



Regional District of Bulkley-Nechako

HRVA Electoral Area' C' Committee Backgrounder

ELECTORAL AREA 'C' HAZARD IDENTIFICATION

DECEMBER 2021

"Know the Risks, Make a Plan, Be Prepared"

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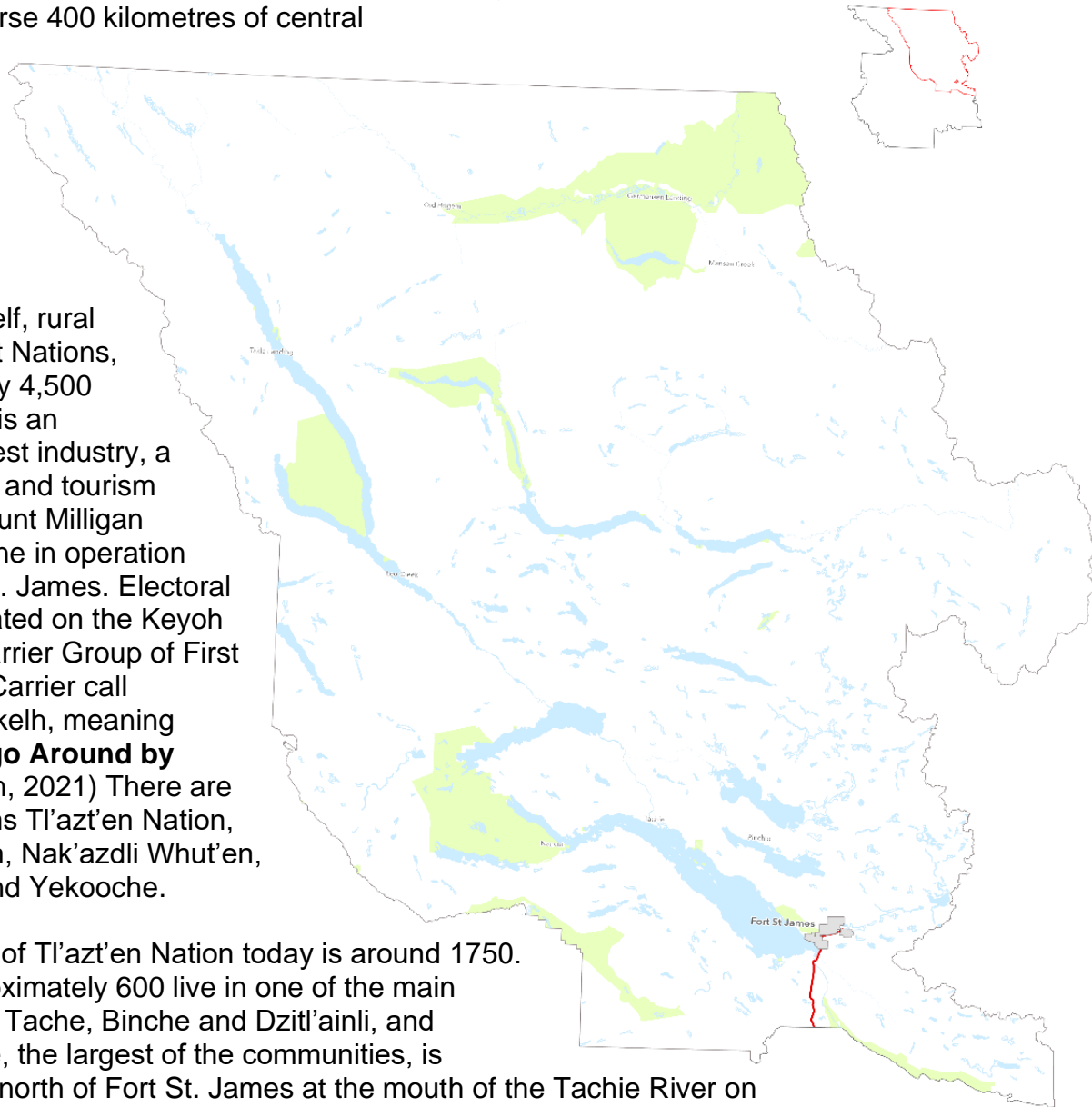
CHAPTER 2: ELECTORAL AREA 'C' HAZARD IDENTIFICATION

Electoral Area 'C' Geographic Setting

Electoral Area 'C' (Fort St. James Rural) is the rural area surrounding the District of Fort St. James. The unincorporated communities within the area are Manson Creek, Germansen Landing, Leo Creek, Tachie, Nancut, Pinchie, Takla Landing, Old Hogen, and Trembleur. The area is the gateway to a chain of rivers and lakes that traverse 400 kilometres of central British Columbia.

The population of the Fort St. James's area, including the municipality itself, rural areas, and First Nations, is approximately 4,500 people. There is an established forest industry, a growing mining and tourism sector, with Mount Milligan copper-gold mine in operation North of Fort St. James. Electoral Area 'C' is situated on the Keyoh (land) of the Carrier Group of First Nations. Most Carrier call themselves Dakelh, meaning **"People Who go Around by Boat."** (Whut'en, 2021) There are five First Nations Tl'azt'en Nation, Binche Whut'en, Nak'azdli Whut'en, Takla Nation and Yekooche.

The population of Tl'azt'en Nation today is around 1750. Of these, approximately 600 live in one of the main communities of Tache, Binche and Dzitl'ainli, and K'uzche. Tache, the largest of the communities, is situated 65 km north of Fort St. James at the mouth of the Tachie River on Stuart Lake. Binche Whut'en is 25 km from Fort St. James and at the mouth of the Binche River which drains Binche Lake into Stuart Lake (Binche, 2021). Dzitl'ainli is on Leo Creek Road alongside Trembleur Lake. K'uzche is on the Tache River. The main



administrative offices are in Tache. Tache also houses an elementary school, daycare, head start, and health office. (Nation T. , 2021)

Nak'azdli Whut'en is a non-treaty First Nation located adjacent to Fort St. James. It has eighteen reserves in total in and around Fort St. James. Most people live on Indian Reserve (IR) #1 which is separated from Fort St. James by Kwah Road. There are also a few families on IR #1A up the North Road at Four-Mile and William's Prairie Meadow. The current population of Nak'azdli is close to 2000 members though only about 700 live "on-reserve." Most of those living "off-reserve" live in Fort St. James or Prince George.

The traditional territory of the Takla First Nation is approximately 27,250 square kilometers. Takla Nation is an amalgamation of the North Takla Band and the Fort Connelly Band, a union which occurred in 1959. (Nation T. , 2021)

Yekooche First Nation is located about 85 km northwest of Fort St James. It comprises 4 reserves on a total of roughly 180 hectares. Most of the band members live on Reserve #3 (Yekooche) located along the northwest arm of Stuart Lake, where Nancut Creek drains Cunningham Lake into Stuart Lake. Currently the Yekooche First Nation is not affiliated with any other tribal councils or treaty groups. (Yekooche, 2021)

Stuart Lake, Pinchi Lake, Tezzeron Lake, Trembleur Lake, Babine Lake, Takla Lake, Tchentlo Lake and the Stuart River and Necoslie River are the predominant natural features of the area. Their importance, along with other lakes and watercourses to the local communities, the entire region, and areas beyond cannot be over emphasized. These features play a role in many aspects of community life. They are the source of drinking water, an economic generator, and a recreational playground. (Depatrmnt, 2010)

Electoral Area 'C' Hazard History

Electoral Area 'C' has experienced several events that have impacted residents of the region since the early 1900's. The regularity of the event happening determines the risk factor which will be used in the Hazard, Risk, and Vulnerability Analysis.

There are only two well-known and documented hazards in Electoral Area 'C' including wildfire and flooding. These hazards are high risk and are a priority to all communities within the Regional District of Bulkley-Nechako.

[Appendix 1](#), Historic Hazard Data, provides the details on recorded events in Electoral Area 'C' from 2001 to 2021.

The Regional District HRVA 2003 Hazard, Risk, and Vulnerability Analysis Priority Matrix identifies the following hazards:

FREQUENCY	Very Low	Low	High	Very High	
			Fire – industrial (18)	Fire- interface & Wildfire, Flood (24)	Frequent or very likely
	5 Avalanche (5)		Dangerous goods spill, Epidemic- human, Explosion transportation accident – Road (15)	Severe Weather (20)	Moderate or likely
	4	Critical Facility Failure, Infrastructure Failure (8)	Transportation accident – Air, Rail (12)	Earthquake (16)	Occasional, slight chance
	3	Epidemic – Animal (6)	Landslide, debris flow (9)		Unlikely, Improbable
	2		Terrorism (6)		Highly unlikely (rare event)
	1	Dam Failure, Mine Accident (2)		Volcano Eruption (4)	Very Rare event
	1	2	3	4	
	SEVERITY				

Risk index # is the Frequency x Severity.

The District of Fort St. James Emergency Management Plan does not contain a risk matrix.

Tl'azt'en First Nations has and Emergency plan from 2010 and is in the process of reviewing and renewing this plan. This Plan has a list of hazard probabilities.

Nak'azdli Whut'en has and Emergency Plan from 2010 containing a list of hazard probabilities.

Takla Lake First Nation has an emergency plan updated in August 2018. The Emergency Plan contains a list of hazard probabilities, and contains a historical hazard response matrix, including a number of hazard response action plans.

Yekooche First Nations has and Emergency Plan from 2013. This Plan contains a list of hazard probabilities, and a historical hazard response matrix and action plans.

Binche Whut'en First Nations Emergency Management Plan is currently (2021) being developed.

Defining Hazard Considerations for Electoral Area 'C'

This section provides definitions from the HRVA Hazard Reference Guide 2021 Province of British Columbia and includes descriptions of various hazards in the Fort St. James hazard plan and from the various surrounding First Nation Emergency management plans. These definitions and related information can help to inform the HRVA advisory committee in determining what hazards will be analyzed in this HRVA process.

The hazards are grouped in to three categories: Natural Hazards; Human-Caused Hazards; and Diseases, Pest Infestations & Epidemics. Hazards defined in this section are based on historical events that may have impacted Area 'C' as well as following the Hazard, Risk, and Vulnerability Analysis Priority Matrix's from the Regional District HRVA 2003, the Fort St. James hazard plan, and from the various surrounding First Nation Emergency management plans. This backgrounder has also been updated with input and further research resulting from the Hazard Identification workshop on November 29th, 2021. The top two priority hazards identified by RDBN staff include:



Flooding



Wildfire

Known hazards are also identified on a map of electoral area 'C' and can be found in [Appendix 3](#) of this chapter. HRVA electoral area 'C' Committee Workbook Backgrounder. Additional hazard definitions and information can be found in the provinces [HRVA Companion Guide 2021](#).

If you have information on known hazards, resources or details on resiliency strategies related to the hazards listed below, please include these as notes and pass them on to the Regional District HRVA Coordinator for inclusion in the analysis.

Indigenous Traditional Knowledge

Long before European explorers and traders arrived in the late 1700s, Indigenous people in BC told stories and practiced traditions to share important knowledge about natural hazards. By repeating these stories, Indigenous people passed on valuable information about how to prepare for and survive disasters across time and across generations. (Prepare BC Emergency Management BC, 2019)

Those holding traditional knowledge can assist in understanding the nature of local hazards, suggest appropriate risk reduction and response mechanisms, and even give options for recovery based on past experiences. They can also help us recognize and respect the long history and rich traditions of First Nations communities on this land. (Munsaka, 2018) The Regional District recognizes the importance of learning from traditional knowledge and is looking to continually strengthen and develop relationships in the hopes that this knowledge can assist and inform future emergency planning and preparedness planning to ensure the safety and sustainability of our communities.

