

**Emergency Management  
Hazard Identification Risk Assessment  
Simcoe Muskoka District Health Unit**

**March 2017**

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## Glossary of Terms

CBRNE: Chemical, Biological, Radiological, Nuclear and Explosives (CBRNE) are categories of hazardous materials capable of harming people, property or the environment.

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.

Hazard Identification: A structured process for identifying those hazards which exist within a selected area and defining their causes and characteristics.

HIRA: Hazard Identification Risk Assessment (HIRA) is a process of defining and describing hazards by characterizing their probability, frequency and severity and evaluating adverse consequences, including potential losses and injuries. The process further allows for the identification of risks, threats and vulnerabilities that can impede the delivery of services and leads to the development of controls and safeguards and strategies to mitigate the risks.

Mass Gathering: Simcoe Muskoka District Health Unit defines a mass gathering as a pre-planned public event that is held for a limited time period and generally has, but not limited to, an attendance of greater than 25,000 people and where any of the following conditions are met:

- Provincially (Ministry of Health and Long Term Care, Emergency Management Branch) identified as a mass gathering event, requiring coordinated health sector planning OR
- Municipal Emergency Management involvement
- Multi-jurisdictional events involving multiple municipalities
- Politically sensitive events

And/or where there are:

- Temporary overnight accommodations
- Temporary Infrastructure that has been or will be installed and includes but is not limited to, power lines, non-municipal potable water systems and waste removal
- Events last a few hours to several days in duration

Risk Assessment: A methodology to determine the nature and extent of risk by analyzing potential hazards and the evaluation of vulnerabilities and consequences.

# Hazard Identification and Risk Assessment (HIRA)

## Introduction

Hazard Identification Risk Assessment (HIRA) is a process of defining and describing hazards by characterizing their probability, frequency and severity and evaluating adverse consequences, including potential losses and injuries.<sup>i</sup> The process further allows for the identification of risks, threats and vulnerabilities that can impede the delivery of services and leads to the development of controls and safeguards and strategies to mitigate the risks<sup>ii</sup>.

The HIRA Process takes into account

- a) **The Hazard** - an event or physical condition that has the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, damage to the environment, or other types of harm or loss
- b) **Probability** - the likelihood of the event happening
- c) **Consequence** - how severe would the hazard or public health impacts the community or the agency
- d) **Impacts** are rated from 1 being unlikely to 4 being high probability. The rating has a direct link to Public Health response and the resources required to respond and to the severity of the consequences to public health programs and the ability to deliver the programs

The Hazard identification and risk assessment (HIRA) is a critical part of every emergency management program in Ontario, where programs at the Provincial and Municipal level are required by the *Emergency Management and Civil Protection Act* to be risk-based. Section 4 of this Act requires that 'in developing its emergency management program, every municipality shall identify and assess the various hazards and risks to public safety that could give rise to emergencies and identify the facilities and other elements of the infrastructure that are at risk of being affected by emergencies'.<sup>iii</sup>

Public Health Units (PHU) in the province of Ontario are required by the Ontario Public Health Standards "*Public Health Emergency Preparedness Protocol*" to conduct risk based emergency planning. The Standards and protocols enable and ensure a consistent and effective response to public health emergencies and emergencies with public health impacts. There is an expectation that boards of health are aware of the hazards in the health unit and that the boards of health have enhanced risk-based emergency planning and programming to guide ongoing board of health preparedness efforts.

Requirement # 1 of this protocol states that:

*The board of health shall identify and assess the relevant hazards and risks to the public's health in accordance with the proposed Population Health Assessment and Surveillance Protocol, 2008 (or as current); the proposed Public Health Emergency Preparedness Protocol, 2015 (or as current); and the proposed Identification, Investigation and Management of Health Hazards Protocol, 2008 (or as current).*

A key challenge in the development of any emergency management program is the ability to focus our resources and time in the development of emergency plans for dealing with the most significant risks. To obtain such focus, credible hazards must be identified and assessed to determine their probability of occurrence and identify potential public health consequences/impacts.

## SMDHU HIRA Planning Process

The HIRA process reflects a proactive attitude for dealing with potential threats. It is essential that this risk-based approach involves stakeholders from various organizations who have a common interest in emergencies, hazards, and vulnerabilities.

