

REVELSTOKE & AREA



Hazard, Risk and Vulnerability Analysis

Revelstoke and Area Emergency Management Program

October 2022



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Introduction

The purpose of a Hazard Risk and Vulnerability Analysis is to help a community make risk-based choices to address vulnerabilities, mitigate hazards and prepare for responding to and recovering from hazard events. The HRVA process assesses sources of potential harm, their likelihood of occurring, the severity of their possible impacts, and who or what is particularly exposed or vulnerable to these impacts. The results from an HRVA are foundational for any community emergency management program.

This Hazard, Risk, and Vulnerability Analysis is based on recommended practices and standards for conducting a local hazard risk assessment. Elements of this report were generated using the Hazard, Risk, and Vulnerability Analysis Tool for First Nations & Local Authorities produced by Emergency Management British Columbia (EMBC). The tool was developed with the support of a working group of emergency management practitioners across British Columbia, as well as the Alberta Emergency Management Agency (AEMA), through funding opportunities under the Federal Government's National Disaster Mitigation Program (NDMP). The tool and its supporting documents are provided free of charge to First Nations and Local Authorities in British Columbia.

This HRVA supports the implementation of the Local Authority Emergency Management Regulation 2(1) which requires local authority emergency plans to be reflective of a local risk assessment.



Emergency
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Methodology

The disaster risk calculations and visualizations used in this assessment are based on common practices for conceptualizing risk. It is important to note that there are many ways of conceptualizing risk; quantitative data is only one aspect of risk analysis, and a number of additional qualitative factors will often influence local decision making. This tool and its outputs should be considered as one element of a comprehensive Disaster Risk Reduction (DRR) program, and can help inform emergency planning and risk reduction strategy development at the community level.

The hazard list referenced within this report is based on the 57 Hazards identified in the Emergency Management Regulation (update) as well as any unique local hazards identified during the HRVA Process. For additional information on hazard identification and the HRVA process, please feel free to visit the Emergency Management British Columbia website.¹

¹ <https://www2.gov.bc.ca/gov/content/safety/emergency-preparedness-response-recovery>



All-Hazards Summary

The following table is produced from the values input into the Current and Future Likelihood Tables of the EMBC HRVA Tool, as well as the Consequence Assessment Tables. Data calculations alone do not always account for the core values of the community, and a specific hazard(s) priority number may have been intentionally adjusted to better reflect local concerns.

Risk Level Colour Codes	Low likelihood / Low Consequence	High likelihood / Low Consequence	Medium likelihood / Med. Consequence	Low likelihood / High Consequence	High likelihood / High Consequence
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Likelihood Scoring	A – Rare	B – Unlikely	C – Possible	D – Likely	E – Almost Certain
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Consequence Total	Combined scores of 11 specific categories – Maximum possible score of 44
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Priority	Hazard List	Current Likelihood	Consequence Total	Risk Level	Future Likelihood
1	Rail Incident	C	20	Medium Likelihood / Med. Consequence	C
2	Human Disease (including Pandemic and Epidemic)	C	18	Medium Likelihood / Med. Consequence	C
3	Hazardous Materials Spill	D	15	High Likelihood / Low Consequence	D
4	Wildfires	C	14	Medium Likelihood / Med. Consequence	D
5	Cyber Security Threat	D	11	High Likelihood / Low Consequence	D
6	Motor Vehicle Incident	D	11	High Likelihood / Low Consequence	D
7	Snowstorms and Blizzards	E	8	High Likelihood / Low Consequence	E
8	Air Quality	E	7	High Likelihood / Low Consequence	E
9	Avalanche	D	9	High Likelihood / Low Consequence	D
10	Landslide/Debris Flow	D	9	High Likelihood / Low Consequence	D
11	Drought	D	6	High Likelihood / Low Consequence	E
12	Extreme Heat	D	5	High Likelihood / Low Consequence	E



