergency Response Plan (2011), a supporting department is a federal government institution that provides general or specialized assistance to a primary department in response to an emergency.</i>
Key information sources for the risk event scenario description - please tag the information as <i>Unclassified (U)</i> or <i>Classified (C; S; TS; TS SA)</i> :	<i>Identification of supporting documentation is important, especially in cases where qualitative and/or quantitative data supports scores decided upon during the risk scoring workshop. This ensures credibility and legitimacy of risk scores. In addition, reference can be made back to decision points at any point in time and by anyone. Clearly identify unclassified and classified information, for ease of reference when assessing likelihood components for malicious threats.</i>
<b>Risk event description</b>	
<b>Description (context, setting, cause, source, nature, scale), of the risk event:</b>	<i>The description entered here must be plausible in that factual information would support such an occurrence. The considered time-frame from which events are considered in the AHRA process is short-term (within the next 5 years) threats/hazards. Long-term threats/hazards (that span 5–25 years into the future)</i>

(continued)

	<p><i>are not currently considered in the AHRA. Background information leading up to the risk event provides context to the scenario without making broad assumptions which may skew results during the risk scoring workshop. Information inserted in this area should take into consideration the assessment of the following impact categories: People, Environment, Economic, Territorial Security, Canada's Reputation and Influence and Society and Psycho-Social.</i></p>
Description of the lead-up to the incident, consisting of the (underlying) cause and any underlying insidious process:	<i>This section is optional.</i>
Geographical considerations (location, geographical extent, region):	<i>This section is optional. Geographical coordinate system (latitudinal and longitudinal lines), country, province, territory or region is to be included in this section.</i>
<b>Natural environment:</b>	<i>Relevant physical or environmental characteristics are inserted in this area facilitating the assessment of the environmental impact category.</i>
<b>Meteorological conditions:</b>	<i>Relevant meteorological condition(s) that influence the outcome of the scenario should be inserted in this area. If applicable variants may be inserted in this area.</i>
Seasonal:	<i>This section is optional and left to the discretion of the scenario developers. Dependent on the scenario, seasonal changes may influence the outcome of assessment of a particular risk.</i>
Hazard characteristics:	<i>Characteristics of chemical, biological, radiological and/or nuclear agent(s) involved in the scenario are inserted in this area. Elements captured should relate to: Toxicity, transmissibility, behaviour, fate and persistence to indicate a hazard severity and duration.</i>
<b>Nature and vulnerability of the affected area (context, population density, degree of urbanisation, key infrastructure, economic considerations, political considerations, etc.):</b>	<i>This area is important to note as it provides relevant information from which subject matter experts score risks. Population density, degree of urbanisation and key infrastructure influence the people and possibly the society and psycho-social impact category. Economic considerations affect the economic impact category. Political, geographical and territorial considerations influence Canada's reputation and influence and territorial security impact categories.</i>
Any other relevant assumptions made in describing the risk event scenario:	<i>If assumptions relating to the risk event description can be identified or isolated they should be inserted in this area. Although this</i>

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	<i>field is considered optional, the information may still be required in the risk scoring tool.</i>
Uncertainty or variability in the risk event description:	<i>If there are areas of uncertainty or unpredictability, it should be inserted in this area. Although this field is considered optional, information may be required in the risk scoring tool.</i>
Other relevant information, notes or comments:	<i>Any other relevant information relating to the risk event description should be identified in this area.</i>
<b>Likelihood assessment</b>	
<b>Time period/time horizon during which the risk event might be realised:</b>	<i>The translation of the data in likelihood of occurrence on a yearly basis will be done in the risk scoring tool.</i>
Uncertainty in the likelihood assessment:	<i>Unknown factors which would influence the likelihood assessment should be inserted in this area.</i>
Other relevant information, notes or comments:	<i>Any other relevant information relating to the primary likelihood assessment should be inserted in this area.</i>
<b>Impacts/consequences assessment</b>	
<b>Impact categories: Nature and scale</b>	
<b>1. People:</b>	<i>Specific indicators have been selected to evaluate the effect of hazards and threats on people. Estimated figures should be inserted in this box e.g. the number of fatalities, serious injuries, etc.</i>
<b>2. Economy:</b>	<i>Based on the Department of Finance Canada's criteria of risks and hazards on the economy. This impact category captures direct and indirect losses. Direct losses are immediate economic damage as a result of a risk event. Losses are measured based on repair or replacement costs. Indirect losses refer to the flow of goods and services which will not be produced as a result of damage to productive assets and infrastructure.</i>
<b>3. Environment:</b>	<i>Based on the indicators developed by public safety Canada, in close collaboration with Environment Canada, on the effects of hazards and threats on the environment.</i>
<b>4. Territorial security:</b>	<i>Based on indicators that capture conditions in which there is a loss in the ability of the Government of Canada to secure the territory or the border and to secure the safety of citizens.</i>
<b>5. Canada's reputation and influence:</b>	<i>Based on expert assessment of the potential international reaction to an emergency event occurring in Canada, or involving Canadians abroad.</i>

