# Hazard Risk Analysis

## *Overview and Instructions*



## What is a Hazard?

A hazard can best be described as:

***A threat to humans and what they value: life, well-being, material goods, and environment.***

There are many things which can be a threat – falling down a flight of stairs can certainly injure someone, as can being involved in a motor vehicle accident. However, here are only concerned with hazards that are likely to cause a major incident or disaster for the entire community. Common examples would be floods, forest fires, snow storms, a disease outbreak, or a train derailment. *Appendix 1* includes a list of potential hazards that could lead to a community experiencing a disaster.

## Types of Hazards

When people think about hazards they tend to think about the source, or cause of hazards. There are generally three different ways to think about hazards:

1. natural
2. diseases, pest infestations and epidemics
3. human-caused hazards.

## Natural Hazards

Natural hazards are those that were normally thought of as “acts of God” (for example earthquakes and hurricanes). These hazards have their origin in the natural environment – they often occur as a result of weather (like snowstorms) or as a result of something to do with the earth (like landslides).

## Diseases, Pest Infestations and Epidemics

Diseases, epidemics, and infestations may apply to people, animals, or plants. Often it is hard to find the cause or origin of diseases – for example, West Nile virus existed in the Middle East for a long time before humans brought the disease to North Vancouver by taking birds or mosquitoes to the area on a boat or plane.

## Human-Caused Hazards

Human-caused hazards are caused either by people doing things deliberately, such as building of bombs or just not taking the right preparedness steps. When people don’t take the proper preparedness steps even when they know they should, it’s called an “act of omission”, such as not maintaining a plane, or not building a structure with enough care.

## Natural and Human-Caused Hazards

Some hazards can be both natural and human-caused. For example, a forest fire can be started by humans (like careless campers) or by lightning.

# Why is Understanding Hazards Important?

It is important to understand which hazards have the potential to threaten your community. Some communities choose not to identify and discuss which hazards exist – kind of like burying your head in the sand and hoping that if you don’t talk about them, they won’t occur. But a quick look at what has happened to rural, remote, and coastal Aboriginal communities in Canada has shown that many hazards have had an impact on many Aboriginal communities.

In many cases the community was directly impacted – sometimes there were deaths, sometimes injuries, but often some financial loss. In some cases communities could be evacuated, but in the end there is no damage – for example, if a forest fire threatened the community but never actually reached the community. In other cases, the community was impacted even though the event originated a considerable ways away – for example, a power transformer might blow up and leave communities without power hundreds of kilometers away. Or in other situations, no one in the community was directly affected but the community responded to rescue tourists and visitors – for example, when an airplane crashes or a boat capsizes nearby. The community rallies together to provide what support it can.

Many Aboriginal communities have been affected by one or more incidents or disasters. Identifying what hazards have happened in the past is one thing to consider. Understanding what has happened to other Aboriginal communities can assist community leaders in determining what hazards have the potential to happen to them.

So, if your community wants to do more than just simply react to hazardous events and disasters, if your community wants to look at ways to reduce the risk of disasters and to become more resilient, then the first step is to identify and understand which potential hazards exist. The second step is to note which hazards have previously had an impact in your community, and if so, when and where they took place.

# Hazard Risk Assessment Instructions

There are 17 categories of hazards for you to assess (See table below). In an ideal world, you would assess all of these hazards but your planning team may decide to initially focus on just one area of hazards for this risk assessment, because either those hazards are what the community is most concerned about (based on past events), or there might be recent events that have happened to other communities which are making your own community concerned (e.g., pandemic disease, flooding). If you decide not to assess all hazards faced by your community right now, you will want to come back to the other hazards later. It is often the hazards you don't anticipate that can have a serious impact on your community.

Here are six steps to assist you to complete the Risk Assessment:

## 1. Decide on which hazards you will start with:

- Each hazard has a number of factors attached that describe the hazard.
- Make sure you and/or all the members of the team are clear on the definitions of the hazards and the discussion information.
- Additional information can be found in the Hazard Risk Analysis Tool for each hazard under Hazard Risk Analysis list of hazards and in the "Provincial/Territorial Information Guides".

## 2. Consider dividing your community into zones:

- Review the Aboriginal Disaster Resilience Planning Resources on Mapping to identify zones for your assessment.

## 3. Rate the factors for each hazard:

- Rate your community against each factor using the following scale:
  - Yes
  - No
  - Need More info
  - Not Applicable
- Place a check in the "yes" box next to each factor you believe is "strong" or relates to your community.
- If you believe the factor is either not present in your community or present only in a in a minor way, check "no".
- There may be some factors you think do not apply to your community, or you might need more information. In this case, check "not applicable", "needs more information" or cross that indicator out so that it does not count in your assessment of that section.
- Before crossing anything off, make sure you consider whether it really is something you don't have in your community at this time but is worth looking at in the future. If you think it should be looked at and developed in the future, you would not cross off that section.
- If you are working in a group we suggest that you go through each factor and discuss your assessment as team before deciding which box to check.