13	Lake, River, and Stream Flooding	B	16	Low Likelihood / High Consequence	C
14	Propane line leak	C	11	Medium Likelihood / Med. Consequence	C
15	Marine Vessel Incident	C	10	Medium Likelihood / Med. Consequence	C
16	Telecommunications Interruption	C	9	Medium Likelihood / Med. Consequence	C
17	Public Health Crisis	D	7	High Likelihood / Low Consequence	D
18	Electrical Outage	D	7	High Likelihood / Low Consequence	D
19	Hurricane/Typhoon/ High Wind Event	D	7	High Likelihood / Low Consequence	D
20	Structure Fire	D	6	High Likelihood / Low Consequence	D
21	Freezing Rain or Drizzle	D	4	High Likelihood / Low Consequence	D
22	Dam and Spillways Failure	A	34	Low Likelihood / High Consequence	A
23	Dike Failure	B	17	Low Likelihood / High Consequence	B
24	National Security Threat	B	14	Low Likelihood / High Consequence	B
25	Explosions	B	13	Low Likelihood / Low Consequence	B
26	Public Disturbance	B	9	Low Likelihood / Low Consequence	B
27	Wastewater Interruption	B	9	Low Likelihood / Low Consequence	B
28	Water Service Interruption	C	8	Medium Likelihood / Med. Consequence	C
29	Aircraft Incident	C	8	Medium Likelihood / Med. Consequence	C
30	Hail	C	6	Medium Likelihood / Med. Consequence	C
31	Lightening	C	5	Low Likelihood / Low Consequence	C
32	Structure Failure	B	7	Low Likelihood / Low Consequence	B
33	Earthquake	A	7	Low Likelihood / Low Consequence	A



All-Hazard Consequence Breakdown

Consequence Scores are an amalgamation of 11 specific categories found within the EMBC HRVA Consequence Tables. Each individual consequence category is scored from 0 - 4 (None - Extreme), with a possible combined high score of 44 for any single hazard. A visual breakdown of the total scores into each of the sub-categories is reflected in the consequence stacking table. Only categories that received a numerical score of 1 or higher are shown on the graph.