Summary of Climate Patterns

The information below has been summarized from the *Climate Patterns, Trends, and Projections for the Omineca, Skeena, and Northeast Natural Resource Regions, British Columbia - Technical Report 097*, 2016. (Foord, 2016)

Baseline climate of the Fort St. James District

Seasonal/Annual	Precipitation (mm)	Mean temperature (°C)	Maximum temperature (°C)	Minimum temperature (°C)
Fort St. James District				
Winter	129.3	-9.9	7.9	-36.9
Spring	84.8	2.6	24.1	-24.1
Summer	138.1	13.4	30.4	-1.5
Fall	135.6	3.0	23.4	-21.0
Annual	486.5	2.2	30.6	-38.4


Omineca Natural Resource Region Trends (1895 – 2008)

The Omineca Natural Resource Region has become warmer and wetter over approximately the last century. Precipitation has increased by approximately 20% in spring, summer, and fall. Mean summer and fall temperatures has occurred in the Fort St. James District (approximately 2°C each). Extreme maximum temperatures have increased significantly in the Fort St. James and Mackenzie Districts during winter. The annual extreme minimum temperature has increased by 2.9–5.7°C across the region, likely because Arctic air movements through the region have become less frequent because the jet stream has been moving northward. Increases in spring extreme minimum temperatures have been large (up to 9.3°C in the Fort St. James District) and seem to follow an east-to-west trend across the Omineca. Summer minimum temperatures have increased by slightly more than 1°C in most districts. Fall minimum temperatures have increased significantly in the Fort St. James and Mackenzie Districts (4.6 and 3.3°C, respectively). Annual temperature has increased the most (>2°C) in the Fort St. James District.

Omineca Natural Resource Region Climate Projections

Mean annual temperature in the Omineca Natural Resource Region is projected to increase by 3.5°C with minimum temperatures increasing more than maximum temperatures. Mean annual precipitation is projected to increase by 7%. Any increases will likely be as rainfall because precipitation as snow is projected to decrease by about 30% (ranging from -10% in Mackenzie District to -40% in the Robson Valley). The number of growing degree-days will increase, and the number of frost-free days will increase. Evaporation and climate moisture deficit will increase despite moderate increases in growing-season precipitation.

A Note about Climate Change:

 Climate change impacts both the frequency and intensity of many hazards. It may also cause new hazards to emerge. In this HRVA methodology, climate change is not indicated as a separate hazard; however, those hazards identified as being impacted by climate change are indicated with a special symbol. e.g. Drought (BC E. M., 2021)

Natural Hazards

Flooding: Lakes, Rivers, and Stream



Flooding is the overflow of natural drainage channels, natural shorelines and/or human-made facsimiles leading to partial or complete inundation from the overflow of inland or tidal waters, and/or the accumulation or runoff of surface waters from any

SOURCE. (BC E. M., 2021)

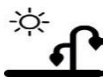
- Floods in Electoral Area 'C' are caused by natural conditions and geography. The area experiences a variety of flooding due to:
 - Heavy Rains or rain-on-snow events in spring, fall, and winter months;
 - Spring freshet flooding from rapid snow melt; and
 - Intense precipitation at any time of year.
- Stuart River and Lake are of the highest concern in the area.
- The [Regional District Floodplain Management Bylaw No. 1878, 2020](#) was established to reduce or prevent injury or the loss of life, and to minimize property damage, during flood events. This bylaw contains drawings for Stuart River and Lake, Takla Narrows and lists other lands which are below the flood construction levels of the Bylaw.
- 216 addresses are in the floodplain this includes Fort St James and Nak'adli Whut'en.
- The Province of BC has invested in [Flood Plain mapping](#) along the Stewart River and Lake at Fort St. James. With the BC River Forecast Centre continual monitoring and forecasting river flows.
- See [Appendix 2](#) for hydrometric data reporting annual maximum daily discharge rates (m³/s) for five Ministry of Environment monitoring stations.
- Notable floods in Electoral Area 'C' can be found in [Appendix 1](#).
- Hudson's Bay Creek caused flooding due to significant rainfall on snow that affected 3 homes in October in Takla. This creek has a possible freshet issue.
- Tear drop FSR is impacted annually with erosion and flooding. Single access and egress for residents. There is a backroad to PG that is not always open.
- Binche and T'latzen are at risk of flooding.
- Sowchea Bay is a big issue as is Nak'azdli reserve along the lower road. 30 homes more at risk, the rest is up high.
- Yekooche is at risk of flooding, a lot of the area is low land.
- Takla Main Road is lake shore a large sluff into the lake, the road would be an issue. There is no study we are aware of on Reserve Road, FLNRORD looks after the road past the reserve.

Comments and Questions for consideration and further research:

- A mitigation for one hazard can impact another. Ex. Removing trees arounds roads to reduce wildfire risk may cause flooding risk.
- Observe what will happen at Sowchea Creek area due to logging around Yekooche.
- Opportunity to maintain the teardrop road and the 400 road to keep the road open would require good spring maintenance. Can this be passed on to FLNRORD or MoTI?

Related Hazards: Hurricane/Typhoon/High Wind Event / Landslide/Debris Flow / Storm Water Flooding / Flash Flooding / Dam and Spillways Failure / Dike Failure

Drought



Drought is a recurrent feature of climate involving a deficiency of precipitation over an extended period, resulting in a water shortage for activities, communities, or aquatic ecosystems. In BC, combinations of insufficient snow accumulation, hot and dry weather, or a delay in rainfall may cause drought. (BC E. M., 2021)

- Drought can lead to reduced water availability for household and business use. Lower stream flows may cause warmer river temperatures, affecting fish and other aquatic life. Low stream flows can also affect the growth of agricultural crops and limit the water available for irrigation. Low flows and extended periods of low precipitation can also have impacts on groundwater levels. Aquifers – particularly those at shallow depths - may develop a lower water table due to drought in any given year and from previous drought seasons, as there may not be enough water to recharge the aquifer. If natural water sources or adequate storage are not available in a community, it may also lead to insufficient supplies for firefighting. (Econics, May 2021)

Notable regional incidents and experiences involving drought:

- Due to relatively normal to high snowpacks in the spring, early forecasts did not flag a drought risk for 2018. However, a heat wave in late spring rapidly depleted snowpacks and caused freshet flooding earlier than normal. That, and the lack of precipitation from July to November, created extensive dry conditions across lots of the province.
- In 2018, the Northwest, Upper Fraser West, Upper Fraser East, and Nechako regions reached Level 2 to Level 3 drought ratings, meaning these areas were very dry. (BC Agriculture & Food Climate Action Initiative, 2019)
- Seeing drying forests and increase in wildfire risks.
- There have been some periods of time where they have experienced drought – 2014, 2015, 2018.

Related Hazards: Extreme Heat / Lightning / Animal Disease / Human Disease / Plant Disease and Pest Infestation / Public Health Crisis / Wildfire / Food Source Interruption / Water Service Interruption.

Wildfire



An unplanned fire - including unauthorized human-caused fires - occurring on forest or range lands, burning forest vegetation, grass, brush, scrub, peat lands, or a prescribed fire set under regulation which spreads beyond the area authorized for burning.

The wildland urban interface (WUI) is any area where combustible forest fuel is found adjacent to homes, farm structures or other outbuildings. This may occur at the interface, where development and forest fuel (vegetation) meet at a well-defined boundary, or in the intermix, where development and forest fuel intermingle with no clearly defined boundary. (Service B. W., 2021)

- There are 21 rural area addresses, and approximately 20 addresses in Yekooche in a high Wildfire Urban Interface risk area¹.
- The Wildland-Urban Interface (WUI) occurs where homes, structures, and critical infrastructure are found adjacent to or intermixed with combustible vegetated lands. Historically in BC, the WUI was created by buffering an area, using geographic information systems, where structure density is greater than 6 structures/km² by 2 km. The 2 km buffered area was originally designed to represent a reasonable distance that embers from a wildfire can travel to ignite a structure.
- The District of Fort St James and Nak'azdli Band has a Community Wildfire Protection Plan developed in 2013. The plan identifies grassfires as the most common wildland type of call to the fire department.
- The Fort St James area is included within the Sub Boreal Spruce Forest Ecosystem and is rich in diverse forests. Local forests are comprised of unmanaged mature forests, unmanaged immature forests, managed plantations, and open swampy ground. Tree cover is comprised of Lodgepole Pine, White and Black, Spruce, Douglas Fir, Balsam Fir, Aspen, Cottonwood, and White Birch. (Lants, Bennet, & Flannery, 2013)
- Yekooche First Nations reported 2006/2007 interface & Wildfires. (Nation Y. F., 2013)
- The Regional District of Bulkley Nechako operates a [FireSmart program](#) that is a federal, provincial, and community-based program that encourages the public to take simple, scientifically proven steps to increase wildfire resiliency. In 2021 the RDBN FireSmart educator conducted 15 home assessments in Electoral Area 'C' to help residents better understand and apply these practices on their properties and homes. These assessments came with funding for mitigation work.

Notable fires outside Electoral Area 'C'

In the summer of 2018, the RDBN mobilized its emergency management structure for over 72 days in response to 15 major fires which resulted in 64 evacuation orders and alerts with 1,544 dwellings under evacuation order, affecting approximately 3,475 people and requiring the relocation of over 3,000 livestock. Eight dwellings and over 45 other structures were lost and a declaration of state of local emergency was in place from August 1 to September 20. (Inc., 2019)

Comments and questions for consideration and further research:

- A fire at or near the Cunningham FSR would cut off Yekooche. Leo Creek FSR would cut off Takla. North Road would cut off Mason Creek and Germasens landing.

¹ This data was collected on October 6, 2021 from the RDBN GIS system

- Need for a fire break along the pipeline north of the community.
- Concerns about Dickson Mountain Way.
- Mount Poke and FSJ there is a lot of ground fuel, this is a provincial park. FSJ is working with FLRORD and Parks to look at mitigation options for the area.
- Interested in the status of Fire Smart in each area.

Related Hazards: Air Quality / Extreme Heat / Lightning / Structure Fire / Explosions / Drought / Structure Failure / Electrical Outage / Telecommunications Interruption / Transportation Route Interruption / Water Service Interruption.

Area C Weather Hazards

- According to Environment Canada, in the Smithers area, the minimum extreme temperature recorded was -43.9 degrees Celsius and occurred in January of 1950. On average, there are less than 1.1 days in January where the temperature reaches below -30 degrees Celsius. (Canada E. , Climate Normal 1981-2010 - Smithers A, Climate ID 1077500, 1981-2010)
- Snowfall is a common occurrence in the winter months for the Bulkley Valley, although it is rarely heavy enough to pose a significant risk. Historic climate data collected by

Climate Norm's 1981-2010²

Annual Rainfall 367.2 mm
Annual Snowfall 182.7 mm
Average Temperature, January -7.2 C
Average Temperature, July 15.2 C
Frost-free Days 108 days
Hours of Sunshine 1621 hrs. per year
Maximum Temperature 37.1 C (June 27, 2021)
Minimum Temperature -43.9 C (Jan. 13, 1950)

Snowstorms and Blizzards



Meteorological disturbance giving rise to a heavy fall of snow, often accompanied by strong winds. Snowstorm and blizzards impact upon transportation, powerlines and communications infrastructure, and agriculture. (BC E. M., 2021)

Environment Canada suggests that the prevailing winter winds blow from the Southeast. During the winter months, the most common winds are south easterlies. It is important to note that winter winds are generally much stronger than summer winds in the area. (Canada E. , Climate Normal 1981-2010 - Smithers A, Climate ID 1077500, 1981-2010)

- According to historic climate data, the greatest one-day snowfall was 51 cm recorded October 27, 2006. This is also confirmed and documented in historical evidence in the Yekooche Emergency Plan.
- Snowstorm, freezing rain up Takla, Yekooche and Tachie are more at risk on road surfaces with distance.