The Simcoe Muskoka District Health Unit (SMDHU) conducted a local public health risk assessment using a risk assessment grid model adopted by emergency management officials in Ontario to assist the agency's planning and response to incidents with public health impacts. This was accomplished by assigning a likelihood value and an impact level to a risk and combining those two values to arrive at the level of risk completes the assessment. In general, risk with the highest assessment values should be treated first.<sup>iv</sup>

For the purpose of this hazard assessment impacts or consequences were assessed. Three factors/components were considered when assessing overall impacts to the health unit's ability to deliver an appropriate level of service. These three areas of impact included: the human impact, the property impact and the business impact. An overall impact rating was assigned to reflect how significantly an incident would have on the ability of the agency to function.

This hazard identification and risk assessment process involved four distinct steps:

1. Identifying and researching the risks/hazards. Our research focused on two components: a literature review for mass gathering public health implications and local community assessments with emergency planners to identify most likely hazards within Simcoe Muskoka.
2. Conducting a risk assessment for each hazards identified to determine probability of occurrence and public health consequences.
3. Establishing program priorities by using the risk assessment grid tool.
4. Development of incident specific plans for prioritized hazards.
5. Identifying high risk populations in the community relevant to specific hazards and assessing potential for disproportionate health impacts to high-risk populations for relevant hazards.

The SMDHU HIRA is based on the generic HIRA done for risks in the region (assessed from a list of emergencies identified when OFMEM's HIRA tool) and findings from literature reviews on public health risks associated with mass gatherings. The OFMEM Model was adopted to conduct the risk assessment; however, additional components from the Centre for Excellence in Emergency Preparedness Risk Assessment Model were incorporated into this model. The model was further modified to identify probability and consequences, specifically related to public health agencies.

## Step 1: Identifying and Researching Risks/Hazards

### Part A: Identifying and Researching Risks/Hazards based on Ontario Fire Marshal Emergency Management (OFMEM) Provincial HIRA

The hazard Identification step in the HIRA process aims to identify the hazards that are relevant for the area included in the risk assessment. This requires a systematic review of all hazards and their causes in order to determine whether they may pose a threat to the area. In order to generate comprehensive risk profile for Simcoe Muskoka all municipal (Upper Tier and Lower-tier) based emergency plans were used to evaluate the likely types of hazards to occur in our region.

The following list of emergencies are identified as hazards found in the Simcoe Muskoka Municipal plans.

Moreover the listing also reflects the provincial risk provide identified in the Provincial HIRA by OFMEM<sup>v</sup>

### **Natural**

- Drought/low water, Drinking Water Emergencies
- Agricultural and Food Emergencies, Fires (Forest/Wildlife)
- Major winter Storms (Blizzards, Ice, Hail, Snow)
- Major Storms (Hurricanes, Lightning, Windstorms, Tornadoes)
- Weather Related (Heat, Cold, Fog, Smog, Earthquakes, Land/mudslides, and Floods)
- Extreme Temperatures
- Erosion
- Human Health Emergencies and Epidemic

### **Technological**

- Building/Structural Collapse
- Critical Infrastructure Failure
- Dam Failure
- Energy Emergency (Supply)
- Explosion/Fire
- Hazardous Materials Incident
- Human-Made Space Object Crash
- Mine Emergency
- Nuclear Facility Emergency
- Oil/Natural Gas Emergency
- Radiological Emergency
- Transportation Emergency

### **Human-Caused Hazards**

- Civil Disorder
- Cyber Attack\*
- Sabotage
- Special Event
- Terrorism/CBRNE

Each of these hazards were assessed based on whether the likelihood of occurrence, and the pact on the community from a public health perspective. The likely types of hazards to occur in Simcoe Muskoka having public health implications are:

- Food Quality Issues
- Animal Diseases
- Severe Weather Events (snow/ice storms, blizzards, tornadoes)
- Infectious and Contagious Diseases
- Water Quality Issues (Low pressure, flooding, and contamination of water supply)
- Hazardous Material/Chemical Spill or Explosion Incidents (spills, leaks, fires)
- Environmental (Forest Fires, Smog, Earthquakes, Heat waves)
- Technological/Critical Infrastructure Failures (Power/utility outages, road access)
- Bioterrorist Events
- Mass Gatherings
- Technological – Critical Infrastructure Failure (power outages, IT breaches)