**Individual
Consequence
Scoring**

0 - None

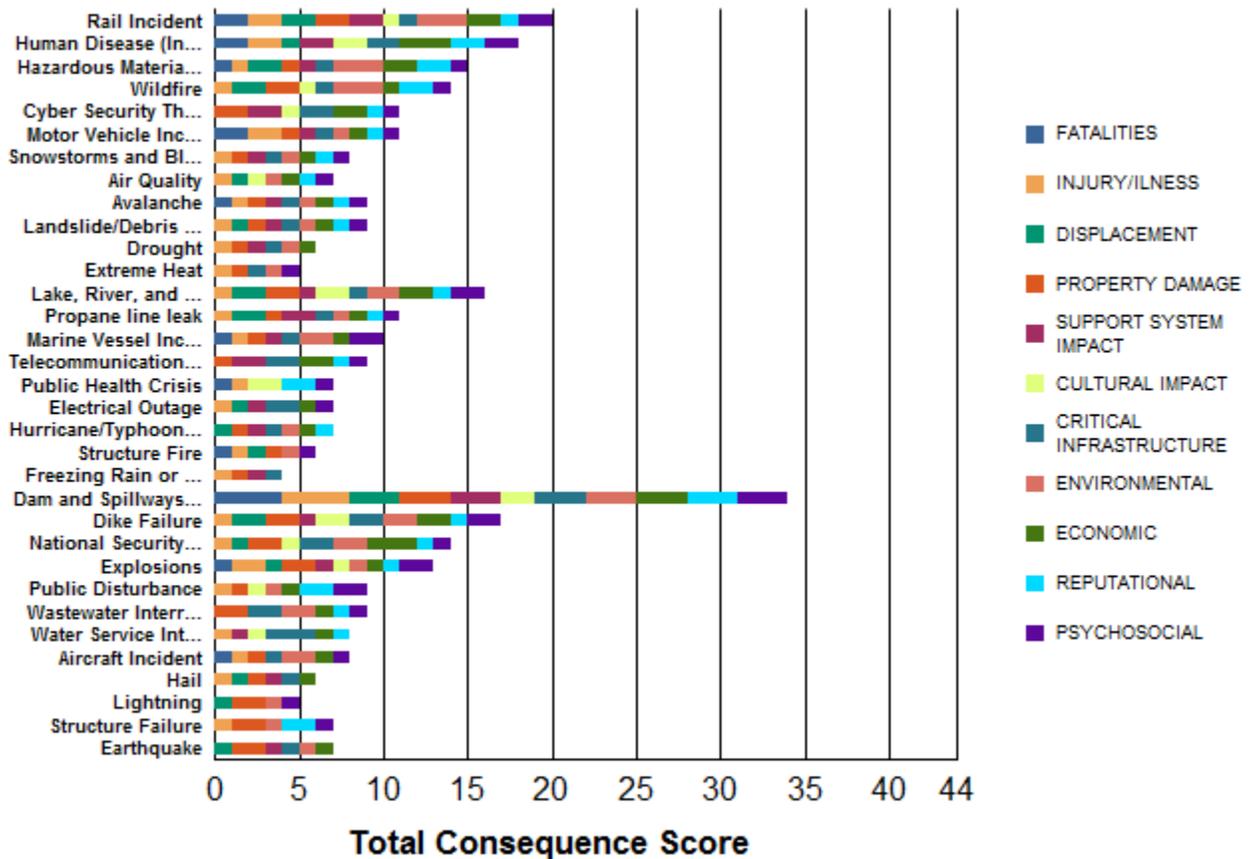
1 - Low

2 - Medium

3 - High

4 - Extreme

Consequences





Critical Assets & Infrastructure Summary

List the critical assets which service the community. Namely, water, food, transportation, health, energy & utilities, safety, telecommunication & information technology, and finance.

Infrastructure	Assets
City Hall Community Recreation Centre Public Works RCMP Revelstoke Fire Rescue Services BC Ambulance Service Search and Rescue Queen Victoria Hospital Sewerage Treatment Plant Water treatment plant Water reservoirs, pump stations and network Emergency Operations Centre Communications – Network Edge Radio stations Schools <ul style="list-style-type: none"> – Revelstoke Secondary, Arrow Heights, Columbia Park, Begbie View Banks <ul style="list-style-type: none"> – RBC Royal Bank, TD Canada Trust, CIBC, Revelstoke Credit Union Grocery stores <ul style="list-style-type: none"> – Save-On-Foods, Southside Market Gas stations <ul style="list-style-type: none"> – Petro-Can, Chevron, ESSO, Shell, FasGas, 7-11, Big Eddy, Chevron Commercial Cardlock, Eds Gas Revelstoke Dam, BC Hydro Fortis Propane Plant Telus building and network Road network Columbia bridge (TransCanada) Bid Eddy bridge Fourth St bridge TransCanada Highway Highway 23, north and south Airport Railway network Ferry - Galena/Shelter Bay	<u>Internal</u> RFRS – staff, apparatus, equipment Public Works – staff, vehicles, equipment IT – staff, hardware, software Emergency Support Services EOC staff CSRD Staff Internet delivery structure Radio system (first responders, City)
	<u>External</u> RCMP – staff, vehicles, equipment Victim Support Services BCAS – staff, vehicles, equipment Health Emergency Management BC (HEMBC) IHA IMIT – (communication disruption) MOTI/Emcon BC Hydro – staff, equipment Fortis – staff, equipment BC Wildfire – staff equipment Parks Canada – staff, equipment CPRail BC Ferries Selkirk Medical Group



Vulnerability Summary

List community groups or members, structures and environments that may be more vulnerable to emergencies.

Social

- Elderly – group homes or retirement complexes (Mt Cartier Court, Moberly Manor, Mt. Begbie Manor)
- Gender – mothers and children, violence against women (Women’s shelter)
- Infirm – hospitals (Queen Victoria Hospital)
- Language – ethnic centres
- Persons with disabilities – vision, hearing, mobility, mental, dependency (Community Connections, assisted living, list of independent disabled)
- Young – schools or recreation centres (RSS, AHE, CPE, BVE, daycares)
- Displaced
- Recent arrivals, tourists

Economic

- Agricultural land and animals
- Lack of economic diversity – few major employers or tourism
- Limited access to credit
- Minimal access to critical services (Beaton, Galena Bay, Trout Lake)
- No insurance
- Poor – social housing or low-rent areas
- Food bank

Physical

- One ingress/egress route (QV Hospital, EOC, Airport, RMR, Arrow Heights)
- Bridges - 4th St/Illecillewaet (design standards), Big Eddy (age)
- Communications systems – telephone, radio, cellular, television (Telus, Bell)
- Critical infrastructure (Greeley water treatment plant, Big Eddy water)
- Infrastructure below high-water flood elevation
- Propane distribution pipelines
- Structures built before, or without, building codes/fire codes
- Power transmission towers
- Transportation – routes, terminals, systems: road, rail, air, water (TCH, Hwy 23, CP rail, Ferries)