Related Hazards: Extreme Cold / Freezing Rain or Drizzle / Avalanche / Structure Failure / Electrical Outage / Food Source Interruption / Telecommunications Interruption / Transportation Route Interruption / Fuel Source Interruption / Aircraft Incident / Motor Vehicle Incident.

² (Canada E. , Climate Normal 1981-2010 - Fort St James, Climate ID 1092970, 1981-2010)

Extreme Heat



Heat waves can be characterized by temperatures significantly above the mean for an extended period, or by a combination of high temperatures with high humidity and a lack of air motion. Heat waves impact upon the very young, the elderly and those with cardiovascular conditions. Heat waves also impact upon agriculture. (BC E. M., 2021)

- The last week in June 2021 brought about unprecedented heat in British Columbia and across western Canada. With forecasts stating it was the warmest stretch since records have been kept (In many instances 100+ years) ((MSC), 2021). With CBC reporting 486 sudden deaths over a five-day period from June 25th – 30th, 2021 195% increase over the approximately 165 deaths that would normally occur in the province over a five-day period. (Service B. C., 2021)
- Temperatures reaching 40°C on June 29, 2021. (Online, 2021)
- Nak'azdli purchased several air conditioning unit to set up a colling station if required to support elders during extreme heat wave events.

Comments and Questions for consideration and further research:

- What are the ramification for the most vulnerable populations during extreme heat events? What mitigation need to be in place?

Related Hazards: Lightning / Animal Disease / Human Disease / Plant Disease and Pest Infestation / Public Health Crisis / Structure Fire / Wildfire / Drought / Food Source Interruption / Water Service Interruption.

Lightning



Generally, all the various forms of visible electrical discharge that are produced by thunderstorms; often seen as a bright flash of light in the sky. Lightning impacts air transportation, powerlines and communications infrastructure and causes forest fires. (BC E. M., 2021)

- Lightning occurs virtually year-round in the Pacific coastal region. The average date of the beginning of lightning season in Western Canada (1999-2018) for British Columbia - Interior – North and high mountain ranges is June 1st. The Average date of the end of the lightning season in Western Canada (1999-2018) is between October 1st and November 1st. (Canada G. o., Lightning Statistics, 2016)
- The Canadian Lightning Detection Network (CLDN) was established in 1998 and consists of over 80 lightning sensors distributed across Canada. (Canada G. o., Lightning, 2016)
- Some quick facts regarding forest fires from [Natural Resources Canada](#), Forest fires started by lightning, represent 45 per cent of all fires and 81 per cent of the total area burned in Canada, and occur in remote locations and often in multiple clusters. (Canada G. o., Lightning Statistics, 2016)
- Total ground to cloud lighting strikes from 1999-2018 in Prince George was 9,499 and the average number of lightening days (within 25km) is 32.9. (Canada G. o., Lightning Statistics, 2016) Historical Lightning strike data is included in [Appendix 3 – Hazard Maps](#).

Related Hazards: Hail / Wildfire / Storm Water Flooding / Flash Flooding / Electrical Outage / Telecommunications Interruption.

Air Quality



Solids, liquids, or gases which, if discharged into the air, may result in statutory air pollution. (BC E. M., 2021)

- Communities in this regional district experience air quality episodes due to elevated particulate concentrations at various times throughout the year. Particulate matter is a concern for human health and from an aesthetic point of view. The AQHI reports on the health risks posed by a mixture of pollutants, including [particulate matter \(PM_{2.5}³\)](#), ground-level ozone (O₃), and nitrogen dioxide (NO₂). (BC A. Q., 2021) These readings illustrate the level of health risks with a number and advice on minimizing health risks from air pollutants.
- In Canada, wildfires can significantly increase air pollution levels of fine particulate matter (PM_{2.5}) posing the greatest human health risk (Canada H. , 2021).
- Elevated PM_{2.5} typically occur in the autumn and winter months when dispersion is poor and many different emission sources (industry, space heating, open burning) are active. (Zirnhelt, June 21, 2021)
- There is one [Purple Air Quality Monitoring](#) station in Takla Landing.

Comments and Questions for consideration and further research:

- Will we see a decrease in air quality due to weather changes and increases in wildfires?

Related Hazards: Human Disease / Public Health Crisis / Structure Fire / Wildfire / Ash Fall / Explosions / Hazardous Materials Spill / Oil or Gas Pipeline Spill.

Space Weather



A disturbance or fluctuation in the earth's magnetic field, associated with solar flares. The impact may include disruption of electrical grids, communications systems, navigation equipment, and satellite operations. Resource operations including surveying, drilling, and pipelines may also be negatively affected. (BC E. M., 2021)

- The source of space weather is the Sun. The Sun is a million times larger than Earth and so distant that its light takes eight minutes to reach us. When violent solar phenomena occur, they create space weather effects on Earth, which can pose a hazard for human activities. (Government of Canada, 2021)
- Effects from solar activity include (but are not limited to) geomagnetically induced currents in power systems and pipelines, azimuthal errors in directional drilling, disruptions to HF radio communication and GPS navigation, and failure or misoperation of satellites:
 - Magnetic disturbances induce electric currents in long conductors such as power lines and pipelines causing power system outages or interfere with pipeline corrosion systems.
 - Magnetic disturbances directly affect operations that use the magnetic field, such as magnetic surveys, directional drilling, or compass use.
 - Radio waves used for satellite communications or GPS navigation are affected.

³ PM_{2.5} Particulate matter with a diameter of less than 2.5 micrometers (µm). One micrometer is one millionth of a metre. PM_{2.5} is included in fine particulate and is a subset of PM₁₀ (when measuring PM₁₀, it includes PM_{2.5}). PM_{2.5} is typically associated with combustion sources (smoke) and is more closely related to adverse health effects than larger particles.

- Effects on satellites including radiation damage, memory upsets, phantom commands, surface charging and internal charging. (Government of Canada, 2021)

Related Hazards: Cyber Security Threat / Telecommunications Interruption / Electrical Outage / Transportation Route Interruption.

Fog



A cloud based at the earth's surface, consisting of tiny water droplets, or under very cold conditions, ice crystals or ice fog. It is generally found in calm or low wind conditions. Under foggy conditions, visibility is reduced to less than 1 kilometre. (BC E. M., 2021)

- Dog Creek Area and Braeside Area see significant fog.

Related Hazards: Extreme Cold / Freezing Rain or Drizzle / Transportation Route Interruption / Aircraft Incident / Marine Vehicle Incident / Motor Vehicle Incident.

Hurricane / Typhoon / High Wind Event



Hurricanes are tropical cyclones with maximum sustained surface winds of at least 64 knots (118 km/h). Hurricanes are known as typhoons in the western Pacific, very severe cyclonic storms in the North Indian Ocean, and severe tropical cyclones in Australia. There are five classes of hurricane intensity as outlined by the Saffir-Simpson Scale. (BC E. M., 2021)

Related Hazards: Hail / Lightning / Snowstorms and Blizzards / Tornado / Landslide/Debris Flow / Explosions / Hazardous Materials Spill / Seiche / Storm Surge / Lake, River, and Stream Flooding / Coastal Flooding / Storm Water Flooding / Flash Flooding / Dam and Spillways Failure / Dike Failure / Structure Failure / Electrical Outage / Food Source Interruption / Telecommunications Interruption / Transportation Route Interruption / Wastewater Interruption / Water Service Interruption / Fuel Source Interruption / Aircraft Incident / Marine Vehicle Incident / Motor Vehicle Incident / Rail Incident

Freezing Rain or Drizzle



Rain that freezes on impact to form a coating of clear ice (glaze) on the ground and on exposed objects. (BC E. M., 2021)

Related Hazards: Extreme Cold / Fog / Hail / Snowstorms and Blizzards / Electrical Outage / Telecommunications Interruption / Transportation Route Interruption / Aircraft Incident / Motor Vehicle Incident.

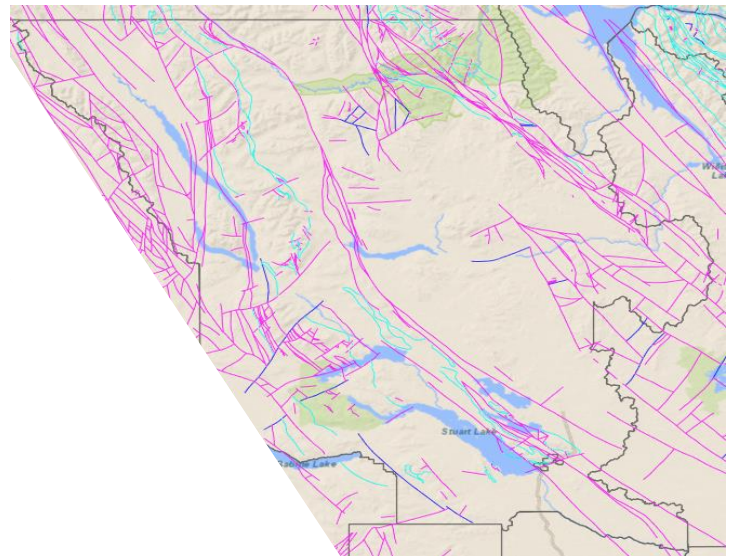
Earthquake



An earthquake is defined as the shaking of the ground due to movement along a fault rupture. When a large magnitude earthquake occurs, energy traveling in seismic waves may cause damage to structures, trigger landslides, liquefaction, or other geologic hazards and, in certain circumstances, generate tsunamis.

Impacts from earthquakes can be widespread and severe. (BC E. M., 2021)

- The Regional District's risk for seismic activity is considered medium to low (Canada G. S., 2015).
- In electoral area 'C' there are records of three recent earthquakes. Two 73km NE of Necoslie (Fort St James) BC on March 11, 2020, being 2.0 in magnitude and on Dec 28, 2019 being 3.0 in Magnitude. Another earthquake was reported on February 4, 2020 being 2.1 magnitude and 29 km NE of Necoslie. (Natural Resources Canada, 2021)
- The Yekooche Emergency Plan state that a historical earthquake event happened in 2012. (Nation Y. F., 2013)
- Regional District residents would experience minimal physical impact; however, there could be a significant event that could impact the delivery of goods and services, depending on the location of the epicentre and the impact on major transportation routes from the east and the south.
- A map showing faults lines within Electoral Area 'D' reveals that many faults do exist. Most faults in the regional district are of the Strike-Slip (pink) variety, but there are a few Thrust (light blue) type faults in the mountains surrounding Smithers. See map – source: [ImapBC](#), retrieve Nov 2nd, 2021.
- The five biggest earthquakes in BC occurred in 1700, 1946, 1949, 1970 and 2012. They ranged in magnitude from 7.3 (1946) to 9.0 (1700).
- Earthquakes happened in early 80's
- Takla feels tremors.
- Pinche Mine was developed along the Pinche Fault line, the mine was shut down 45 years ago.



Related Hazards: Structure Fire / Avalanche / Landslide/Debris Flow / Land Subsidence / Submarine Slides / Liquefaction / Tsunami / Explosions / Hazardous Materials Spill / Mine Incident / Oil or Gas Pipeline Spill / Seiche / Dam and Spillways Failure / Dike Failure / Structure Failure / Electrical Outage / Food Source Interruption / Telecommunications Interruption / Transportation Route Interruption / Wastewater Interruption / Water Service Interruption / Fuel Source Interruption / Marine Vehicle Incident / Motor Vehicle Incident / Rail Incident.

