

5. Jean Marie River's Key Vulnerabilities to Climate Change

Based on the results of the literature review, interviews and the focus group session our community is particularly vulnerable to health related climate change impacts in regard to:

- 1. Food security/safety:** Every family in Jean Marie River eats country foods, such as moose, woodland caribou, waterfowl and fish to varying degrees; however, this is being negatively impacted by climate change due to:
 - More difficult and dangerous to access harvesting areas;
 - Changes to the landscape that are causing habitats for some animals to disappear resulting in these animals leaving the area;
 - Reduced abundance of traditional country foods (e.g. berries, fish, rabbit, and beaver);
 - Fewer migratory birds that are harvested seasonally (including their eggs) are returning;
 - Some animals are unsafe to eat because of increased levels in contaminants (e.g. mercury in fish and cadmium in moose organs), and fish from the Mackenzie River are inedible;
 - New species of animals and plants are appearing that may start competing with the local animals and plants, especially if there are significant changes to particular ecosystems, and;
 - More people are relying on store bought food, which is very expensive and less healthy; however, even this is a food security issue when access to Fort Simpson by vehicle is impossible during freeze up and breakup.
- 2. Access to Safe Drinking Water:** The fluctuation in water levels and changes in river freeze and thaw cycles, due to climate change among other factors, are bringing our water resources and quality into further question, and as such:
 - People do not drink water from natural sources, or melted snow, because of the film the water leaves behind in cups;
 - There have been a number of water advisories since 1995, and most people in the community buy bottled water rather than drinking tap water (a costly expense over a year). People need to stock up on bottled water when access to Fort Simpson is impossible by vehicle during freeze up and breakup;
 - With the water in lakes and rivers warming, this could potentially increase the risk of exposure to new water and vector borne diseases, and;
 - There is also great concern that a changing climate is causing lakes and streams to dry up and permafrost to melt; releasing contaminants into the water and land.
- 3. Cultural & Community Health and Continuity:** Maintaining our culture and traditional practices means, in part, travelling on the land and harvesting resources, and we feel these country foods are better for our physical and mental health. Country foods have better nutritional value than processed foods bought in the store. In addition, the act of harvesting provides a means for cultural and spiritual renewal. However, impacts being caused by climate change has:
 - Provided fewer opportunities to go out on the land and practice TLU activities and pass on TK with the changes in seasonal weather patterns;
 - Caused our TK for predicting weather to become unreliable because the changes in seasonal weather patterns have been changing so rapidly that the indicators in nature we rely on for predicting weather are no longer harmonized with these changes;
 - Contributed to fewer people going out on the land, and less country foods is being consumed;
 - Contributed to fewer people learning Slavey, which requires references to the environment while on the land to fully master the language;

- Increased the chance of exposure to contaminants in, and new diseases transmitted by, air, water and animals;
 - Increased damage to infrastructure and roads from severe storms, floods, and melting permafrost, and;
 - Increased the potential for our youth to develop allergies to new species of trees, plants, and animals encroaching on our traditional lands.
4. ***Travel Safety:*** Travel safety is always a major concern in our community, as many of the areas we frequent are only accessible by ATV, snowmobile, boat or foot. With a warming climate we need to be observant when:
- The ice cover is not as thick, and ice conditions are more difficult to assess due to increased snow cover, making traveling during years with mild winters increasingly hazardous;
 - Melting permafrost is causing traditional trails to become blocked or impassable, and is causing dramatic changes to the landscape, which can cause people to become disoriented in once familiar areas, especially with younger land users;
 - Traveling by boat along rivers is more risky due to lower water levels exposing hazards such as rocks, or making some parts of rivers too shallow to cross by boat, and;
 - Driving in winter because unpredictable weather events such as blizzards are happening more suddenly.
5. ***Extreme Weather & Increased Exposure to UV-B Rays:*** Extreme weather events such as blizzards, heat waves, sudden cold spells, and severe thunder and windstorms are having numerous impacts on our community and individual members. Vulnerabilities include:
- The JMR Administration Office and other community buildings being damaged by particularly violent windstorms;
 - Certain health problems being aggravated when it becomes too hot or too cold (e.g. respiratory and heart problems), and people in the community being seriously disturbed and concerned by the severity and intensity of the thunderstorms they are seeing now, which residents do not remember experiencing in the past;
 - Unpredictable and severe weather events that are particularly discomforting to community members, and even harmful to Elders if they are unprepared for these events;
 - Increases in number of community members suffering from sunburns, skin irritations, heatstroke, and vision problems during heat waves in the summer, and;
 - Increase in number of community members getting frostbite when out on the land because extreme weather can occur with little or no warning
6. ***Negative impacts to the health of plants and animals:*** Climate change is having observable negative impacts on plants and animals common to the area, increasing JMR's vulnerability to climate change with respect to:
- Areas where trees have died and collapsed have blocked trails to harvesting areas;
 - Northward spread of spruce bud worm and warmer drier summers will increase the risk of forest fires;
 - Decreased abundance and quality of berries;
 - Decreased abundance and quality of fish;
 - Many small mammals and woodland caribou do not have as much fat, and the quality of fur on small mammals is poor, and;
 - Habitats of certain animals that are harvested are disappearing in areas where permafrost is melting (e.g. permafrost heaves, drying up of wetland areas).