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<b>6. Society and psychosocial:</b>	<i>Based on indicators regarding public outrage and public anxiety, as well as social actions, such as protests, civil disturbances or vandalism, can be provoked by a risk event.</i>
Uncertainty in the impacts/consequences assessment:	<i>Uncertainty, unpredictability or areas of doubts relating to the impacts/consequences assessment should be inserted in this area.</i>
Other relevant information, notes or comments:	<i>Other relevant information relating to the impacts/consequences assessment should be inserted in this area.</i>
<b>Preliminary risk treatmentplanning</b>	
Baseline risk treatment plan (treatment actions, timeframe(s), readiness, etc.):	<i>This area is optional. Federal institutions may choose to fill it out after the completion of the risk scoring workshop. This area would assess the capacity of the emergency support functions (ESF).</i>
<b>Risk treatment measures already in place</b>	<i>As the AHRAtakes into consideration mitigation measures in place when assessing the likelihood of occurrence and the impacts of a risk, (all or some of) these measures should be clearly captured somewhere in the risk event scenario template. This will force divisions which “own” mitigation measures (usually Program divisions) to share their information with EM divisions (usually under GOC, Operations or Corporate Branches).</i>
Degree to which the risk (likelihood, impacts) can be reduced by risk treatment.	<i>This area may be completed by departments and agencies. This area would assess the capacity of the ESF.</i>
Additional risk treatment resources required.	<i>Additional information relating to risk treatment may be inserted in this area.</i>
Other relevant information, notes or comments:	<i>Other relevant information should be inserted in this area.</i>

## Appendix 8

Economic category assessment tool – direct and indirect economic loss for repair or replacement

Direct Economic Loss (those involving damages to stock and assets occurring at the time of the disaster or soon after)

**Buildings:** e.g. industrial, commercial, institutional (plants, offices, recreational facilities, hospitals).

**Infrastructure:** e.g. roads, water systems, irrigation, docks, terminals, other transportation, electric power, oil and gas engineering.

**Machinery and equipment:** e.g. computers and software, agricultural and industrial machinery, furniture, trucks, etc.

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**Residential housing and contents.**

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**Raw materials:** e.g. coal, crude oil, natural gas, grains, animals and animal products, wood, ferrous, non-ferrous, non-metallic.

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Indirect economic loss (those involving a loss in the flow of production of goods and services which begin after the disaster and may extend through the reconstruction period)

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**Production or service provision losses** due to the full or partial paralysis of productive activities: e.g. loss in industrial production due to damage to factories or shortages of raw materials/energy supplies, loss in agricultural production due to flooding or prolonged drought, loss of profits in the fishing and tourism industry following an oil spill, loss of production due to illness following a pandemic or listeriosis outbreak, etc.

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**Higher operational costs** due to destruction of physical infrastructure and inventories or losses to production or income: e.g. a ban on beef and cattle exports would first translate into higher maintenance costs due to rising inventory of live animals.

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**Lost production due to linkage effects:** e.g. destruction of a factory reduces the economic activities of suppliers who have no alternative markets.

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Additional **costs incurred due to the need to use alternative means** of production or provision of essential services: e.g. costs arising out of need to use alternative roads or transportation means due to damage to principal routes and critical infrastructures.

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**Costs of required government response** due to emergency and rescue operations: e.g. overtime payments to provide emergency assistance and repair critical infrastructure, additional expenses incurred to accommodate evacuees or for investigation, productivity loss induced from distortion of government resources and time allocation, etc.

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Mitigating factors, if applicable (disasters sometimes involve indirect benefits or adjustments over the short-medium term which we may want to flag)

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**Shift in consumer demand/spending:** e.g. following a BSE outbreak, demand for other types of meat may increase.

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**Change in the productivity of assets:** e.g. following a flood, land productivity sometimes rises.

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**Labour reallocation:** e.g. some workers could work longer or harder to make up for the shortfall in labour supply due to a pandemic outbreak.

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**Reconstruction activity:** e.g. rebuilding activities after a hurricane.

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## Appendix 9

Rating of the impact on Canada’s reputation and influence

Level	Actions	Political relations	Non-political relations
0–1.0 <b>insignificant</b>	Canadian missions abroad are not affected.	Trade regulations slow Canadian exports into some minor foreign markets but are not stopped.	No effect on international events.
	Concentrated and short-lived condemnation of Canada/Government of Canada.	Canadian mission staff are not affected.	International travel is discouraged to one region within Canada by foreign governments.