Environmental

- Areas of biodiversity and ecological value – wetlands (Species at risk)
- Parks (Mt. Revelstoke, Glacier, Blanket, Arrow Lakes, Martha)
- Resource degradation or depletion – forests
- Sensitive areas – riparian or fisheries

Underlying Disaster Risk Driver Summary

Poverty and inequality

Climate change

Rapid growth

Resort community, tourists, seasonal population fluctuations

Availability of technology in remote areas



Risk Reduction Measures

Resiliency of a community is the ability to resist and recover from disasters. There are many measures that are already in place to protect against the effects of hazards. A key goal of the HRVA is to identify additional strategies that reduce the risks identified in this analysis. Below is a table of current and future risk reduction measures for the higher ranked hazards.

There are several risk reduction measures that would assist in the mitigation of multiple hazards and reduce the overall risk. These recommended actions should be a priority and include:

- Emergency Response Plan update
- Evacuation Plan update
- Business Continuity Plan
- Communications Plan for emergency messaging
- Increase trained staff for EOC and frequency of EOC training
- Climate change review of HRVA
- Improve access/egress to isolated areas to improve emergency access and evacuation capability.

Hazard	Current Risk Reduction Measures	Future Risk Reduction Measures
Rail accidents	Community Emergency Planning Guide Integrated Contingency Plan CP Response Organization (CP Police, Hazmat) Inspection/maintenance program (analytical tech) Tank car construction standards Standard procedures Emergency response equipment AskRail Provincial/local evacuation plan IHA protocols (decon, environment, EOC)	
Pandemic	IHA safety plan, Health Emergency Management BC support BC Pandemic Provincial Coordination Plan BC Centre for Disease Control Services Revelstoke Pandemic hazard plan	Business continuity plan



HAZMAT	Canutec RFRS-operations Regional Hazmat Team Provincial Environmental Emergency Program IHA protocols (decon, environment, EOC) Provincial hazmat release response plan	Update RAEMP Hazmat Response OG
Interface wildfire	BC Wildfire, RFRS, Parks Training, joint exercises EmergInfo BC, Alertable - evac notices Community Wildfire Protection Plan (including fuel breaks) Evacuation plans (City, IHA) Inter-agency coordinated response under Province's emergency response framework Notification systems (Alert Ready, Alertable) Burning restrictions	Update CWPP to Community Wildfire Resiliency Plan Local structure protection unit Update evacuation plans FireSmart - assessments and awareness OCP - Development permit area
Cyber Security	Daily cybersecurity patrols Quarterly audits on user access and onboards/offboards IHA IMIT	
Motor vehicle incident	BCAS, RCMP, RFRS - Highway rescue MOTI/Emcon Multiple access routes. Notification - DriveBC, Alertable	
snowstorms / blizzard	Envir Canada, Alertable, EmergInfo BC Public works snow removal MOTI / EMCON BC Hydro repairs Communication Plan IHA EM plan, policies Fortis supply procedures	



<p>Air Quality</p>	<p>Emergency Management Act Open burning smoke control regulation. Anti-idling bylaw Air quality advisory - BC Gov service Air Quality Health index Envir Canada, Alertable, EmergInfo BCIHA/media PSA for air quality plans HEMBC air exclusion plans</p>	
<p>Avalanches</p>	<p>Canadian Avalanche Association Parks Canada, MOTI SAR Avalanche Bulletins</p>	
<p>Drought</p>	<p>Water restrictions. Alternate water sources Provincial drought response plan</p>	
<p>Heatwave</p>	<p>Water restrictions Land use restrictions Cooling Centre Envir Canada, EmergInfo BC Notification systems (Alert Ready, Alertable) IHA: Heat Alert & Response Planning toolkit BC gov: extreme heat preparedness planning Workplace acclimatization Energy efficiency</p>	<p>Heat Alert Response System (BC HARS) Local heat response plan Contingency plan for power supply to cooling centres</p>
<p>Flooding</p>	<p>Dike systems, annual inspections Flood plain mapping River Forecast Centre Flood preparedness guide BC Hydro flood alerts BC Hydro Columbia River system - wide coordination to reduce local impacts Provincial Flood Emergency Plan Evacuation plans (City, IHA) IHA community client list Notification systems (Alert Ready, Alertable)</p>	<p>Updated flood mapping assesment Develop flood resiliency road map Second means of access to Arrow Heights</p>