## Part B: Identifying Risk/Hazards based on Literature Review on Mass Gatherings

In order to fully assess public health implications as a result of mass gatherings and to make this HIRA process more specific to these types of events, the Simcoe Muskoka District Health Unit conducted a literature review for mass gatherings. The review identified the most common public health implications based on history at past mass gathering events. Based on the research findings, the following is a list of Mass Gathering Risk/Hazards:

- Infectious and Contagious Disease
- Food Related Hazards
- Environmental/Weather Related
- Water Related Hazards
- Hazardous Material/Chemical Spill or Explosion Incidents (spills, leaks, fires)
- Technological/Critical Infrastructure Failures
- Bioterrorist Events (Biological Agents Only)
- Injury Related & Public Safety Hazards

The findings from the literature search aligns with the likely hazards for our region based on the Provincial HIRA process. [Appendix 1: Hazards Associated with Incidents having Public Health Impacts](#) further identifies and defines the specific hazards associated with incidents having public health impacts.

## Step 2: Conducting Risk Assessments and Determine Probability of Occurrence and Public Health Consequences

The Risk Assessment Process takes into account

- a) The Hazard - an event or physical condition that has the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, damage to the environment, or other types of harm or loss
- b) Probability - the likelihood of the event happening
- c) Consequence - how severe would the hazard or public health impacts the community or the agency
- d) Impacts are rated from 1 being unlikely to 4 being high probability. The rating has a direct link to Public Health response and the resources required to respond and to the severity of the consequences to public health programs and the ability to deliver the programs

The Provincial OFMEM Model used for HIRA was adopted to conduct the risk assessment; however, additional components from the Centre for Excellence in Emergency Preparedness Risk Assessment Model were incorporated into this model. The model was further modified to identify probability and consequences, specifically related to public health agencies. Hazard Information Sheet was completed while conducting risk assessments for each Hazard.

## Step 3: Establishing Program Priorities (Using a Risk Assessment Grid)

Assigning a likelihood value and an impact level to a risk and combining those two values to arrive at the level of risk completes the assessment. In general, risk with the highest assessment values should be treated first. [Appendix 3: Risk Assessment Grid](#) depicts assessment values for each hazard. In general, risks that have an assessment score placing them in the upper right quadrant of the graph should be treated as priorities. This is because both their likelihood and impact are high.<sup>vi</sup> The overall impact rating reflects the effect on Public Health resources and personnel. The hazard or risk may directly impact on staff, clients, critical infrastructure and the ability to conduct business and provide services to the community in the normal manner.

### Public Health Emergencies (Priority Planning Hazards)

**a) Infectious and Contagious Diseases** are types of hazards that are common at mass gathering events and have significant impacts to the population as a whole.

**b) Food Related** hazards have the potential to happen at any time during the year and are common at mass gathering events. These hazards can be directly related to power outages/winter and summer. Large scale food borne illness outbreaks and large scale food recalls are associated with poor food handling practices and with mass gathering events has been linked to illegal operations.

**c) Environmental/Severe Weather** emergencies can happen at any time during the year and have the potential to cause food, water, human health and technological emergencies. In Simcoe Muskoka, this region experiences a wide variety of incidents including tornadoes, severe summer and winter storms. The most common environmental issues associated with mass gathering events, based on literature review, are heat related incidents.

**d) Drinking Water** emergencies can occur at any time during the year and although large scale emergencies are rare the consequences and impact can be severe

#### **e) Hazardous Material Emergencies**

HAZMAT incidents are fortunately few in number given the volume of hazardous materials that are transported via road and rail on a daily basis in this country. Highly trained specialist teams would normally respond to such an emergency with Public Health being used in an advisory role and not as first responders.

**f) Critical Technological and Infrastructure** emergencies such as road closures due to accidents or bridge collapses due to aging infrastructure are fortunately rare. The province wide power outage that occurred in the summer of 2003 caused food, water and human health emergencies as a direct result. As the infrastructure ages and the demand for electricity increases the potential for more of these emergencies exists

**g) Mass Gatherings** generate more injuries and illnesses than a general population equivalent in size. Concentrated crowds place strain on public health infrastructure and increase demands for services such as infectious disease surveillance, food, water, weather event health, and campsite safety. This creates a surge in demand for emergency medical services, the acute-care system, and public health prevention activities.