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Level	Actions	Political relations	Non-political relations
		Bilateral trade agreements are temporarily suspended.	
	Canadians abroad are not affected.	International working level meetings are delayed.	
<b>1.0–2.0 minor damage to Canadian reputation</b>	Canadian missions abroad receive threats but none materialize.	Temporary trade bans and/or sanctions are imposed by a few minor trading partners.	International conferences see fewer participants.
	Short-lived condemnation of Canada internationally.	Canadian mission staff exercises increased levels of vigilance.	International travel is discouraged to several regions within Canada by foreign governments.
		Canadians delayed at border crossings but visas are not imposed.	
	Threats issued to Canadians abroad but are unlikely.	Cancellation of meetings with minor international partners.	
Minor trade agreements are temporarily suspended.			
<b>2.0–3.0 significant damage to Canadian reputation/prestige</b>	Canadian missions abroad receive serious threats and are forced to close.	Trade bans and/or sanctions imposed by a few major and minor trading partners and trading blocs (United States, Japan, United Kingdom, China not included).	International events are forced to reschedule.
	Significant condemnation of Canada and/or the Government of Canada internationally.	Canadian mission staff leaves host country due to insecurity.	International travel to Canada is discouraged by foreign governments.
		Entry visa requirement imposed on Canadians travelling abroad.	
	The Government of Canada encourages citizens not to travel due to threats abroad.	Cancellation of bilateral meetings with major and minor international partners.	
Minor trade agreements are cancelled.			
<b>3.0–4.0 major damage to Canadian reputation/prestige</b>	Attempted invasion, occupation, and/or destruction of Canadian missions abroad.	Trade bans, embargoes, blockades and regulations imposed by some major and minor trading partners and trading	Significant international events are cancelled.
			International travel to Canada is discouraged

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Level	Actions	Political relations	Non-political relations
		<p>blocs (United States not included).</p> <p>Forced deportation of Canadian mission staff.</p>	<p>by international organizations such as the World Health Organization, the United Nations, American government, etc.</p>
	Wide-spread condemnation of Canada and/or the Government of Canada nationally and internationally.	<p>Denial of entry visas to a number of countries or the imposition of extreme fees (e.g. United Arab Emirates visa).</p> <p>Temporary suspension of trade agreements such as the north American free trade agreement.</p>	
	Persistent threats to Canadians abroad.	Cancellation of major and minor international delegations to Canada or the rejection of Canadian delegations to other countries.	
4.0–5.0 <b>severe damage to Canadian reputation/prestige</b>	Invasion, occupation, and/or destruction of Canadian missions abroad.	Trade bans, embargoes, blockades and regulations imposed by major and minor trading partners and trading blocs (ex: United States, Japan, United Kingdom, China, etc.).	<p>Refusal by major and minor Canadian partners to attend significant international events, such as the G8/20, Olympics, etc.</p> <p>Cancellation of major international events in Canada by event organizers (ex: International Olympic Committee, International Federation of Association</p>
			Football, la Francophonie, the commonwealth, etc.).
	Wide-spread and continuous condemnation of Canada and/or the Government of Canada nationally and internationally.	<p>Deportation, arrest and/or killing of Canadian mission staff.</p> <p>Denial of entry visas to many countries.</p> <p>Cancellation of Canadian trade agreements such as the north American free trade agreement.</p>	Ban on international travel to Canada. Ban on Canadians travelling overseas.
Threats to Canadians abroad materialise.	Canada is expelled from major security		

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Level	Actions	Political relations	Non-political relations
		<p>organizations such as the North Atlantic Treaty Organization.</p> <p>Relations between the Government of Canada and foreign governments cease.</p> <p>Public cancellation of major international visits (ex: State visit by the president).</p>	



**Risk Assessment Table**
**INSTRUCTIONS**

**Column 1:** Compile a list of assets (people, facilities, machinery, equipment, raw materials, finished goods, information technology, etc.) in the left column.

**Column 2:** For each asset, list hazards (review the "Risk Assessment" page from Ready Business) that could cause an impact. Since multiple hazards could impact each asset, you will probably need more than one row for each asset. You can group assets together as necessary to reduce the total number of rows, but use a separate row to assess those assets that are highly valued or critical.

**Column 3:** For each hazard consider both high probability/low impact scenarios and low probability/high impact scenarios.

**Column 4:** As you assess potential impacts, identify any vulnerabilities or weaknesses in the asset that would make it susceptible to loss. These vulnerabilities are opportunities for hazard prevention or risk mitigation. Record opportunities for prevention and mitigation in column 4.

**Column 5:** Estimate the probability that the scenarios will occur on a scale of "L" for low, "M" for medium and "H" for high.

**Columns 6-10:** Analyze the potential impact of the hazard scenario in columns 6 - 10. Rate impacts "L" for low, "M" for medium and "H" for high.

**Column 8:** Information from the business impact analysis should be used to rate the impact on "Operations."

**Column 10:** The "entity" column is used to estimate potential financial, regulatory, contractual, and brand/image/reputation impacts.

**Column 11:** The "Overall Hazard Rating" is a two-letter combination of the rating for "probability of occurrence" (column 5) and the highest rating in columns 6 - 10 (impacts on people, property, operations, environment, and entity).

Carefully review scenarios with potential impacts rated as "moderate" or "high." Consider whether action can be taken to prevent the scenario or to reduce the potential impacts.

# Appendix 11


**Business Impact Analysis Worksheet**

---

Department / Function / Process \_\_\_\_\_  
**Operational & Financial Impacts**

Timing / Duration	Operation Impacts	Financial Impact

**Timing:** Identify point in time when interruption would have greater impact (e.g., season, end of month/quarter, etc.)