## 4. Highlight factors that are important to your community:

- If you feel that any factor is particularly important to your community, and you want to make sure to identify it as something you want to focus on in your plan, check the "important to my community" box.

## 5. Rate your community's hazard risk level:

- When you have finished your assessment look at the number of boxes you have ticked. Pay particular attention to those that are marked with an asterisk symbol: * – these indicators are considered to be more important in assessing whether or not the hazard is likely to occur.
- Once you have finished all of the factor boxes for a single hazard, review your checks and rate your community's hazard risk using the following scale:
    - High Risk
    - Low Risk
    - Need more info
    - Not applicable

  Be sure you use the "not applicable" rating only for those hazards that have absolutely no chance of taking place in your community – for example, a tsunami in Saskatchewan.
- In some cases, there may be hazards that you need more information on to be able to assess them. In this case you may want to check the "more info" box and see whether others in the community have information that could help you more fully assess this section.

## 6. Complete Hazard Risk Profile Template:

- At this point, you can now determine if the hazard applies to the entire community or not. Note that some hazards will apply to the entire community, while in other cases they will only apply to one specific area in the community. For example, a windstorm will likely happen to the entire community, while a snow-melt flood might only happen in the area by the river.
- Then transfer your rating into the first column of the Hazard Risk Profile Template.
- If you believe that the hazard would apply equally to everyone in the community, then you can leave it as an overall community rating. If you think it would only apply to one or more areas then you should complete the assessment for each of the areas (or zones) that you have identified in your community.

## Comprehensive Classification and Type of Hazards

| Category | Hazard |
|---|---|
| Accidents | Airplane Crashes<br>Marine Accidents<br>Motor Vehicle Crashes<br>Train Derailments |
| Astronomical | Asteroid, Comets, and Meteor Crashes<br>Geomagnetic and Ionospheric Storms<br>Space Object Crashes |
| Atmospheric | Blizzards<br>Climate Change<br>Drought<br>Extreme Cold<br>Fog<br>Frost<br>Hailstorms<br>Heat Waves<br>Hurricanes<br>Ice Fogs, Ice Storms, and Freezing Rain<br>Lake-Effect Storms<br>Lightning and Thunderstorms<br>Microbursts<br>Sea Storms and Sea Surges<br>Seiches<br>Snowstorms<br>Tornadoes and Waterspouts<br>Windstorms |
| Conflictual Social Action | Conflictual Social Action |
| Contamination | Air Pollution<br>Soil Contamination<br>Water Contamination |
| Dam Failure and Structural Collapse | Dam Failure<br>Structural Collapse – Buildings<br>Structural Collapse - Transportation |
| Diseases | Diseases - Animals - Air & Water<br>Diseases - Animals - Human Transmitted<br>Diseases - Animals - Animal Transmitted<br>Diseases - Human - Air and Water Transmitted<br>Diseases - Human - Animal Transmitted<br>Diseases - Human - Human Transmitted<br>Diseases - Human - Food Transmitted<br>Diseases - Plants - Human Controlled<br>Diseases - Plants – General<br>Plant and Pest Infestations |
| Earthquakes, Tsunamis & Volcanos | Earthquakes<br>Tsunamis |

| Category | Hazard |
|---|---|
| | Volcano-Ash Falls, Projectiles and Lateral Blasts, Pyroclastic Flows and Lava Flows |
| Fires | Brush, Bush and Grass Fires<br>Community Structural Fires<br>Community Interface Fires<br>Forest Fires or Wildfires<br>Peat Bog Fires |
| Food Shortages | Food Shortages: For Communities that depend mostly on local food for sustenance<br>For communities that depend mostly on food grown elsewhere for sustenance |
| Geological Hazards | Dust and Sand Storms<br>Erosion, Deposition and Desertification<br>Expansive Soils<br>Gravitational Mass Movement (Landslides)<br>Land Subsidence and Sinkholes<br>Submarine Slides |
| Hazardous Material Spills, Explosions and Oil Pipeline and Gas Leaks | Gas Explosions and Gas Leaks<br>Mine Explosions<br>Oil Pipeline Leaks<br>Other Explosions<br>Hazardous Material Spill - On Site<br>Hazardous Material Spill - Air Transport<br>Hazardous Material Spill - Marine Transport<br>Hazardous Material Spill - Land Transport<br>Hazardous Material Spill - Rail Transport |
| Hydrological Hazards | Avalanches - Natural and Human Caused<br>Flash Floods<br>Ice Jam Floods<br>Local Floods<br>Rain Storm Floods<br>Snow Melt Floods<br>Glaciers<br>Icebergs, Sea Ice and Ice Floes<br>Lake Outbursts |
| Nuclear Failure | Nuclear Accidents |
| Power and Water Outages | Power Outages<br>Water Outages |
| Riots | Riots |
| Terrorism | Terrorism – General<br>Terrorism – Biological<br>Terrorism – Chemical<br>Terrorism - Cyber Terrorism<br>Terrorism - Explosives and Bombs<br>Terrorism - Nuclear |