Landslide/Debris Flow



Debris avalanches and debris flows.

Debris avalanches are extremely rapid debris flows of mud, rock, brush, trees, and other debris propelled by torrential rains.

Debris flows are a form of rapid mass down-slope movement of a slurry of loose soils, rocks, and organic matter. (BC E. M., 2021)

- Hudson's Bay Creek splits Takla Landing, there is a looser slope that is falling including trees into the creek during freshet. Slow moving landslide, the bridge is over this creek and connects the community. Under the Bridge is a wastewater pipe connecting 100 homes to the Takla septic system, if this was to fail, 16 out of the 100 homes would be cut off completely.
- A lot of FSR access roads have slope stability issues that could be affected with high precipitation.
- The teardrop FSR seems to get washed out every year.

Related Hazards: Avalanche / Land Subsidence / Submarine Slides / Tsunami / Seiche / Lake, River, and Stream Flooding / Flash Flooding / Structure Failure / Electrical Outage / Telecommunications Interruption / Transportation Route Interruption.

Ash Fall

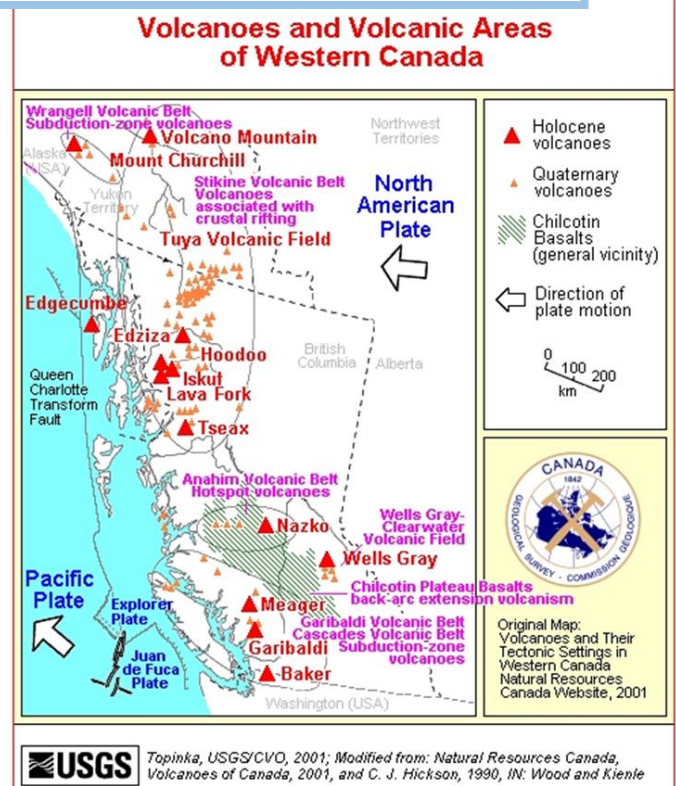


Ash falls occur where fine volcanic ash has been ejected out of a volcanic vent into the atmosphere, possibly transported by upper-level winds, and deposited on the earth. Impacts may include health hazards, damage to crops, harm to wild and domestic animals, reduced visibility, contamination of water supplies, disruption of transportation (with particularly serious consequences for aircraft), damage to power production and distribution systems, damage to many types of machinery, and structural collapse. (BC E. M., 2021)

- Volcanic hazards in the region are extremely low; there are no known active volcanoes. The only real potential volcanic hazard is volcanic ash, and even that is extremely unlikely, since it would require a very large eruption from a distant volcano and the right conditions to blow the ash in the direction of the region.
- Ash from fires in 2018 was experienced, but non from Mt St. Helen's in the 80's.

Comments and questions for consideration and further research:

- Are there dormant volcanoes in the north that could send ask to Area C?



Radon



Radon is an invisible, odorless gas that can seep into your home through cracks in floors, walls and foundations. Radon comes from the natural breakdown of uranium in soil, rock and water. Radon is the second leading cause of lung cancer in Canada. As radon breaks down it forms radioactive particles that can get lodged into your lung tissue as you breathe. (Association, 2021)

- RDBN redirects inquiries on Radon to the BC Lung association [Radon Awareness Program](#).
- Due to geological factors, some areas in British Columbia have naturally higher surface levels of radon than others. Many of these areas are in the Interior and Northern parts of the province. However, indoor radon accumulation can vary widely from building to building, even in the same neighborhood. Even if you live in an area with generally lower levels of radon, it is still recommended to test your home for radon. BC Centre for disease control has an [interactive map](#) displays indoor radon levels recorded in homes across BC. In the Northern BC region, it is estimated that 18% of homes tested are in the medium range for radon levels and 4% of homes tested are in the high range for radon levels. Health Canada recommends testing every home for radon because levels can vary widely from house to house, even in the same neighborhood.

Human-Caused Hazards

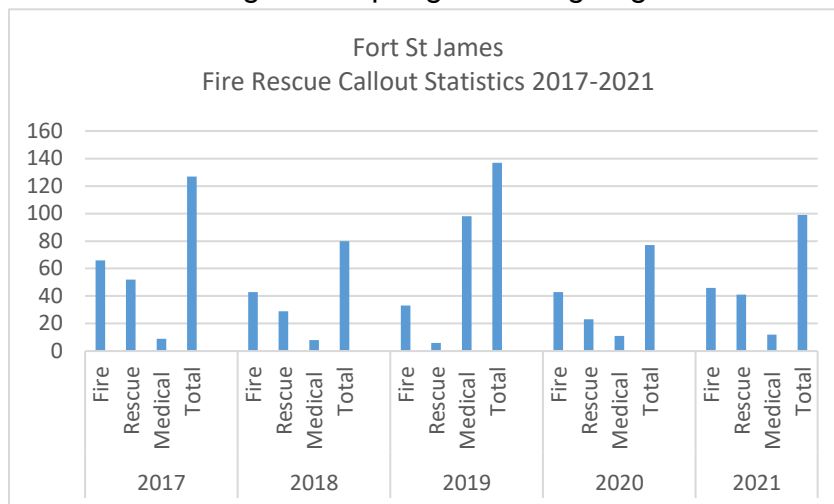
Structural Fire



Urban fires are fires that occur in a residential, commercial, or industrial community. Rural and urban fires occur on a frequent basis in many parts of the province, and of provincial concern are the fires that cause many deaths and injuries, those that are beyond the ability of the local resources to respond or those that cause severe economic losses. For interface fires, see wildfires. (BC E. M., 2021)

- On March 2, 2021 the Fort St. James Fire department celebrated 66 years. (BC Local News Black Press Media, 2021)
- Only one place to get fuel in town FSJ – Sowchea Rd has a small general store and a small card lock north of town. If a large fire was to occur than people would not have the capacity to get fuel.
- Only two grocery stores, one in FSJ and one in Nak'azdli, if a fire were to occur this would impact food supply to the entire region.
- There is not enough resources to fight a larger structural fire or apartment fires in FSJ. 5 apartment complexes in town with 30 units in each one.
- Lack and challenge around putting up temporary housing or shelter in FSJ.
- Several large fires in FSJ – Canfor Fires, the FSJ Fire department responded with everyone and it was not enough, residents and workers helped to control that fire.
- There was an apartment fire before FSJ had a ladder truck, one casualty.
- Germanson and Manson Creek, Cassiar ranch Pinchi Lake area have no fire protection, just private residents with fire pumps and no formal training.
- Takla is working on developing a fire department, they are 3.5 hours away from FSJ so no mutual aid is possible. 5year project (3years into this project) to get the fire department started.

- Tachie has a truck and station but no certified fire fighters
- Germansen Landing, 6 hours from FSJ, West Arm, Wolverine Lake, Bear Lake, all reserves with structures on them and are extremely remote.
- There were sprinkler systems put in for 12 homes in these areas but they have not been maintained and are not operable.
- Many First Nations communities will do cultural burning in the spring that will go right next to homes on reserves.
- Tachie is starting up a fire department.
- Adjacent is a chart outlining the number of call outs that the Fort St. James Fire department responded to over the last 5 years:



Related Hazards: Air Quality /
Lightning / Wildfire / Explosions /
Structure Failure / Electrical Outage /
Telecommunications Interruption /
Water Service Interruption

Rail Incident



An incident involving a passenger, cargo or light-rail train that results in damage, bodily injury, or death. (BC E. M., 2021)

- The CN Rail runs West from Highway 97 near Summit Lake to Fort St James and further North. This line is called the Apollo Line after the Apollo Forest Products Mill in Fort St. James. The train primarily hauls lumber and wood products. There are concerns the train blocking traffic due to loading times on Highway 27 and Tachie Rd on a regular basis.

Notable Rail Incidents in Electoral Area C:

- In December of 2005, 20 km east of Fort St James, a reported derailment involving 13 empty cars. (Haggerstone, 2013)
- July 25th, 2005, in Takla Lake, north of Fort St. James, there was a report of a derailment train car of logs into Takla Lake. (Haggerstone, 2013)
- March 15th, 2013, a derailment was reported at the CN Rail yards in Fort St James. (Haggerstone, 2013)

Comments and questions for consideration and further research:

- Is the rail line bringing Hazardous materials through community.

Related Hazards: Avalanche / Landslide/Debris Flow / Explosions / Hazardous Materials Spill / Transportation Route Interruption / Fuel Source Interruption.

Aircraft Incident



An incident involving one or more aircraft that results in damage, bodily injury, or death. (BC E. M., 2021)

- Fort St James has an airstrip located 4.4 km south of Fort St James along the Stewart River for private flights. In addition there is a Stewart River Water Aerodrome.
- Takla Landing has a water aerodrome.
- Lots of air traffic through the region, helicopters, small aircrafts, industrial.
- Strong wind events that can cause aircraft incidents.

Related Hazards: Fog / Snowstorms and Blizzards / Ash Fall / Explosions / Hazardous Materials Spill / Structure Failure / Transportation Route Interruption.

Motor Vehicle Incident



An incident involving a truck, car, bus, farm vehicle, or any other motor- or person-powered vehicle that results in damage, bodily injury, or death. (BC E. M., 2021)

- Highway 27 Stewart Lake Highway runs through the region, ending in Fort St James. This route and other side roads that have a mix of industrial and residential traffic contribute to the risk of motor vehicle crashes in the area, with the majority being reported along Highway 27. The chance of a hazardous materials spill is also possible.
- According to the Insurance Corporation of British Columbia North Central Crashes 2016 to 2020, there were 71 reported casualty crashes⁴ in Fort St. James, 10 reported in Takla Landing, 3 in Tachie, and 1 near Pinchi Lake. (ICBC, 2020)
- MVI's on the highway affect all communities relying on the one route in and out. Closures can last for days if they involve hazardous materials.

Related Hazards: Fog / Freezing Rain or Drizzle / Snowstorms and Blizzards / Explosions / Hazardous Materials Spill / Transportation Route Interruption.

Explosions



An explosion affecting a residential or non-residential area, resulting in partial or total destruction of the structure and/or bodily injury, smoke inhalation or death. (BC E. M., 2021)

- Explosions several potential locations, fuel storage facilities, propane storage and pipelines.

Comments and questions for consideration and further research:

- What are the plans for the Bio Plant – the pressure generated in the turbine and boiler could cause explosion?

⁴ "Casualty Crash" (ICBC collision data) motor vehicle crashes resulting in an injury or fatality.

Related Hazards: Structure Fire / Hazardous Materials Spill / Structure Failure / Electrical Outage / Telecommunications Interruption / Transportation Route Interruption / National Security Threat / Public Disturbance / Major Planned Event / Aircraft Incident / Marine Vehicle Incident / Motor Vehicle Incident / Rail Incident.

- Hazardous material for fire department only Ryan and Deputy Chief have training.