**h) Zoonotic/Vector Borne** disease have the potential to cause widespread anxiety and fear and to have serious Public Health implications for the human population.



### *Less Likely Events – Lower Planning Priority for Public Health*

**a) Injury, Drug and Alcohol, and Health & Safety Related Hazards** common at mass gathering events. Research findings indicate that most of these incidents are associated with substance abuse (alcohol and drugs).

**b) Bio/Terrorism** emergencies can happen at any time and the impact and consequences can be catastrophic. Fortunately they are very rare and usually happen only in areas of political or religious significance or in areas of high population density. This type of incident ranked low as a Public Health planning priority, however, for security and safety purposes, federal officials consider this type of hazard as a high priority issue.

## Step 4: Develop Incident Specific Plans for Prioritized Hazards

Identified public health emergencies have been ranked using an assessment grid. The Risk Assessment Grid identified in Step # 3 identifies which emergencies have been ranked with the highest priority. The health unit uses these rankings to make decisions on program planning priorities. Incident action plans will be dependent on the outcome of these risk assessments. Incident specific plans may not be required for all public health incidents with the lowest priority ranking if the agency is already responding well to these incidents, with existing day-to-day structures and resources.

The identification and prioritization of potential public health hazards within our communities can also assist with business continuity planning. Impacts on pre- identified essential services by these hazards can be assessed to determine potential surge impacts on each service area. Once assessed, staff redeployment plans and specialized training can be provided. Based on the HIRA Assessments, the health unit develops detailed Incident Specific Action Plans. Hazards/risks were prioritized.

## Other Factors Impacting on Business Operations

The identification and prioritization of potential public health hazards within our communities can also assist with business continuity planning. Activities carried out to address these hazards will have an impact on the agency's capability to deliver other routine activities.

### **Other factors impacting on business operations**

- Business Continuity & Critical Infrastructure Considerations
- Surge Capacity and Redeployment Plan
- Mutual assistance agreements.
- Human resource policies – reviewing after-hours response, vacation requests & scheduling, shift lengths.
- Occupational health & safety issues-
- Travel restrictions: highway closures restricting provision of essential services.
- Community partnerships – coordination/planning with other government organizations, community partners and health sector required.
- Information technology – communication capabilities between field staff and command

## Business Continuity

The identification and prioritization of potential public health hazards within our communities ensures consistent delivery of service within the Health Unit. Activities carried out to address these hazards will create impacts on the agency's capability to deliver other routine activities. Therefore in order to address the concern of maintaining effective and efficient service delivery the staff redeployment strategy outlined within the agency's [Business Continuity Plan](#) will be utilized to ensure minimal program and service disruptions and ensure the safety of employees.

## Appendices

### Appendix 1: Hazards Associated with Incidents having Public Health Impacts

Public Health HIRA		
Hazard	Specific Hazard	Rationale for Public Health Implications
<p><b>Infectious and Contagious Diseases</b></p> <p>Infectious and Contagious Diseases can either be of domestic origin or imported by persons attending the event. Note: imported diseases are not often diagnosed in the country of origin</p>	<p>Out of season Influenza Meningitis/meningococcal Measles, Mumps, Varicella Gastroenteritis Respiratory illness</p>	<p>high probability of illness in affected population potential exists for fatalities depending on severity and duration of illness High potential for multiple illness and deaths children elderly immune suppressed most vulnerable contact and case management, staff redeployment</p>
<p><b>Food Related Hazards</b></p> <p>Suspect food adulteration (could be from international/domestic sources)</p>	<p>E-coli 157[ hamburger disease] outbreak with potentially fatal results</p> <p>Outbreak with other organisms – salmonella, campylobacter, or Hepatitis A, Shigella, Staphylococcus aureus Clostridium perfringens and Listeria Parasitic contamination of food Giardia/ Cryptosporidium/ Cyclosporiasis most common types</p> <p>Gastroenteritis</p>	<p>high probability of illness in affected population potential exists for fatalities depending on severity and duration of illness</p> <p>children elderly immune suppressed most vulnerable</p> <p>contact and case management</p>
<p><b>Zoonotic / Vector Borne Disease</b></p>	<p>Indirect transmission of an infectious agent that occurs when a vector bites or touches a person Chronic Wasting Disease Lyme Disease West Nile virus Rabies Anthrax Avian Influenza Bovine Spongiform Encephalopathy (Mad Cow disease) Eastern Equine Encephalitis (EEE—affect animals only Seoul Virus</p>	<p>High probability of illness in effected population possibility of death most probable in untreated positive rabies case pandemic potential, anthrax, mad cow, quarantine, mass immunization, act of terrorism fear and panic</p> <p>Moderate costs and recovery time involved depending on the type of setting i.e. farm, summer camp, tourist outfitter, adventure camps, exotic wildlife sanctuaries</p> <p>Potential exists for significant business interruption to HU</p>