**Duration:** Identify the duration of the interruption or point in time when the operational and/or financial impacts will occur.

- < 1 hour
- > 1 hr. < 8 hours
- > 8 hrs. < 24 hours
- > 24 hrs. < 72 hrs.
- > 72 hrs.
- > 1 week
- > 1 month

**Operational Impacts**

Considerations (customize for your business)

- Lost sales and income
- Negative cash flow resulting from delayed sales or income
- Increased expenses (e.g., overtime labor, outsourcing, expediting costs, etc.)
- Regulatory fines
- Contractual penalties or loss of contractual bonuses
- Customer dissatisfaction or defection
- Delay executing business plan or strategic initiative

**Financial Impact**

Quantify operational impacts in financial terms.

[ready.gov/business](http://ready.gov/business)

# Appendix 12

 **Ready Business.**  
ready.gov/business

## Business Continuity Resource Requirements

Resource Category	Resource Details	Normal Quantity	24 hours	72 hours	1 week	Later (specify)
Managers						
Staff	Primary site, relocation site and recovery site					
Office space						
Office equipment	Furniture, phone, fax, copiers					
Office technology	Desktops and laptops (with software), printers with connectivity, wireless devices (with email access)					
Vital records, data, information	Location, backups, and media type					
Production Facilities	Owned, leased, or reciprocal agreement					
Production machinery & Equipment	Especially custom equipment with long replacement time					
Dies, patterns, molds, etc. for machinery & equipment						
Raw Materials	Single or sole source suppliers and possible alternates					
Third party services						

**Instructions:** Identify resources required to restore business operations following a disaster. Estimate the resources needed in the days and weeks following the disaster. Also review information technology disaster recovery plan for restoration of hardware and software.

### Appendix 13

Prioritization of hazards for the Chatham Islands identified using the SMUG model (CDEM 2011)

Hazards	Risk analysis		Risk evaluation					Manageability					Growth			
	Likelihood	Consequence	Rating	Seriousness			Sub-total	Reduction	Readiness	Response	Recovery	Sub-total	Sub-total	Total		
				Social	Built	Economic									Natural	
Natural																
Tsunami-local	Likely	Major	VH	5	4	3	3	8.5	2	3	3	2	2	2.5	5	16.0
Tsunami-distance	Likely	Moderate	H	4	4	3	3	7.5	2	3	3	2	2	2.5	5	15.0
Storm surge	Possible	Minor	M	3	2	2	2	5	4	4	3	3	3	3.5	4	12.5
Wind storm	Possible	Minor	M	2	2	2	1	3.8	4	4	3	3	3	3.5	5	12.3
Earthquake	Unlikely	Minor	L	2	2	2	2	4	4	4	3	3	3	3.5	4	11.5
Volcanic	Rare	Minor	VL	2	2	1	1	3.5	4	4	3	3	3	3.5	4	11.0
Erosion-lagoon	Certain	Minor	M	1	2	1	3	2.9	4	4	3	3	3	3.5	2	8.4
Erosion-coastal	Certain	Moderate	M	1	2	1	3	2.9	4	4	3	3	3	3.5	2	8.4
Drifting sand dunes	Certain	Minor	M	1	1	2	3	2.7	2	4	3	3	3	3	3	8.7
Land slide	Rare	Very minor	M	1	1	2	3	2.7	3	3	3	3	3	3	3	8.7
Fire-rural	Likely	Moderate	M	4	3	2	1	6.3	3	3	3	3	3	3	4	13.3
Icebergs	Unlikely	Insignificant	VL	1	1	1	1	2	4	4	4	4	4	4	1	7.0
Sea level rise	Possible	Insignificant	L	1	1	1	1	2	4	4	3	3	3	3.5	1	6.5
River flood	Likely	Minor	M	1	2	1	2	2.7	2	3	3	3	3	2.75	2	7.5
Drought	Possible	Minor	M	1	1	2	2	2.5	4	4	4	4	4	4	2	8.5
Slope stability	Rare	Insignificant	VL	1	1	1	1	2	4	4	3	3	3	3.5	3	8.5
Power failure	Unlikely	Major	M	3	1	2	2	4.5	3	3	3	4	4	3.25	3	10.8
Water failure	Unlikely	Minor	H	2	1	3	1	3.6	3	3	3	3	3	3	3	9.6

(continued)



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# Glossary and Definitions of Terms

ACE	Accumulated Cyclone Energy
AHRA	All Hazard Risk Assessment
ATR	Access to Resources
BIA	Business Impact Analysis
CBC	Canadian Broadcasting Corporation
CBS	Columbia Broadcasting Systems
CCA	Climate Change Adaptation
CDC	Center for Disease Control
CDD	Canadian disaster database
CDEM	Civil Defence Emergency Management
CEG	Coordinating Executive Group
CF	Critical facilities
CFFDRS	Canadian Forest Fire Danger Rating System
CI	Critical infrastructure
CME	Coronal Mass Ejections
CRED	Center for Research on the Epidemiology of Disasters
CSS	Centre for Security Science
CTLCC	Community Technology Learning Centers
DALY	Disability-Adjusted Life Year
DRDC	Defense Research and Development Canada
DRR	Disaster Risk Reduction
EC	Environment Canada
EF	Enhanced Fujita
EM	Emergency Management
EMO	Emergency Management Ontario
EOC	Emergency Operation Centre
EVD	Ebola virus disease
FEMA	Federal Emergency Management Agency