JMR's vulnerability as whole to climate change is also compounded by, and compounds pre-existing issues in our community that go back as far as first contact with Europeans in the 18th century. The major issues in our community that climate change is compounding are:

- 1. *Limited Medical Facilities and Staff:*** Our community has a nursing station, but no doctors or nurses are stationed here to treat any serious injuries, or administer prescription medications for serious illnesses or infections. We must travel into Fort Simpson for all basic medical appointments and to Yellowknife, Hay River and Edmonton for more serious issues. The safety issues brought about with climate change, such as increased exposure to extreme weather, increased hazards associated with traveling, and the potential for increases in vector and water borne diseases emphasizes the importance of having medical facilities and supplies readily accessible in the community.
- 2. *Water Sources, Pollution & Cancer Risks:*** Water for community use has usually been drawn from the Jean Marie River because it is clearer than the Mackenzie River, although water from the Mackenzie has also been used. Many community members believe that cancer rates are also linked to our water quality because like all things water is alive, and when its flow is slowed it is more susceptible to contamination from natural and anthropogenic sources. A warmer climate in the North will also likely introduce new diseases and increase the levels of contaminants entering into our water sources with the increased melting of permafrost and in the air from pollution from down south; increasing our risk to diseases and illnesses linked to the exposure to such contaminants (Furgal and Prowse, 2008; Séguin and Berry, 2008; Berner et al., 2005; Wrona et al., 2005). From the interviews conducted with community members an interesting, and potentially enlightening observation that many participants made was that cases of cancer in the community started to increase about 15-20 years ago, approximately the same time that most interviewees also started noticing significant changes to the climate.
- 3. *Existing Health Issues such as Diabetes and Obesity:*** More and more we are relying on store bought foods that put us at higher risk to health problems such as obesity, diabetes, high blood pressure and tooth decay. Today the majority of people living in the community are already diabetic, and many are overweight and living with high blood pressure. These are common health issues in other communities in the Dehcho Region (Guyot et al., 2006; Paci et al., 2005). Managing these conditions and ensuring the cycle does not repeat itself in our younger generations is a priority. Unfortunately because our community does not have a staffed nursing station, and because of our small size, there are no local statistics related to these issues that are readily available to us. With harvesting becoming increasingly difficult and dangerous to do our members will be more susceptible to the health risks from eating store bought foods, unless alternative local food sources that are more readily available are found.
- 4. *Altered Lifestyles/Cultural Activities:*** Perhaps the most prominent health issue still facing our community is the ongoing rapid social and cultural changes that have been occurring since first contact with European settlers and fur traders in the eighteenth century. We continue to struggle with the erosion of our cultural values and TK due to the shift from a nomadic to a sedentary lifestyle, and from a traditional economy to a mixed economy. Climate change is just one factor that is contributing to this erosion of our cultural values and TK.

Although our community is vulnerable in a number of ways to climate change, by identifying where we are vulnerable has enabled our community to be aware of the seriousness and range of impacts that a changing climate is causing, or may cause, to our community and surrounding area. Conducting this vulnerability assessment has also allowed our community to explore some initial adaptation strategies to respond to these impacts.