<b>Public Health HIRA</b>		
<p><b>Water Related Hazards</b></p> <p>Water related Issues that may arise at a mass gathering event. The occurrence may be due to contamination, malfunctioning systems, disruption or by Vandalism/terrorism</p>	<p>Disruption/Malfunction in water treatment process Breach of system integrity Water main break Loss of pressure Vandalism/Bioterrorism Contamination of water supply (E.coli, Giardia, cryptosporidium, shigella Chemical/Biological contamination) Contamination of recreational water sources</p>	<p>High probability of illness, long term medical complications or death</p> <p>Increase in public fear and anxiety, hospitalization, extended medical treatment</p>
<p><b>Hazardous Material Incidents (HAZMAT)</b></p> <p>Hazardous Material Explosion Incident (Chemical, Nuclear or radiological events)</p>	<p>Chemical Spills Transportation Incidents Terrorists ( Dirty Bombs, etc )</p>	<p>Decontamination of exposed individuals Evacuation of residents or surrounding areas Shelter in Place Hospitalizations of symptomatic cases Post Exposure contact and Case management High demand on health care services</p>
<p><b>Mass Gathering</b></p> <p>Mass gatherings events have higher incidence of injury and illness due to population density, size, and activities</p>	<p>Food and Water Outbreaks Infectious Disease Outbreaks (Respiratory &amp; Gastro) Injury Severe Weather events</p>	<p>Heightened Inspections of Facilities (Food , Pool, Water) Heightened Assessments of Drinking Water Systems Heightened Surveillance (Human and Environmental) Increased Communications ( Public and Stakeholders)</p>
<p><b>Bioterrorist Event ( Biological Agents Only)</b></p>	<p>Bioterrorist Agents: Anthrax, variola virus (small pox), botulism, plague, cholera, tularemia, plus others</p>	<p>Increased Public fear and anxiety, stress Potential to overwhelm health care facilities/professional Potential to overwhelm 1st responder resources</p>
<p><b>Environmental/ Weather Related</b></p>	<p>Extreme Heat, severe storms, tornadoes, lightning strikes</p>	<p>serious injuries, illness and potential for deaths (tornado)</p> <p>dehydration</p> <p>large scale evacuations</p> <p>vulnerable populations[elderly, COPD, mobility impaired] shelter in place</p> <p>impacts to local health care</p> <p>cooling centres, evacuation centres</p>
<p><b>Technological/Critical Infrastructure Failure</b></p>	<p>Energy supply disruption (power, natural), mechanical failure at water treatment and sewage Water and Sewage System disruptions/malfunctions Road closures Information Technology Communication System</p>	<p>Impacts on the Vulnerable populations long term care residents restoration of essential services, evacuation, food premises food suppliers retail last economic impact for business and other agencies</p>

<b>Public Health HIRA</b>		
<p><b>Injury Related_ Public Safety hazards</b></p> <p>Community Health Issues – Substance Abuse – alcohol/drug related injuries,, sprains/fractures, slips, falls, heat related, dehydration, exhaustion and strokes, medication related concerns</p>	<p>Alcohol Abuse Drug Use Slips/Falls Heat related Medication related</p>	<p>Increase risk of heat related illness (headache, fatigue, sunburn, insect bites)</p> <p>Dehydration</p> <p>Medication Concerns for individuals not travelling with vital medications</p> <p>Implications of Sprains/fractures</p>

## Appendix 2: Risk Assessment Grid

	High Risk- High Priority for Incident Specific Planning
	Medium Risk- Medium Priority for Incident Specific Planning
	Low Risk- Lower Priority for Incident Specific Planning

