

1 Executive Summary

The Northwest Territories (NWT) Hazard Identification Risk Assessment (HIRA) identifies the hazards and examines the risks that pose a threat to the people, property, environment and economy of the NWT. This assessment is a critical part of an emergency management program. Identified hazards should be used in preparedness programs, mitigation strategies, emergency response plan exercises, and training and awareness programs.

Governments have limited resources and planning for every possible hazard is not a realistic approach. However, an informed ranking of hazards provides a cost-effective approach to risk mitigation, emergency planning and response. This assessment identified and rated twenty hazards that could affect the NWT, and then ranked them in order of emergency planning priority.

To support the analysis that culminated in the hazard ranking, extensive documentation and data were provided by stakeholders and supplemented by online research. Six regional workshops and an online survey provided additional information on hazards in the NWT.

This HIRA also looked at current hazards through a climate change lens. In anticipation of the impact of climate change in the NWT, this analysis also projected which hazards could occur more frequently or become more extreme in the future.

The NWT Hazard Summary (inset) provides a list of the hazards ranked into four categories of risk. These rankings are supported by the NWT risk matrix (page 6) and the information outlined in the hazard narratives in Section 5. The rankings were determined using best practices methodology combined with insight from community stakeholders and local experts. With this comprehensive approach, the analysis may not be identical to risks assigned using other methods or criteria.

Very High Hazards

Fire/Explosion and Flood were found to be the highest risk hazards throughout the NWT. These hazards have frequently caused extensive damage to people, property, the environment and the economy. Both of these hazards are also expected to increase in frequency due to climate change, causing more extensive damage to communities in the future.

NWT Hazard Summary

Very High

1. Fire/Explosion
2. Flood

High

3. Weather - Winter Storm
4. Transportation Accidents
5. Critical Infrastructure Failure - Energy Crisis
6. Critical Infrastructure Failure – Other
7. Critical Infrastructure Failure - Water Contamination
8. Weather - Other Extreme

Moderate

9. Industrial Emergency
10. Weather - Wind Storm
11. Human Disease
12. Ice Hazard
13. Snow Load Hazard
14. Earth Movement - Permafrost Degradation
15. Civil Unrest
16. Earth Movement – Other

Low

17. Earth Movement - Earthquake/ Tsunami
18. War/ International Incident
19. Food and Agricultural Emergency
20. Falling Debris

There are a number of reasons that the Fire/Explosion hazard ranked very high. First of all, twelve NWT communities have development areas with an extreme wildfire hazard and seven others have development areas with a high wildfire hazard. Secondly many of the industrial activities in the NWT have a high or moderate forest fire risk classification, including land clearing, timber harvesting, timber processing, mechanical site preparations and other silviculture treatments, gas or oil well operations, mining, highway maintenance and construction, engineering operations, plant harvesting, milling, railroad operations, trenching, and the use of explosives. In addition, urban fires and arson in isolated communities with volunteer firefighters can lead to the loss of critical infrastructure. In NWT communities with professional firefighters, it has been difficult recruiting and retaining resources. The NWT suffers roughly two million dollars' worth of urban fire losses annually (See Table 4). The Fire/Explosion hazard groups together explosions, wildfires, and urban fires. Emergency planners across the NWT should create fire education training and awareness sessions for first responders and the public and enforce fire prevention practices.

Floods have caused many losses in the NWT and are likely to continue to do so. A majority of the population is located on a body of water and nine communities are currently designated flood risk areas. Aklavik, Tuktoyaktuk and Hay River have been particularly hard hit. Emergency planners across the NWT's should develop and exercise plans and programs for watershed management, river/lake/ocean modelling/prediction and monitoring, erosion control, and flood response. In the face of rapid snowmelt and intense rains in spring and summer, communities susceptible to flash flooding should review and improve their drainage facilities and protect vulnerable buildings and facilities.

High Hazards

Six additional hazards fell into the high risk category, including all three Critical Infrastructure Failure hazards – Energy Crisis, Water Contamination and Other. Planners must consider that Critical Infrastructure Failure can combine with any natural hazard to impair response, increase damage to a community and prolong recovery. Critical infrastructure in the NWT can be very vulnerable due to:

- The high construction and operating costs owing to community remoteness and extreme cold temperatures;
- Rapid structural deterioration in extreme environments;
- The high cost of reopening public services, even after a short interruption;
- An existing infrastructure shortfall;
- The lack of options and “backups” in services; and
- Finances and human resource capacity limits.