Hazardous Material Spill



Hazardous material spills can happen under two circumstances:

- 1) spills, leakage, or accidents involving materials on site; and,
- 2) spills, leakage, or accidents that happen when hazardous materials are transported by aircraft, rail, ship or truck

Hazardous materials can involve any materials that are considered dangerous by Transport Canada. These involve toxic gases, radioactive material, acids, and any number of chemicals and goods. Hazardous materials can also include gas or oil spills when they pose a risk of fire, explosion, or damage to the environment. (BC E. M., 2021)

Prince George fire department is the closest certified group?

- Bowzers fire suppression retardant transported in high concentrations, impacts environment severely, kills fish in creeks and need to be cleaned up properly.
- Oil tanker truck spill on highway

Comments and questions for consideration and further research:

- What hazardous materials are being trucked through FSJ up the North Road?
- Mining Companies are trucking hazardous chemicals and materials through the community and on the highways? Can we ask Mount Milligan what hazardous materials are being transported?

Food Source Interruption



Food shortages occur when the population of a community undergoes a severe shortage of food. A severe shortage of food can lead to starvation, illness and, in extreme cases, death. (BC E. M., 2021)

- Statistics Canada provides data on the primary types of locations where BC residents buy their food. If residents in the region are representative of BC, they would be expected to buy 87% of their grocery shopping from supermarkets and other grocery stores. The remaining 13% is purchased from convenience and speciality stores. (Strategies, March 2021) Much of the food in the stores is shipped in through the major highway transportation corridors that are susceptible to external hazards and emergencies that can lead to food source interruptions in this region.
- The cost of locally grown and produced food remains high within the region.
- The average family in the Northern Health region Valley spends \$1038 a month on groceries (BC Centre for Disease Control Provincial Health Services Authority, 2018).
- Canada's Food Price Report 2021, which forecasts an overall food price increase of between 3% and 5% this year. (Prepared by Dalhousie, Guelph, Saskatchewan, and British Columbia Universities , 2021)
- Only two food stores in the Regional, one in FSJ and Nak'azdli.

Notable Incidents involving food source interruptions:

- [COVID-19 Pandemic \(Started 2020\)](#) exasperated food insecurity for Canadian who already had food security and affordability issues. Locally, the 2020 COVID-19 Pandemic prompted transportation delays and crisis in availability of food at the grocery stores following the March 2020 provincial lockdowns. The grocery stores implemented purchase limits and store shelves were empty. "Food bank numbers in the local area increased by 22% at the start of COVID-19 and again increased now that government COVID subsidies have stopped." (Salvation Army Food Bank Coordinator, 2021)
- [Big Bar Landslide, BC \(2019\)](#) caused a decline in salmon fisheries affecting FN food supplies.
- The 2016 ice storms in the Lower Mainland prompted an inevitable crisis — highways were closed, and food trucks couldn't make it up here. Store shelves started emptying. This was compounded by the fact that the grocery store in neighbouring Houston had been closed for a few months and so everyone was shopping in Smithers. We were having a food system breakdown.

Related Hazards: Extreme Heat / Extreme Cold / Snowstorms and Blizzards / Animal Disease / Landslide/Debris Flow / Plant Disease and Pest Infestation / Public Health Crisis / Drought.

Electrical Outage



A deficit, interruption or failure of electricity or power systems, services, supplies, or resources. Power outages occur on a regular basis, however, they become a concern when the power outage is for a significant amount of time, when the temperatures are very low, or critical infrastructure, persons, livestock, or businesses are affected. (BC E. M., 2021)

- Power outages occur on a regular basis, however, they become a concern when the power outage is for a significant amount of time, when the temperatures are very low, or critical infrastructure, persons, livestock, or businesses are affected.
- Historical electrical outage events in Area 'C' are documented in association with other hazards accounts and can be found in [Appendix 1](#).
- One electrical line to FSJ.
- There is a power plant in FSJ that has the potential to run many homes, however there is no switching gear to provide the power -opportunity to explore for the region.
- Fort St. James has a 40-megawatt biomass power generation facility which began operating in 2017, currently not in operation. This partnership between Nak'azdli Whut'en Development Corporation, the Arrow Group of Companies, and Nexus PMG is to purchase and operate that biomass power generation facility under the name BioNorth Energy Ltd., as per the release. BioNorth Energy Ltd. will begin generating power at the facility again early next year. (Parhar, 2021)

Related Hazards: Space Weather / Lightning / Telecommunications Interruption.

Transportation Route Interruptions



An interruption or failure of transportation infrastructure or systems. This can include road, rail, or waterway damage, transportation delays due to weather and/or infrastructure failure. Transportation Route Interruptions are probable during disaster events. (BC E. M., 2021)

- One main transport route for the area.

Related Hazards: Snowstorms and Blizzards / Wildfire / Avalanche / Landslide/Debris Flow / Earthquake / Liquefaction / Tsunami / Lake, River, and Stream Flooding / Aircraft Incident / Marine Vehicle Incident / Motor Vehicle Incident / Rail Incident.

Telecommunications Interruptions



The unavailability of services provided by the communications infrastructure resulting in significant inconvenience or an emergency event caused by human error, equipment malfunction or breakdown. (BC E. M., 2021)

- In the [2020 rain fall and subsequent slides](#) and again in 2021 November floods in the lower mainland the local cell service was disrupted for long periods of time.
- Telecommunication is one line to FSJ and above.
- Takla uses satellite phones and generators for powering the community and other critical infrastructure.

- Solar flares interrupt telecommunications and cause major issues.

Related Hazards: Freezing Rain or Drizzle / Space Weather / Hurricane/Typhoon/High Wind Event / Lightning / Snowstorms and Blizzards / Tornado / Landslide/Debris Flow / Earthquake / Electrical Outage.

Wastewater Interruptions



A deficit, interruption or failure of wastewater or sewer systems, services, supplies, or resources resulting in significant inconvenience or an emergency event. (BC E. M., 2021)

- Wastewater lines in Takla, one goes right over Hudson's Creek, very exposed.

Related Hazards: Hurricane/Typhoon/High Wind Event / Animal Disease / Human Disease / Public Health Crisis / Earthquake / Water Service Interruption.

Fuel Source Interruptions



A deficit, interruption, or failure of fuel systems, services, supplies or resources. This can include pipeline damage, transportation delays due to weather and/or shipping infrastructure damage, or general shortages due to market supply problems, or panic fuel hoarding during emergencies. Fuel Source Interruptions are probable during disaster events. (BC E. M., 2021)

- If we do not have fuel, we cannot run emergency equipment.
- The majority of fuel is transported from Alberta via Trans Mountain Pipeline and railway. Prince George is the [distribution centre](#), where fuel is then trucked to its destination. There is a refinery in Prince George that refines gasoline, diesel, propane butane and heavy oil.
- There are only two gas station in FSJ all brought in by truck on the one transportation route, if fuel was interrupted or block this would cause an issue in the community.

Related Hazards: Hurricane/Typhoon/High Wind Event / Snowstorms and Blizzards / Wildfire / Landslide/Debris Flow / Earthquake / Oil or Gas Pipeline Spill / Transportation Route Interruption / Rail Incident.

Dam and Spillways Failure



A breach in the foundations, abutments, or spillways of a dam, which results in a sudden, rapid, and uncontrolled release of the impounded water. n earthquake is defined as the shaking of the ground due to movement along a fault rupture. (BC E. M., 2021)

- The Dam Safety Regulation under the Water Sustainability Act, objective is to mitigate loss of life and damage to property and the environment from a dam breach by requiring dam owners to inspect their own dams, undertake proper maintenance on them, and ensure that these dams meet ongoing engineering standards. The dam

administered under this regulation are associated with dams that store or divert fresh water from a stream or aquifer or both. These dams are inspected annually and assigned a failure consequence and risk rating according to the [Dam Safety Regulations of BC](#).⁵

- In Area C there are 7 dams regulated under the Dam Safety Regulations, all of these dams have a low failure consequence. Meaning that the risk level is of no concern and includes regular audit programs to identify any changes to operation. (Staff, 2009)
- There are no large dams within the Fort St. James area, however, Rio Tinto Alcan operates a dam and spillway system south of Vanderhoof that has the potential to limit road access to Fort St. James should a full breach of the dam take place. (District of Fort St James, 2008)
- Tailing Storage Facilities, including mining dams, in British Columbia are regulated under Part 10 of the [Health, Safety and Reclamation Code for Mines in British Columbia \(the Code\)](#), as established under the [Mines Act](#). These facilities require annual inspections commonly called Dam Safety Inspection that report on risk data. There are two mine tailing ponds⁶ in Area C.
- Pinchi is a closed mine located on the north shore of Pinchi Lake, in north-central BC, approximately 25 km northwest of Fort St. James. This historic mercury mine was in care and maintenance from 1975 to 2010 when, in cooperation with local First Nations representatives from the Tl'azt'en Nation and the Nak'azdli Bands, Teck initiated the decommissioning and reclamation of the site in 2011. There is one earth fill tailings dam located and monitored on site. (Daniel Klassen, 2020)
- The Mount Milligan copper-gold mine is located 155 km northwest of Prince George, between the communities of Fort St. James and Mackenzie in central British Columbia. The tailing storage facilities (TSF) embankment is comprised of two dams; the Main Embankment and the West Separator Berm. The TSF embankment at the Mount Milligan Mine are designed in accordance with Canadian Dam Association Guidelines (CDA, 2013) which provides a classification of dams in terms of consequence of failure. The overall assigned consequence category for the Mount Milligan Mine TSF is VERY HIGH. (Ministry of Energy, Mines and low carbon innovation, 2020) The mine has listed site environmental ineffective tailings dam management resulting in loss of life, and other effects as a risk factor in operations, however this risk factor was rated diligent monitoring given the companies mitigation strategies, interests and government regulations to monitor and inspect tailings dams. (Centragold, 2020)
- Takla Landing – 6 homes protected by makeshift dikes along lake protecting the road and homes.
- Dam failures that affect the Stuart run affect the salmon and Takla and other First Nations food sources.
- Sowchea Creek, beaver dams up stream cause flooding, currently there is a large beaver dam, if it breaches there will be substantial flooding.

Comments and questions for consideration and further research:

- What are the current emergency procedures, risk and consequence of failure of the Mount Milligan and Pinche mine tailings ponds?

⁵ Michael Trudell, Senior Dam Safety Officer.

⁶ This data is available to the public on the BC Mine information website: <https://www.mines.nrs.gov.bc.ca/map>

Related Hazards: Hurricane/Typhoon/High Wind Event / Landslide/Debris Flow / Earthquake / Mine Incident / Storm Water Flooding / Flash Flooding / Dike Failure / Structure Failure / Electrical Outage / Water Service Interruption.

Cyber Security Threat



A circumstance or event with the potential to interrupt or adversely impact organizational operations, assets, or individuals (including mission, functions, image, or reputation). Cyber Threats occur through information systems via unauthorized access, destruction, disclosure, modification of information, and/or denial of service. Also, the potential for a threat-source to successfully exploit a particular information system vulnerability. (BC E. M., 2021)

- Cyber security is a big threat for government and businesses for business continuity.
- Increase in phone, facebook, dating apps, and email scams affecting seniors and vulnerable populations. Limited statistics affecting the local community however recent news reports state that “British Columbians reported \$3.5 million in losses to cryptocurrency investment scams in the first eight months of 2021” (Samanski-Langille, 2021).
- Public order is challenging in the community but not a large deal with a few people expressing concern.
- Living through restrictions for COVID, anti-protests more prevalent with almost militant type behaviors.
- Aging population create more susceptibility to fraud and scams.
- Takla does not have a high risk of cyber security but lots of phone scams. Cyber security a concern for local governments and First Nations.