(continued)

FERP	Federal Emergency Response Plan
FPEM	Federal Policy for Emergency Management
GC	Government of Canada
GO	GO Public Transit, a division of Metrolinx
GTA	Greater Toronto Area
HIRA	Hazard Identification and Risk Assessment
HRVA	Hazard Risk and Vulnerability Assessment
IAU	International Astronomical Union
ICT	Information and Communication Technologies
IOS	International Organization for Standardization
IPCC	Intergovernmental Panel on Climate Change
IRAWG	Interdepartmental Risk Assessment Working Group
IRAWG	Interdepartmental Risk Assessment Working Group
MDG	Millennium Development Goals
MMI	Modified Mercalli Intensity Scale
MMS	Moment Magnitude Scale
MPAC	Municipal Property Assessment Corporation (Ontario, Canada)
NASA	National Aeronautics and Space Administration
NATECH	Natural and Technological Hazards
NCHD	National Commission for Human Development (Pakistan)
NHC	National Hurricane Centre
NOAA	National Oceanic and Atmospheric Administration
NRC	National Research Council of Canada
NRCan	National Research Council of Canada
NWS	National Weather Service
OECD	Organization for Economic Co-Operation and Development
PAR	Pressure and Release
PBS	Public Broadcasting Station
PEP	Provincial Emergency Program
PSC	Public Safety Canada
SARS	Severe Acute Respiratory Syndrome
SC	Statistics Canada
SME	Subject Matter Expert
SMUG	Seriousness, Manageability, Urgency and Growth
TRCA	Toronto and Region Conservation Authority
TTC	Toronto Transit Commission
USGS	United States Geological Survey
UTR	Upper Thames River
WFO	World Food Organization
WHO	World Health Organization
WMO	World Meteorological Organization

**Definitions from Emergency Management Ontario** <http://www.emergencymanagementontario.ca/stellent/groups/public/@mcscs/@www/@emo/documents/abstract/ec159132.pdf>

**Acceptable Risk** The level of potential losses that a society or community considers acceptable given existing social, economic, political, cultural, technical and environmental conditions (Glossary of Terms, 2011).

**Assessment** The evaluation and interpretation of available information to provide a basis for decision-making (Glossary of Terms, 2011).

**Building Code** A set of ordinances or regulations and associated standards intended to control aspects of the design, construction, materials, alteration and occupancy of structures that are necessary to ensure human safety and welfare, including resistance to collapse and damage (Glossary of Terms, 2011).

**Business/Financial Impact** The negative economic consequences of the occurrence of a hazard.

**Changing Risk** A variable in the HIRA methodology that allows for the inclusion of information on changes in the likelihood and vulnerability of the hazard.

**Climate Change** “A change in the state of the *climate* that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or *external forcing*, or to persistent *anthropogenic* changes in the composition of the *atmosphere* or in *land use*.” (IPCC, 2007).

**Community** A generic term that includes both municipalities and First Nations (Glossary of Terms, 2011).

**Comprehensive Emergency Management** It is an all-encompassing risk-based approach to emergency management that includes prevention, mitigation, preparedness, response and recovery measures (Glossary of Terms, 2011).

**Consequence** The outcome of an event or situation expressed qualitatively or quantitatively, being a loss, injury or disadvantage (Glossary of Terms, 2011).

**Critical Infrastructure (CI)** Interdependent, interactive, interconnected networks of institutions, services, systems and processes that meet vital human needs, sustain the economy, protect public safety and security, and maintain continuity of and confidence in government (Glossary of Terms, 2011).

**Critical Infrastructure Impact** The negative consequences of the occurrence of a hazard on the interdependent, interactive, interconnected networks of institutions, services, systems and processes that meet vital human needs, sustain the economy,

protect public safety and security, and maintain continuity of and confidence in government.

**Current Risk** The present level of risk associated with a hazard.

**Damage Assessment** An appraisal or determination of the effects of a disaster on people, property, the environment, the economy and/or services (Glossary of Terms, 2011).

**Declared Emergency** A signed declaration made in writing by the Head of Council or the Premier of Ontario in accordance with the *Emergency Management and Civil Protection Act*. This declaration is usually based on a situation or an impending situation that threatens public safety, public health, the environment, critical infrastructure, property, and/or economic stability and exceeds the scope of routine community emergency response (Glossary of Terms, 2011).

**Emergency** A situation or an impending situation that constitutes a danger of major proportions that could result in serious harm to persons or substantial damage to property and that is caused by the forces of nature, a disease or other health risk, an accident or an act whether intentional or otherwise (*Emergency Management and Civil Protection Act*) (Glossary of Terms, 2011).