Energy Crisis is a key risk in the NWT precisely because of community isolation and the extreme weather conditions. For most of the communities, fuel must be shipped in by pipeline, barge, road or air. A shortened ice road season, a disruption to pipelines or barge transportation, or prolonged extreme weather events can lead to shortages of fuel. Inuvik and Norman Wells, which have relied on natural gas-fired power plants in the past, are currently experiencing high exposure to this risk as they try to establish a reliable alternative.

Remote communities are particularly reliant on local infrastructure. Communications and transportation systems, as well as sewage treatment facilities, in the Dehcho Region all face

challenges that may lead to failure. Aging infrastructure across the NWT deepens this risk. For many in the NWT, failure of a critical infrastructure system could leave them without basic necessities or unable to contact other communities. For them, Critical Infrastructure Failure of energy, communication or transportation infrastructure could be catastrophic.

Water Contamination issues are of great concern to the people of the NWT. Most NWT communities depend upon one water source. A sudden and severe water contamination of this source in an isolated community would quickly threaten the health of the population and could lead to deaths and environmental damage. Droughts may contribute to contamination as pollutants become more concentrated.

NWT transportation infrastructure includes a network of roads, ports, airports and a railway connection at Hay River. Transportation accidents pose a significant risk to the people, property, environment and economy of the NWT, particularly when the isolation of many areas, weather conditions, and aging infrastructure are considered. Historically, the NWT has experienced accidents that have cost lives and caused property damage. The transportation of fuel and other dangerous goods through communities increases the potential impact of an accident, demonstrated tragically in the 2013 train derailment in Lac-Mégantic, QC. Climate change is expected to further deteriorate roads and airstrips. New transportation infrastructure projects are underway which may change driving patterns or increase the number of vehicles on NWT roads.

The increased frequency of snowstorms impacts roadway safety and contributes to transportation accidents. Winter storms cause millions of dollars of lost revenue due to the shutdown of operations and slow transportation of goods and services every year.

Weather - Other Extreme events such as electrical storms and drought can cause depletion of municipal water sources, increase in forest fire risk and insufficient water flow through waterways.

Emerging Issues Impacting Hazards in the NWT

A number of issues emerging in the NWT may have an impact on emergency response or alter the NWT's exposure and vulnerability to hazards over the next five years.

Emergency planners should pay close attention to two key issues evolving in the NWT - the growth of natural resource development and the expansion of infrastructure. There are a number of oil, gas and mining projects under development across the NWT at this time. Emergency planners need to create an open dialog with business in order to understand and plan for the possible exposures inherent in these operations. The GNWT is committed to the design, development, construction, and maintenance of a highway extending NWT Highway 1 (the Mackenzie Highway) from Wrigley to the Dempster Highway, and extending NWT Highway 8 (the Dempster Highway) from Inuvik to Tuktoyaktuk. Large scale infrastructure projects have inherent risks in their construction and operation. Emergency planners need to create an open dialog with government and contractors in order to understand and plan for the increased exposure. Other evolving issues are discussed in section 2.4, Emerging Issues.

Climate Change

Climate change strongly affects the hazards of the NWT. Temperatures have already increased by 3 to 4 degree Celsius over the past 50 years in the NWT and the rate of increase is expected to continue or accelerate. Climate change shifts the wind and cloud patterns and has an effect on the frequency of storms and lightning strikes across the region. Northern climate change has

been hard to predict but these are some of the effects that could increase the frequency or impact of hazards in the future:

- Rapidly rising temperatures (Fire/Explosion Hazard, Transportation Accidents Hazard, Critical Infrastructure Hazards, Earth Movement Hazards, Human Disease Hazard);
- Shorter, warmer winters (Transportation Accidents Hazard, Critical Infrastructure Hazards);
- Increased rain and snowfall in many regions (Flood Hazard, Snow Load Hazard, Weather Hazards, Earth Movement Hazards);
- More extreme fall and winter storms (Weather Hazards);
- Less predictable weather (Weather Hazards);
- Increased winds in some areas (Weather Hazards);
- Thinner ice (Ice Hazard);
- Lower water levels in some lakes and rivers (Critical Infrastructure Hazards, Water Contamination Hazard, Transportation Accidents Hazard);
- More forest fires in some areas (Fire/Explosion Hazard); and
- Rising sea levels (Flood Hazard, Earth Movement Hazards).