Related Hazards: Telecommunications Interruption / National Security Threat.

Mass Casualty

- Nov 2021 example of shooter in Vanderhoof required people to shelter in place.
- Member of Takla who live in Vanderhoof where calling Takla to find out what was happening. Takla has a larger coverage area than traditional communities, since the community provides services to their people no matter where they are in the province.

Missing Persons

- Recent lost hunter involved a man from Yekooche.
- Convergent volunteers are available in the community to assist with searches, these are volunteers not fully trained for search and rescue.
- Searches happen on a regular basis in the area with 3 already in 2021.
- Infrastructure needs for SAR, funding structure is based on call outs currently and needs more support for the rural areas to be ready, trained and resourced with volunteers.
- In 2021 there was a search that lasted 65 days with drilling thousands of holes in the lake. Everyone across the region participated and demonstrated how community

focused and resilient and dedicated the rural residents are to the region and the people living there.

Diseases, Pest Infestations & Epidemics

Plant Disease and Pest Infestation



Plant diseases include invasive pests including insects and mites, and plant pathogens including fungi, bacteria and viruses' impact upon crops, forests, and urban environments. New introductions and/or widespread outbreaks could have severe economic and environmental consequences. (BC E. M., 2021)

- With climate change, shifts in the distribution, lifecycles, and prevalence of agricultural pests (insects, diseases, weeds, and invasive species) are anticipated. Increasing average annual temperatures (winter minimum temperatures) combined with shifting precipitation patterns are already magnifying pest impacts, pest management complexity and associated costs of production.
- The region has been significantly impacted by Mountain Pine Beetle outbreaks, in part due to increased winter survival rates. Modelling of changes to biogeoclimatic zones (BGC zones) show that the Interior Douglas Fir zone will spread northward and increase in area, while the Sub-Boreal Spruce zone will decrease dramatically. While this modeling was completed with a forestry lens, agricultural pests associated with these ecosystems would be expected to shift along with the BGC zones. (BC Agriculture & Food Climate Action Initiative, 2019)
- More pests could cause economic impacts in the resource sector and the ranching sectors.
- Fir beetle and Spruce Beetle need attention.
- Traditional medicines and harvest are affected by natural disasters, fire and drought.
- Since 2005, the Regional District of Bulkley-Nechako has partnered with the Northwest Invasive Plant Council (NWIPC) to address invasive plant species spread within the region. The NWIPC coordinates the invasive plant response based on priority areas and species and on funding availability through their network of partners. Specifically, funds contributed from the RDBN go toward a number of programs including local education and signage on invasive plants and invasive plant monitoring and treatment at RDBN owned and administered properties. In addition, the NWIPC administers the [Private Landowner Rebate program](#) that offers rebates to land owners that use contractors to treat for invasive plants on their property.
- The Northwest Invasive Plant Council (NWIPC) is currently targeting 60 invasive plants for management, as per the [NWIPC 2020 Target Plant List](#). The list of species is reviewed, updated and approved by the membership every spring at the annual general meeting. The [Nechako IPMA Plant list for 2020](#) identified species listed in electoral area C, D and F.
- Invasive plant species up and down rail lines and highways taking over farm fields – Knapp weed, hock weeds. This results in spraying along Creeks and rivers causing harm to the environment.
- Agriculture producers can also experience challenges due to pests, including grasshoppers, aphids, cutworms and more. Some resources and information are linked below to help with identification, monitoring and management of pests in gardens and crops. [Grasshopper Monitoring and Control in BC](#) ; [Pesticides and Pest Management - Province of BC](#)

Related Hazards: Animal Disease / Human Disease / Public Health Crisis / Drought / Food Source Interruption.

Human Disease (Including Pandemic and Epidemic)



Diseases that are caused by pathogenic microorganisms and are spread directly, or indirectly, from one person to another. Diseases can impact public health, cause death, have economic implications, and result in mass casualty response. These include epidemics such as meningitis, pandemic flu, hepatitis, E. coli, and other communicable diseases.

A pandemic is the worldwide spread of a new disease. The total number of people who get severely ill can vary. However, the impact or severity tends to be higher in pandemics in part because of the much larger number of people in the population who lack pre-existing immunity to the new virus. (BC E. M., 2021)

Notable Pandemic Incidents in BC:

- COVID-19 Pandemic (2020)
- Ebola (2013-16)
- H1N1 Flu Pandemic (2009)
- SARS Outbreak (2003)
- The lands in BC have been populated by the ancestors of First Nations since time immemorial. Epidemics spread through First Nations communities in advance of explorers. Some researchers have suggested epidemics reached the Northwest Coast as early as the 1500s, believing the well-known epidemics from the Caribbean and Central America may have spread to the Pacific Coast through native trade networks and social contact. Some of the recorded epidemics in the Interior were known to have originated on the prairies during the historic period (early 1800s). The introduction of infectious diseases from Europe and Asia into the Northwest Coast and adjacent areas, and an increase in the severity of warfare, had devastating effects on the people. Smallpox, influenza, measles, and whooping cough were recorded epidemics, with smallpox particularly recurring with devastating effects in the native population. The 1918-19 influenza pandemic was the last major epidemic to seriously affect First Nations and marked the end of the epidemic cycles that had begun over 150 years previously. In some cases, entire villages were significantly reduced in single disease events, with mortality rates ranging from 50% to 90% of the population. (First Nations Health Council, 2011)
- History of Pandemics: <https://www.visualcapitalist.com/history-of-pandemics-deadliest/>
- The FSJ hospital deferring patients to Vanderhoof because of a lack of nurses and staff in the summer of 2021. There are 8-12 nursing positions available in FSJ at one time.
- Hard to attract medical professionals to remote areas in FN communities and FSJ. Takla can't compete with the attraction packages that FSJ is offering.

Comments and questions for consideration and further research:

- What are the attraction and retention packages or offers in Area C for doctors and nurses?

Related Hazards: Animal Disease / Plant Disease and Pest Infestation / Public Health Crisis.

Public Health Crisis

A localized or regional event that poses or causes a significant threat to the health of human populations. The event may be declared as a Public Health Emergency if the event meets at least two of the following criteria:



- a regional event that could have a serious impact on public health;
- a regional event that is unusual or unexpected;
- there is a significant risk of the spread of an infectious agent or a hazardous agent; and
- there is a significant risk of travel or trade restrictions because of the regional event.

An example of a Public Health Crisis is the contamination of a communities drinking-water supply by a hazardous material. If the event is regional in nature and poses a serious impact to public health, it may be declared a Public Health Emergency. (BC E. M., 2021)

- Overdose B.C.'s Public Health Emergency Progress Update on B.C.'s Response to the Overdose Crisis reported that on April 14, 2016, B.C.'s provincial health officer declared a public health emergency under the Public Health Act. In July 2017, the Ministry of Mental Health and Addictions was established, in part, to work in partnership to develop an immediate response to the overdose emergency. (Columbia B. , 2021)
- Preliminary data in 2021 has found that fentanyl or its analogues have been detected in 85% of all illicit drug toxicity deaths. In 2020, fentanyl or its analogues have been detected in 86% of deaths. (Service C. , 2021) In the Northern Interior⁷ the Illicit drug toxicity deaths between 2011-2021 have increased and are reported as follows:

2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021 ⁸
8	12	8	11	15	24	35	63	34	84	56

- By Health Authority (HA), in 2021, the highest rates were in Vancouver Coastal Health (46 deaths per 100,000 individuals) and Northern Health (45 per 100,000). Overall, the rate in BC is 39 deaths per 100,000 individuals in 2021.
- The [2019 Taking the Pulse of the Population An Update on the Health of British Columbian](#) identifies positive Mental Health as a public health challenge and a provincial goal. Collecting public health statistics as indicators to monitor this complex public health crisis. Under Section 66 of the Public Health Act, the Provincial Health Officer (PHO) has the authority and responsibility to monitor the health of the population in BC, and to provide independent advice on public health issues and the need for legislation, policies, and practices respecting those issues.
- Read: <https://www2.gov.bc.ca/assets/gov/health/about-bc-s-health-care-system/office-of-the-provincial-health-officer/overdose-response-progress-update-aug-dec-2020.pdf>
- Overdose Opioid crisis is affecting FSJ and other rural areas. Death in Takla in November.
- Fall is the worst time of year for overdoses. In FSJ 3-4 overdoses a week, almost as bad as Prince George with strong relationship to socioeconomic wellbeing of people.

⁷ Fort St James is in the Norther Interior [Health Service Delivery Area](#).

⁸ <https://www2.gov.bc.ca/assets/gov/birth-adoption-death-marriage-and-divorce/deaths/coroners-service/statistical/illicit-drug.pdf>

- Fear that with road closures to the south there maybe a reduction in drug supply from the south causing a shortage of clean drugs to run out in the community and creating the potential of people making their own in more dangerous ways.
- Opioid and mental health is a huge issue in the community, watching generations of locals struggle with these issues and now children are suffering. Need to talk with people who have lived experience to better understand and support community challenges.
- Across Northern health and the province there are challenges in providing and maintaining levels of service in many remote and rural communities. The challenges include the difficulty of recruiting and retaining doctors and nurses, creating tight staffing levels across the province, and the ability for these professionals to offer a comprehensive level of service that address physical to mental health services in rural areas.

Related Hazards: Air Quality / Extreme Heat / Extreme Cold / Animal Disease / Human Disease / Plant Disease and Pest Infestation / Explosions / Hazardous Materials Spill / Structure Failure / Electrical Outage / Food Source Interruption / Telecommunications Interruption / Transportation Route Interruption / Wastewater Interruption / Water Service Interruption / Fuel Source Interruption.

Animal Disease



Precipitation in the form of lumps of ice mainly associated with thunderstorms. Hail ranges in size from that of a small pea to the size of cherries, but has been observed as large as grapefruit. Hail in Canada occurs most frequently during the summer when thunderstorm activity is at its peak.. (BC E. M., 2021)

- Yes, include animal, human and plant disease, pest infestation
- Risk of bovin – economic impacts in ranching community, there is no experience locally but could change any time.
- Moose and fish population hazards – rural communities are reliant on food harvested from the land. Food security is a huge issue the distance to Vanderhoof or FSJ for a family to get groceries could make a family go broke just from gas alone.
- Susceptibility to spread human disease when large families are forced into confined housing or housing that is not suitable. Housing is a challenge in our communities' and creates cascading hazards.
- Increase in grasshopper populations on farmers' fields devastating crops.

Related Hazards: Human Disease / Plant Disease and Pest Infestation / Public Health Crisis / Food Source Interruption.