**Emergency Area** A geographic area within which an emergency has occurred or is about to occur, and which has been identified, defined and designated to receive emergency response actions (Glossary of Terms, 2011).

**Emergency Management** Organized activities undertaken to prevent, mitigate, prepare for, respond to and recover from actual or potential emergencies (Glossary of Terms, 2011).

**Emergency Management Program** A risk-based program consisting of prescribed elements that may include prevention, mitigation, preparedness, response and recovery activities (Glossary of Terms, 2011).

**Emergency Plan** A plan developed and maintained to direct an organization's external and/or internal response to an emergency (Glossary of Terms, 2011).

**Environmental Damage** The negative consequences of the occurrence of a hazard on the environment, including the soil, water, air and/or plants and animals.

**Frequency** How often a hazard occurs at an intensity that may result in an emergency, disaster or service disruption.

**Hazard** A phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. These may include natural, technological or human-caused incidents or some combination of these (Glossary of Terms, 2011).

**Hazard Identification** A structured process for identifying those hazards which exist within a selected area and defining their causes and characteristics (Glossary of Terms, 2011).

**Historical Risk** The level of risk associated with a hazard in the past. The level of risk may have been altered by changes in consequence, frequency or prevention, preparedness, mitigation, response or recovery practices.

**Human-Caused Hazard** Human-caused hazards are hazards which result from direct human action or inaction, either intentional or unintentional. This includes hazards that arise from problems within organizational structure of a company, government etc.

**Impact** The negative effect of a hazardous incident on people, property, the environment, the economy and/or services (Glossary of Terms, 2011).

**Incident** An occurrence or event that requires an emergency response to protect life, property, or the environment (Glossary of Terms, 2011).

**Land Use Planning** The process undertaken by public authorities to identify, evaluate and decide on different options for the use of land to help mitigate and prevent disasters by discouraging settlements and construction of key installations in hazard-prone areas (Glossary of Terms, 2011).

**Mitigation** Actions taken to reduce the adverse impacts of an emergency or disaster (Glossary of Terms, 2011).

**Monitor and Review** The part of the HIRA process in which the HIRA is reviewed and changes in the likelihood and consequences of the hazards is updated.

**Municipality** “Municipality” means a geographic area whose inhabitants are incorporated (*Municipal Act*) (Glossary of Terms, 2011).

**Natural Hazard** Natural hazards are those which are caused by forces of nature (sometimes referred to as ‘Acts of God’). Human activity may trigger or worsen the hazard; (for example deforestation may increase the risk of a landslide) but the hazard ultimately is viewed as a force of nature.

**Preparedness** Actions taken prior to an emergency or disaster to ensure an effective response. These actions include the formulation of emergency response plans, business continuity/continuity of operations plans, training, exercises, and public awareness and education (Glossary of Terms, 2011).

**Prevention** Actions taken to avoid an emergency or disaster and the associated impacts of a hazard (Glossary of Terms, 2011).

**Property Damage** The direct negative consequences of the occurrence of a hazard on buildings, structures and other forms of property.

**Psychosocial Impact** The negative response of community or a subset of the community to a hazard caused by their perception of risk. This includes human

responses such as self-evacuation, mass hysteria, hoarding and other potential undesirable responses.

**Recovery** The process of restoring a stricken community to a pre-disaster level of functioning (Glossary of Terms, 2011).

**Resources** These are personnel and major items of equipment, supplies, and facilities available or potentially available for assignment to incident operations and for which status is maintained. Resources are described by kind and type and may be used in operational or support capacities (Glossary of Terms, 2011).

**Response** The provision of emergency services and public assistance or intervention during or immediately after an incident in order to protect people, property, the environment, the economy and/or services (Glossary of Terms, 2011).

**Return Period** The average time between occurrences of a defined event (AMS, 2000).

**Risk** The product of the probability of the occurrence of a hazard and its consequences (Glossary of Terms, 2011).

**Risk Analysis** The process by which hazards are prioritized for emergency management programs at that particular point in time based on their frequency and potential consequences.

**Risk Assessment** A methodology to determine the nature and extent of risk by analyzing potential hazards and the evaluation of vulnerabilities and consequences (Glossary of Terms, 2011).

**Severity** The extent of disruption and/or damages associated with a hazard (Glossary of Terms, 2011).

**Site** A geographical location of an incident (Glossary of Terms, 2011).

**Social Impact** The direct negative consequences of the occurrence of a hazard on people, such as fatalities, injuries or evacuations.

**Technological Hazard** Technological hazards are hazards which arise 'from the manufacture, transportation, and use of such substances as radioactive materials, chemicals, explosives, flammables, modern technology and critical infrastructure' (HIRA, 2005).

**Threat** A person, thing or event that has the potential to cause harm or damage (Glossary of Terms, 2011).

**Vulnerability** The susceptibility of a community, system or asset to the damaging effects of a hazard (Glossary of Terms, 2011)

**Definitions from AHRA Canada** <https://www.publicsafety.gc.ca/cnt/rsrcs/pblctns/ll-hzrds-sssmnt/index-eng.aspx>

**Accident** An unintended, unplanned and unexpected event that interrupts an activity and sometimes causes injury or damage. Note: Examples of accidents include transportation accidents, hazardous material spills or releases, fire and accidental explosions.