Qualitative data, definitions and more extensive analysis of each hazard is provided in the 2014 NWT HIRA Section 5 Hazard Narratives. Regional summaries are contained in Appendix 8.7, providing communities with a more locally-focused risk assessment.

Hazards are interconnected and fluid. They are not subject to regional and territorial boundaries and may have unique outcomes in different places. The NWT HIRA should be updated every five years or when new information about hazards that could impact the NWT becomes available.

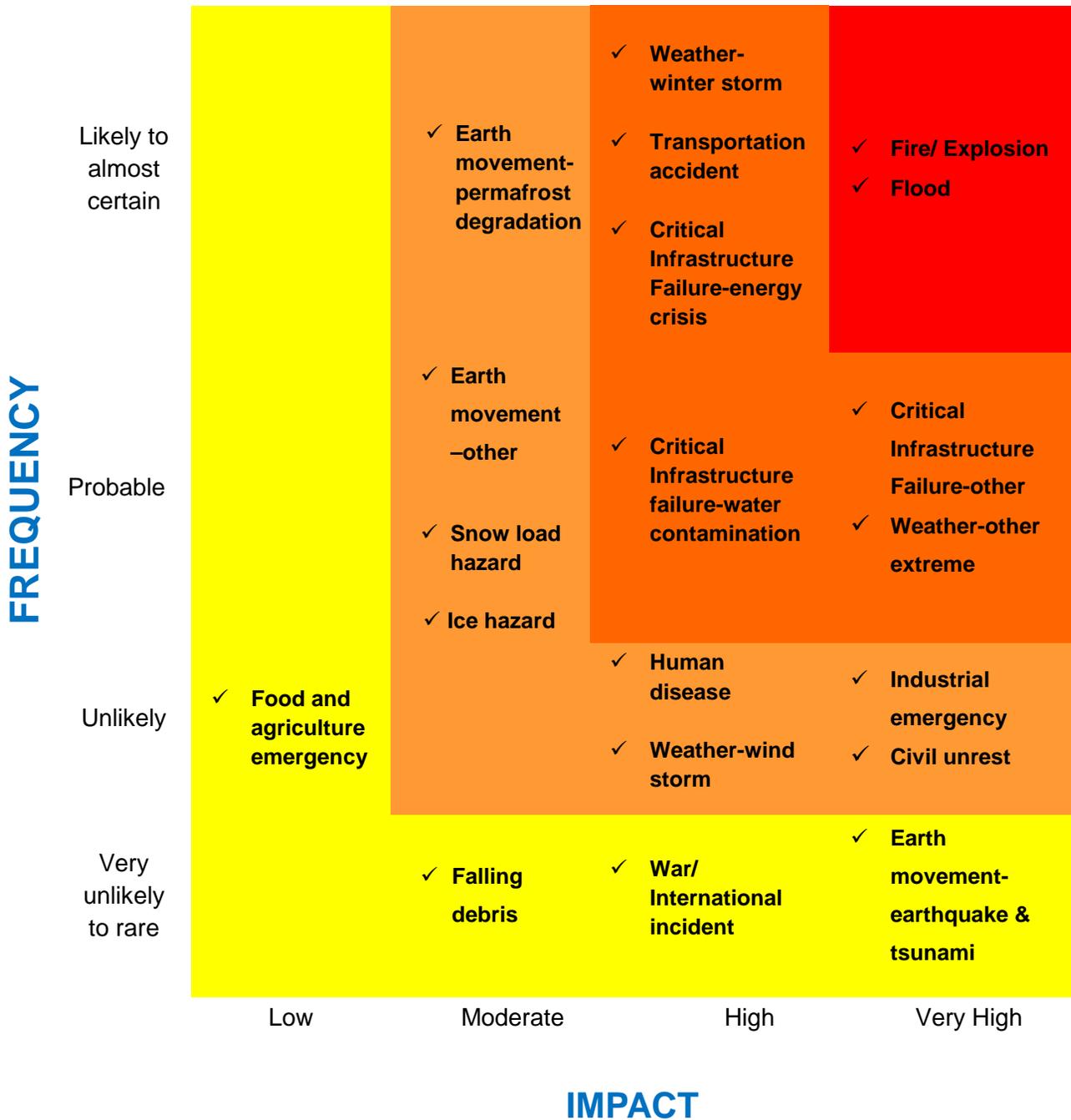


Figure 1: NWT HIRA Risk Matrix