RISK ASSESSMENT GRID					
<u>PROBABILITY</u>	4 Multiple Incidents in 5yrs			Environmental Zoonotic/Vector Borne Diseases Weather related Mass Gathering events Critical Infrastructure (incl. IT/Privacy Breaches) Hazardous Material Incidents Floods	Infectious and Contagious Diseases Food Related Water Related
	3 One incident in 5 yrs.				
	2 last incident in -5-15 yrs.				
	1 No Incidents in 15 yrs.				Bioterrorist Events ( Biological Only)
		1 <i>Negligible</i>	2 <i>Limited</i>	3 <i>Substantial</i>	4 <i>High</i>
		<u>CONSEQUENCES</u>			

### Appendix 3: Hazard Vulnerability Assessment Spreadsheet

	<b>Probability</b>	<b>Consequence</b>			
<b>Hazard</b>	Historical Occurrence	Human Impact	Property Impact	Business Impact	Total
<b>Bioterrorism</b> <i>(Biological Agents Only)</i>	1	4	4	4	4
<b>Critical Infrastructure</b> <i>Energy supply disruption (power, natural), mechanical failure at water treatment and sewage Water and Sewage System disruptions/malfunctions Road closures Information Technology Communication System</i>	4	3	3	3	3
<b>Environmental</b> <i>Extreme Heat/Cold</i>	4	3	3	3	3
<b>Floods</b> <i>Severe spring flooding due to weather conditions and severe winter flooding due to heavier than average snowpack, mild weather unusual heavy rainfall and localized heavy ice conditions</i>	4	2	3	3	3
<b>Food Related</b> <i>Food Recalls</i>	4	4	4	4	4

<i>Food Adulteration</i> <i>Food Poisonings/</i> <i>Gastrointestinal illnesses</i>					
<b>Hazardous Material</b> <i>Chemical, Nuclear,</i> <i>Radiological Incidents</i> <i>Chemical Spills Transportation</i>	4	2	3	3	3
<b>Infectious and Contagious Disease</b> <i>Respiratory illnesses Asthma</i> <i>exacerbations Influenza (H1N1</i> <i>Pandemic) Varicella</i> <i>Meningococcal disease</i> <i>Enteric diseases</i>	4	4	4	4	4
<b>Mass Gathering</b> <i>Mass gatherings have higher</i> <i>incidence of injury and illness</i> <i>than comparable populations of</i> <i>the same size even though</i> <i>they are primarily “collections of</i> <i>well persons</i>	4	4	3	3	3
<b>Water Related</b> <i>Disruption/Malfunction in water</i> <i>treatment process</i> <i>Breach of system integrity</i> <i>Water main break</i> <i>Loss of pressure</i> <i>Contamination of water supply</i>	4	4	4	3	4
<b>Weather</b> <i>Snow storms, blizzards,</i> <i>ice/sleet storms, hailstorms,</i> <i>lightning storms, wind storms,</i> <i>fog, tornadoes and hurricanes</i>	4	3	3	3	3
<b>Zoonotic/Vector Borne Disease</b>	4	3	3	3	3



<i>Indirect transmission of an infectious agent that occurs when a vector bites or touches a person</i> <i>Chronic Wasting Disease</i> <i>Lyme Disease</i> <i>West Nile virus</i> <i>Rabies</i> <i>Anthrax</i> <i>Avian Influenza</i> <i>Bovine Spongiform Encephalopathy (Mad Cow disease)</i> <i>Eastern Equine Encephalitis (EEE—affect animals only)</i> <i>Seoul Virus</i>					
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## References

<sup>i</sup> Guideline for Provincial Emergency Management Programs in Ontario, Essential Level, Emergency Management Ontario (EMO), FEBRUARY 2004, Page 27

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ii Guidelines for Provincial Emergency Management Programs in Ontario, 2004

iii

[https://www.emergencymanagementontario.ca/english/emcommunity/ProvincialPrograms/hira/hira\\_2012.html#P491\\_23492](https://www.emergencymanagementontario.ca/english/emcommunity/ProvincialPrograms/hira/hira_2012.html#P491_23492)

iv Emergency Management Workbook; A tool for Emergency Management Practitioners, Emergency Management Ontario, FEBRUARY 2006, Page 29

v Emergency Management Ontario 2012

[http://www.emergencymanagementontario.ca/english/emcommunity/ProvincialPrograms/hira/hira\\_2012.html](http://www.emergencymanagementontario.ca/english/emcommunity/ProvincialPrograms/hira/hira_2012.html)

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