**All Hazards** Referring to the entire spectrum of hazards, whether they are natural or human-induced. Note: For example, hazards can stem from industrial accidents, national security events or cyber events.

**All Hazards Approach** An emergency management approach that recognizes that the actions required to mitigate the effects of emergencies are essentially the same, irrespective of the nature of the incident, thereby permitting an optimization of planning, response and support resources. Note: The intention of an all-hazards approach is to employ generic emergency planning methodologies, modified as necessary according to the circumstances.

**All Hazards Risk Assessment** The process of identifying, analyzing and evaluating risks using an all-hazards approach.

**Disaster** An event that results when a hazard impacts a vulnerable community in a way that exceeds or overwhelms the community's ability to cope and may cause serious harm to the safety, health or welfare of people, or damage to property or the environment. Note: A disaster may be triggered by a naturally occurring phenomenon that has its origins within the geophysical or biological environment or by human action or error, whether malicious or unintentional, including technological failures and terrorist acts.

**Emergency** A present or imminent event that requires prompt coordination of actions concerning persons or property to protect the health, safety or welfare of people, or to limit damage to property or the environment.

**Emergency Management** The management of emergencies concerning all-hazards, including all activities and risk management measures related to prevention and mitigation, preparedness, response and recovery.

**Frequency** The number of occurrences of an event in a defined period of time.

**Hazard** A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

**Hazard Identification** The process of identifying, characterizing and validating hazards. Note: Hazard identification looks at the type, the properties and the potential effects of hazards and is part of hazard assessment.

**Likelihood** The chance of an event or an incident happening, whether defined, measured or determined objectively or subjectively.

**Mitigation** Actions taken to reduce the impact of disasters in order to protect lives, property and the environment, and to reduce economic disruption. Note: Mitigation includes structural mitigative measures (e.g. construction of floodways and dykes) and non-structural mitigative measures (e.g. building codes, land-use planning and insurance incentives). Prevention and mitigation may be considered independently or one may include the other.

**Natural Hazards** A source of potential harm originating from a meteorological, environmental, geological or biological event. Note: Examples of natural hazards include tornadoes, floods, glacial melt, extreme weather, forest and urban fires, earthquakes, insect infestations, infectious diseases.

**Probability** In statistics, a measure of the chance of an event or an incident happening.

**Qualitative Assessment** A risk assessment method that assigns non-statistical values to risks. Note: A qualitative assessment produces narrative, descriptive or comparative information about risks. It can be based on limited information, numerically incomparable data or complex non-linear relationships.

**Quantitative Assessment** A risk assessment method that assigns statistical values to risks.

**Residual Risk** Risk that remains after implementing risk mitigation measures.

**Resilience** The capacity of a system, community or society to adapt to disruptions resulting from hazards by persevering, recuperating or changing to reach and maintain an acceptable level of functioning. Note: Resilience is built through a process of empowering citizens, responders, organizations, communities, governments, systems and society to share the responsibility to keep hazards from becoming disasters.

**Risk** The combination of the likelihood and the consequence of a specified hazard being realized; refers to the vulnerability, proximity or exposure to hazards, which affects the likelihood of adverse impact.

**Risk Analysis** A process to comprehend the nature of a risk and to determine its level. Note: Risk Analysis provides the basis for Risk Evaluation and decisions about Risk Treatment.

**Risk Assessment** The overall process of Risk Identification, Risk Analysis and Risk Evaluation.

**Risk Avoidance** An informed decision to avert or to withdraw from, an activity in order not to be exposed to a particular risk.

**Risk Communication** The imparting, exchanging and/or receiving of clear, credible and timely information about the existence, nature, form, likelihood, severity, acceptability, treatment or other aspects of risk to improve decision-making in risk management. Note: Risk communication is carried out among public authorities, risk assessors, risk managers, the public and all other interested parties. It is intended to achieve a better understanding of risks and risk management.

**Risk Identification** The process of finding, recognizing and recording risks.

**Risk Management** The use of policies, practices and resources to analyze, assess and control risks to health, safety, environment and the economy.

**Risk Perception** A stakeholder's view on a risk. Note: Risk perception reflects the stakeholder's needs, issues, knowledge, beliefs and values.

**Risk Profile** A description of an entity's existing management practices, common vulnerabilities, tolerance and key interdependencies concerning its particular risks, as well as an assessment of their relative likelihood, consequences and priority.

**Risk Register** A register that contains a list of identified risks and related information used to facilitate the monitoring and management of risks. Note: The risk register is generally in the form of a table, spreadsheet or database and may contain the following information: statement or description of the risk, source of risk, areas of impact, cause of the risk, status or action of sector network, existing controls, risk assessment information and any other relevant information.

**Risk Taxonomy** A comprehensive and common set of risk categories that is used within an organization.

**Risk Tolerance** The willingness of an organization to accept or reject a given level of residual risk. Note: Risk tolerance may differ across an organization, but must be clearly understood by those making risk-related decisions.