APPENDIX 1 – ELECTORAL AREA 'C' HISTORIC HAZARD EVENTS

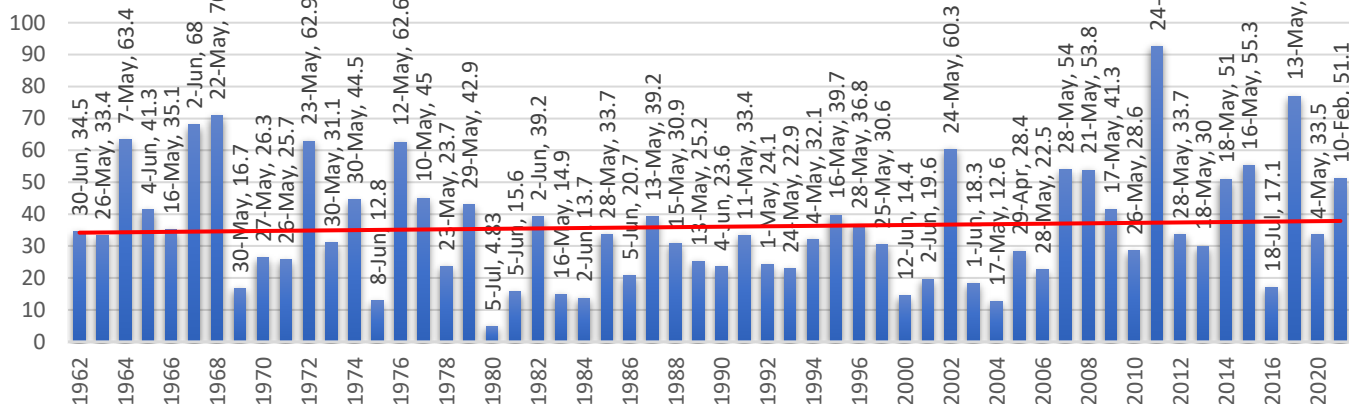
Year	Event Type	Severity	Cause	Impact Effect	Description
2001	Dam Breach	low	beaver dam Breach	Property	Fort St James beaver dam breach Pinchi Rd Jan 27 Advised 2 primary residences on one property on Pinchi Rd have been affected due to a series of beaver dam breaches.
2002	Hazardous Material	low	Tanker Truck Roll Over	Transportation	
2002	Flooding	low		Flood	Sowchea Creek is flooding and threatening his and his neighbor's house. Creek left banks in 1997 protective berm built. Owner may have breached berm to relieve pressure on homes.
2002	Flooding			Flood	Stuart Lake May 24, 2002- Water is now 12 meters from the residence. The home last flooded in '97 and based on their history have requested 900 bags for sand bagging.
2009	Wildfire - EOC Activation	low	Interface Fire	Residential Evacuation Alert	Regional District of Bulkley-Nechako initiated a one-hour evacuation alert for the residential area of Manson Creek where a fire has the potential of becoming a threat to that community. Rescinded August 11.
2011	Flooding	low	Flooding		Sowchea Creek backed up; no homes were impacted.
2012	Flooding	low	Spring Run Off	Transportation, Residential flooding	There is overbanking of Sowchea Creek at the first bridge; some ground water seepage in some homes, the creek came close to overbanking close to some homes.

Year	Event Type	Severity	Cause	Impact Effect	Description
2012	Flooding	low	Spring Run Off		Food Watch Advisory was issued for the Stuart River.
2018	Wildfire - EOC Activation	high	Wildfire	Wildfire - EOC Activation	Tezzeron Lake:10,602 ha; 106 km northwest of Vanderhoof; discovered July 30; lightning-caused; prompted Evacuation Orders and Alerts
2018	Wildfire - EOC Activation	high	Wildfire	Wildfire - EOC Activation	Purvis Lake: 2,290 ha; 20 km east of Takla Lake; discovered July 30; lightning-caused; prompted Evacuation Orders and Alerts
2020	Pandemic	moderate	Pandemic	Social economic	COVID-19 Pandemic, Business shut down and restrictions on gatherings and inter-community travel.
2020	Flooding		Flooding		Fort St James Localized flooding
2021	Wildfire - EOC Activation	moderate	Wildfire	Residential Evacuation order	Camsell Lake Wildfire - G51748 - 5.00 Hectares as of July 11, 2021. ignition date July 10, 2021 by lighting Yekooche and Tl'azt'en have seasonal structures in the area. July 13, 2021, the alert has been changed to an evacuation order. Mount Porter Wildfire - G61192 - 6,345 hectares as of July 10, 2021, Ignition date July 1, 2021, by lightning. interface fire Mount Porter – Incident # 210414

APPENDIX 2 – ELECTORAL AREA 'C' HYDROMETRIC DATA

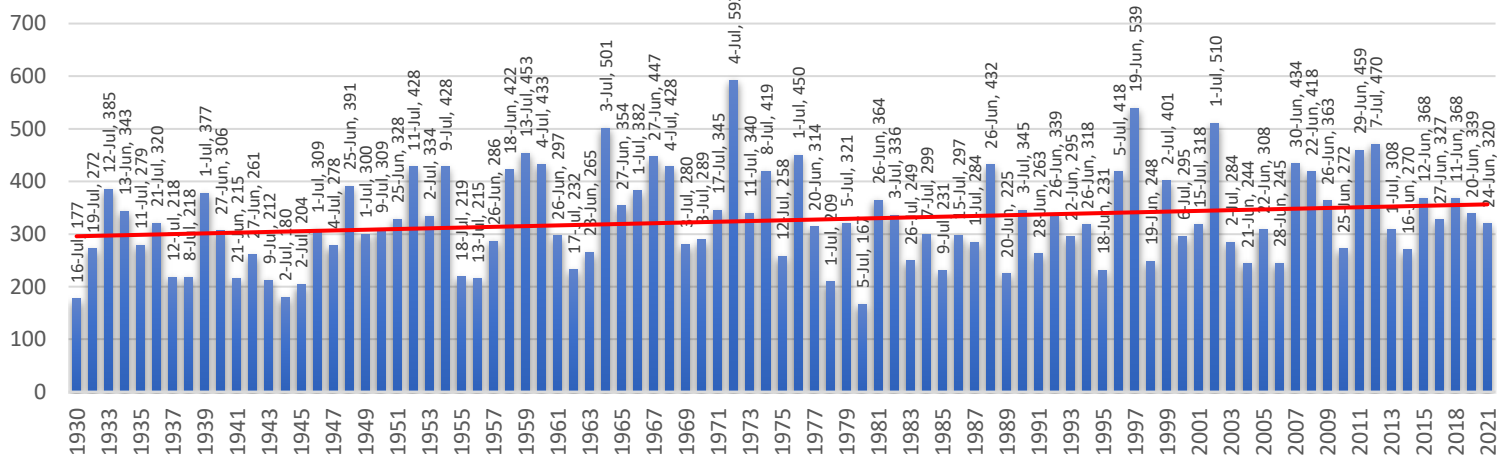
Pinkut Creek near Tintagel 08EC004

Annual Maximum Daily Discharge Rates (m3/s)



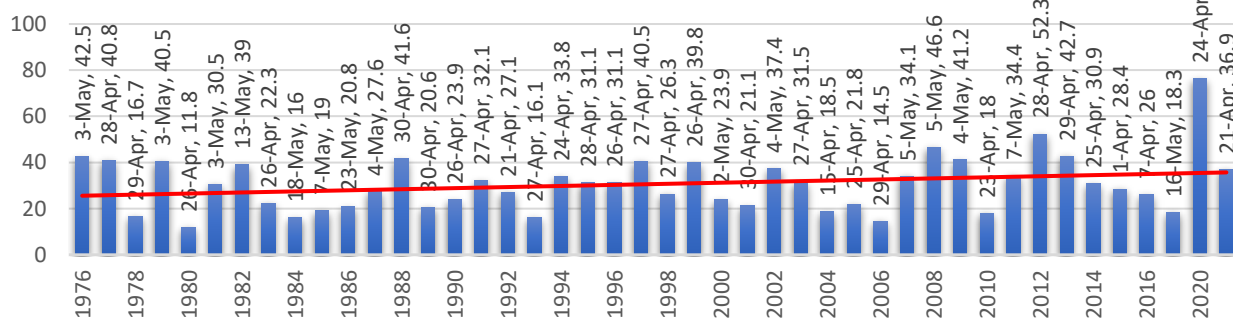
Stuart River near Fort St. James 08JE001

Annual Maximum Daily Discharge Rates (m3/s)

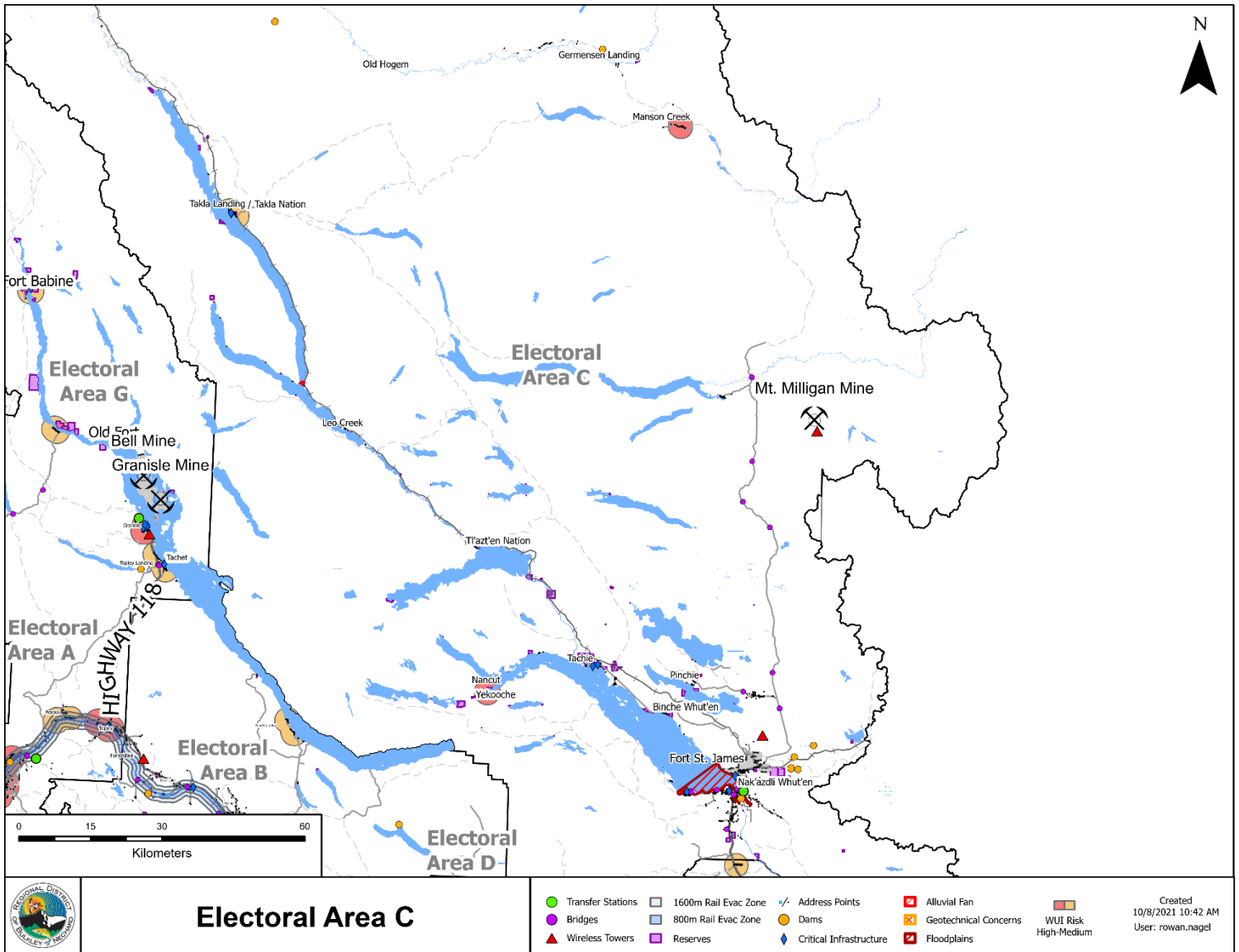


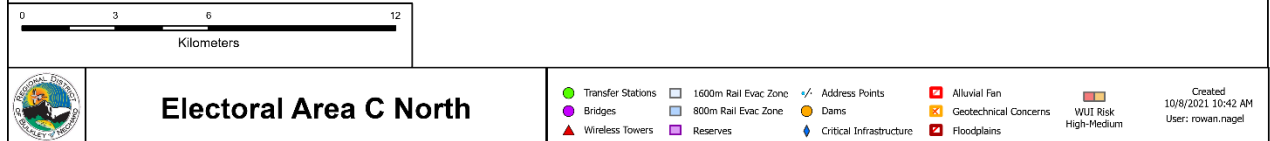
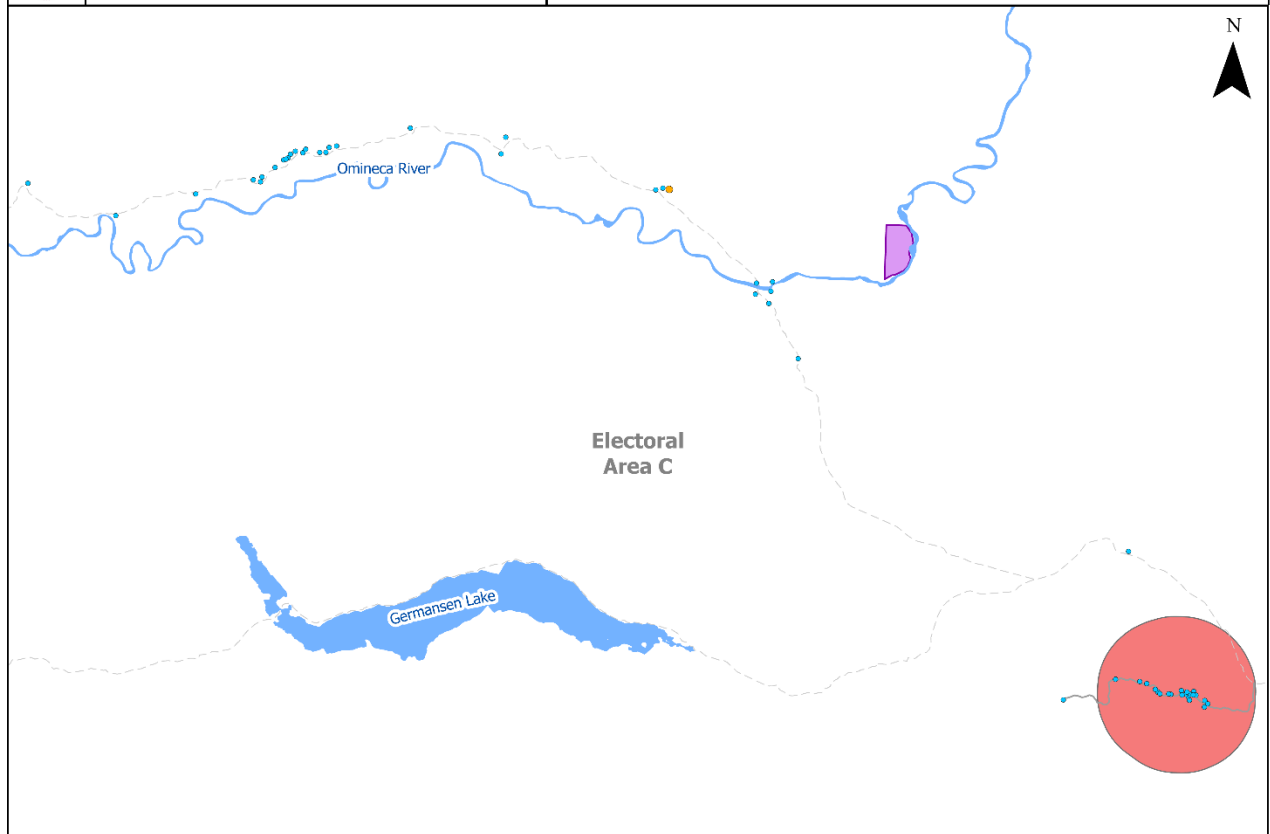
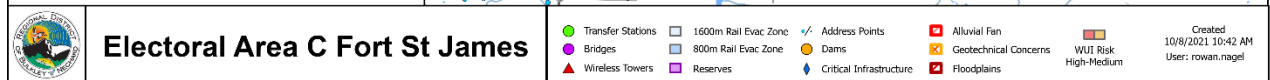
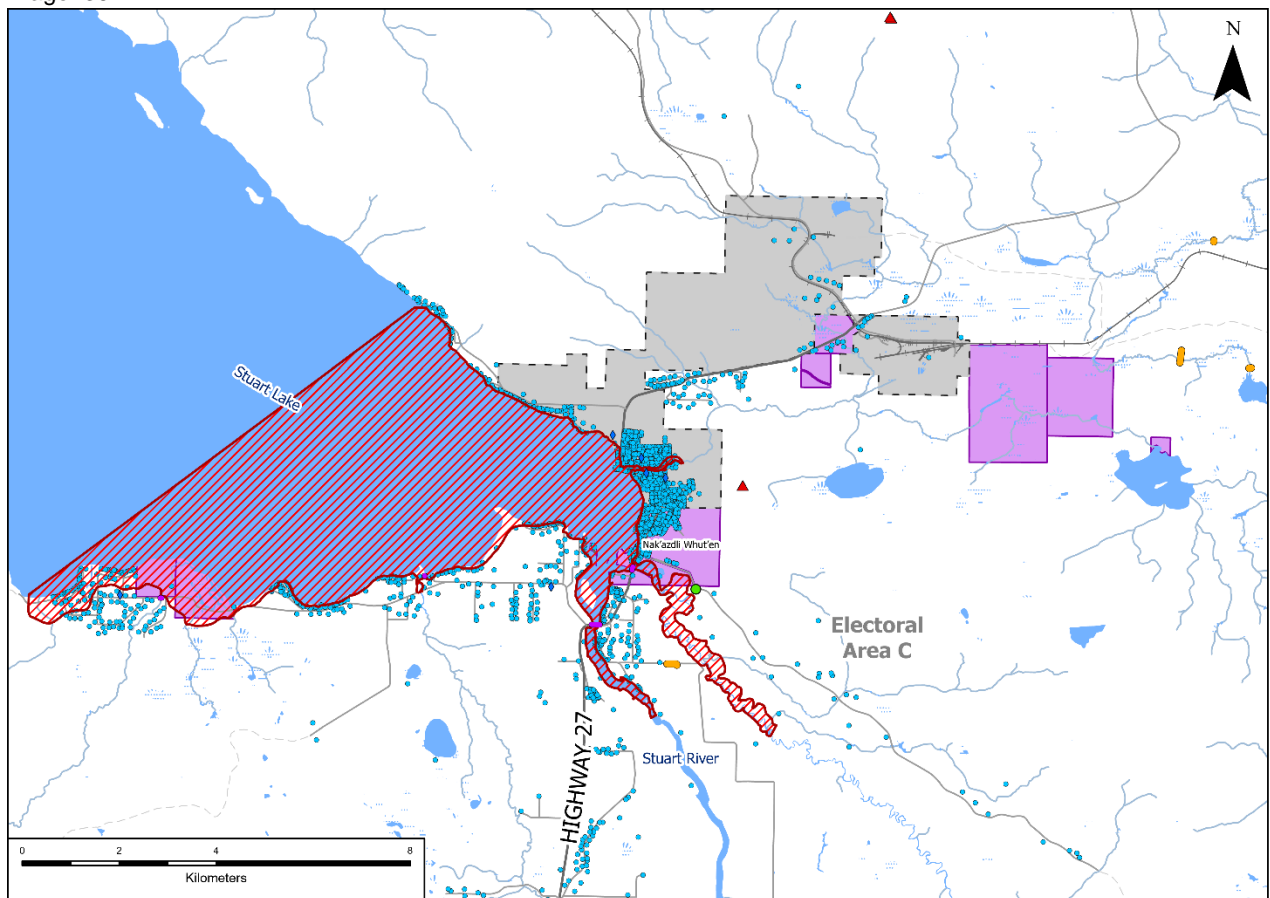
Tsilcoh River near the mouth 08JE004

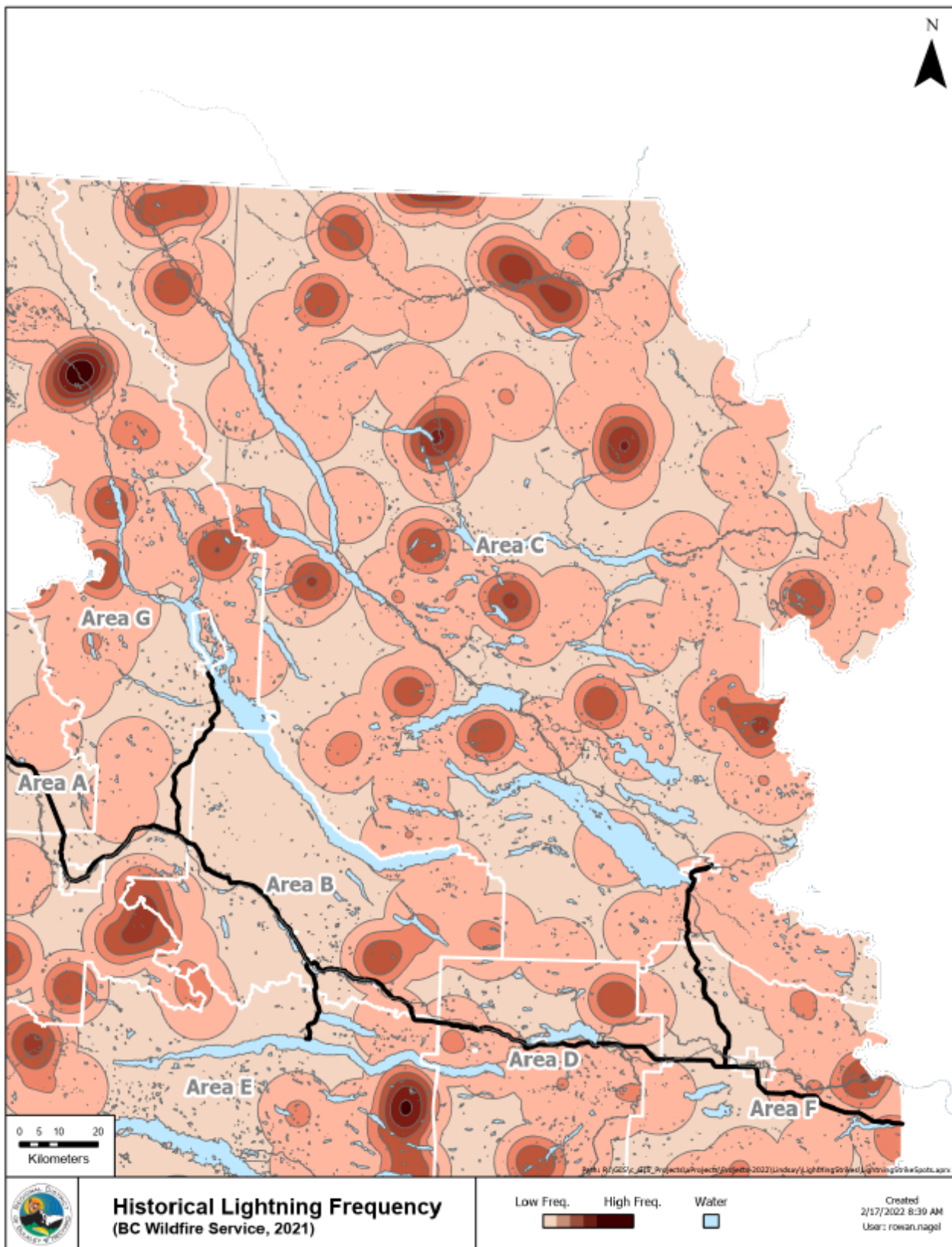
Annual Maximum Daily Discharge Rates (m3/s)



APPENDIX 3 – ELECTORAL AREA 'C' KNOWN HAZARDS MAP







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