**Threat** The presence of a hazard and an exposure pathway. Note: A threat may be natural or human-induced, accidental or intentional.

**Threat Assessment** A process consisting of the identification, analysis and evaluation of threats.

**Vulnerability** A condition or set of conditions determined by physical, social, economic and environmental factors or processes that increases the susceptibility of a community to the impact of hazards. Note: Vulnerability is a measure of how well prepared and equipped a community is to minimize the impact of or cope with hazards.

**Vulnerability Assessment** The process of identifying and evaluating vulnerabilities, describing all protective measures in place to reduce them and estimating the likelihood of consequences.

## Definitions from EMDAT <http://www.emdat.be/explanatory-notes>

EM-DAT data include the main following information:

**Disaster Number** A unique disaster number for each event (8 digits: 4 digits for the year and 4 digits for the disaster number - i.e.: 19,950,324).

**Country** Country(ies) in which the disaster has occurred.

**Disaster Group** Two main groups of disasters are distinguished in EM-DAT: natural disasters, and technological disasters. A third category complex disasters has been added in order to include specific event (famine) which are not directly linked to a natural hazard.

**Disaster Type** Description of the disaster according to a pre-defined classification.

**Date** When the disaster occurred. The date is entered as follow: Month/Day/Year.

**Death** Number of people who lost their life because the event happened.

**Missing** The number of people whose whereabouts since the disaster is unknown, and who are presumed dead (official figure when available).

**Total Deaths** Sum of death and missing.

**Injured** People suffering from physical injuries, trauma or an illness requiring medical treatment as a direct result of a disaster.

**Homeless** Number of people whose house is destroyed or heavily damaged and therefore need shelter after an event.

**Affected** People requiring immediate assistance during a period of emergency, i.e. requiring basic survival needs such as food, water, shelter, sanitation and immediate medical assistance.

**Total Affected** Sum of injured, homeless, and affected.

**Estimated Damage** The amount of damage to property, crops, and livestock. In EM-DAT estimated damage are given in US\$ (\*000). For each disaster, the registered figure corresponds to the damage value at the moment of the event, i.e. the figures are shown true to the year of the event.

For a disaster to be entered into the database at least some criteria must be fulfilled.

- Ten (10) or more people reported killed.
- Hundred (100) or more people reported affected.
- Declaration of a state of emergency.
- Call for international assistance.

# Learning Objectives

Post-secondary students are expected to achieve the learning objectives as outlined under the following six categories used in North American universities.

## 1. Depth and breadth of knowledge

- (a) Understanding of key concepts, theories, and methodologies in the field of natural disasters, associated risks, risk reduction, and mitigation
- (b) Understanding of types of disasters and their characteristics and data sources
- (c) Comprehending disaster management knowledge in theory and practice
- (d) Development of critical and analytical skills
- (e) Application of knowledge from other disciplines such as environmental studies, social sciences, humanities, science and engineering, and management studies to disaster management

## 2. Knowledge of Methodologies

- (a) Comprehension of various risk assessment methodologies and their application in Canadian and international disaster management context
- (b) Evaluation of disaster management frameworks for their effectiveness and efficiency in variety of scenarios
- (c) Deep understanding of disaster prevention, mitigation, preparedness, and strategic planning
- (d) Comprehension of various aspects of disasters – scientific, social, psychological, etc.
- (e) Understanding of the key research methodologies in the identification of problems and development of suitable solution approaches
- (f) Learning to design research studies to consider community engagement through participation and partnerships for policy decisions

### 3. Application of Knowledge

- (a) Comprehension of the applicability of theoretical concepts, methods, and tools
- (b) Ability to grasp step by step workable examples with clear explanations
- (c) Demonstration of the applicability of concepts such as risk perception, vulnerability resilience, and coping capacity
- (d) Learn to implement research studies in communities with ethical considerations
- (e) Critical analysis of past disasters for their physical dynamics and societal impacts

### 4. Communication Skills

- (a) Understanding of the importance of clear and timely risk communication in pre, during, and post disaster situations to stakeholders using variety of media
- (b) Comprehension and accurate analysis of past events for developing awareness campaigns, knowledge-sharing strategies, and decision-making tools
- (c) Recognizing cultural sensitivities and social complexities
- (d) Development of networking skills for effective communication

### 5. Awareness of Limits of Knowledge

- (a) Understanding of the limits of advances in science and technology in the context of disaster management
- (b) Awareness of limits of disaster simulation, modelling, and early warning systems
- (c) Recognizing the ever evolving environment and diversity in social, economic, political, and geomorphological context
- (d) Understanding of the limits in sharing information within and outside of the discipline

### 6. Autonomy and Professional Capacity

- (a) Ability to demonstrate transferable skills to foster universal understanding of the subject matter
- (b) Ability to develop leadership skills based on sound understanding of fundamentals and independent thinking
- (c) Ability to develop collaborative aptitudes and professional integrity
- (d) Ability to practice consistency and competence in decision making

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