

4.3. River, Lakes & Water Quality

The most apparent impact to rivers being caused by climate change is the timing and duration of when rivers and lakes freeze up and breakup. Freeze up is happening approximately 2-3 weeks later and takes longer. Spring breakup happens about 2-3 weeks earlier and is quicker. One of the more significant impacts is that when freeze up takes longer JMR is cut off from Fort Simpson, the nearest community with a grocery store, medical facilities, and other essential services. To reach Fort Simpson from JMR by vehicle the Liard River needs to be crossed, either by ferry when the water is open or by an ice bridge in the winter. During freeze up and breakup Fort Simpson is only accessible via air transport, and the second closest community is Hay River, about a four hour drive from JMR. This means that people need to stock up on food and water before freeze up begins. Moreover, with access to harvesting areas being more difficult and dangerous in the fall, people are becoming more dependent on store bought foods.

While talking about impacts to lakes and rivers caused by climate change all the interviewees voiced their concern about the deteriorating water quality in both natural and treated sources of drinking water. Most people in JMR will not drink water from natural sources anymore, or from melted snow because it is murky and does not look clean; instead people drink bottled water when on the land and at home. The Mackenzie River in particular was mentioned, and people no longer drink water from lakes and rivers in the area because, even when boiled, the water does not taste right and leaves a film in cups.

“... in the olden days people wandered all over the land and when they came to a pond of water, they thought nothing of getting a cup full and drink. Now all these little ponds of water scattered around the land are covered with green, slimy film. Water does not taste good anymore and it’s scary to drink water. The lake, the five fish lakes in the last two years I am noticing a difference in the water if you use the water in the lakes... if you make tea and the water from the lake, it looks dark. In the past when you make tea with the water from the lakes it looks very clear, bright coloured tea, now the tea looks very dark and has a scum on top. There’s a dark scum marks inside your cup, it does not look good.” (*Douglas Norwegian, November 2010; translated by Margaret Ireland*).

The actual cause of this film in the water is unknown, but the temperature in the Mackenzie has been monitored and it is becoming warmer, which could be causing major changes to the ecosystem. The role of climate change in the deterioration of water quality in the region remains unknown, but research has shown that warmer water temperatures can alter northern aquatic habitats (e.g. out migration of cold water fish species) and become more inviting to warm water species, and to vector and water borne diseases (Furgal and Prowse, 2008:102; Séguin and Berry, 2008:327; Wrona et al., 2005:383-384).

Other observations and impacts regarding lakes, rivers, and water quality associated with climate change such as flooding, changes to navigation routes and damage to roads are summarized in Table 2.

There is also the issue of warming temperatures in rivers and lakes contributing to the accumulation of contaminants in the water table via melting permafrost, development activities, and pollution from southern regions. The leaching of contaminants such as heavy metals (e.g. mercury) into water sources as surface and water temperatures rise is well documented in the literature (Furgal and Prowse, 2008:80,98; Berner et al., 2005; 891; Wrona et al., 2005:379,430); however, in the local context of JMR the link between warming temperatures, melting permafrost, contaminants, and water quality needs to be better explored as there has already been an increase in heavy metal contaminants, such as increased mercury levels in popular fishing lakes near the community.

Table 2: Climate Observations and Impacts Associated with Rivers, Lakes, and Water Quality

Climate Change Observations and Health Related Impacts in Relation to Rivers, Lakes, and Water Quality							
Theme	Observations	Impacts	Relation to Health	Vulnerability Ranking	Magnitude	Duration	Ability to Adjust
Rivers, Lakes and Water Quality	<ul style="list-style-type: none"> Freeze up takes longer and happens slower (late October to early November) 	<ul style="list-style-type: none"> Trapping season starts around a month later because ice on lakes and rivers is too thin to travel across Road to Fort Simpson is closed until the Liard River freezes thick enough to drive over 	<ul style="list-style-type: none"> Reduced availability of country foods in the community resulting in more dependence on store bought foods 	Medium	Medium	Long	Easy
			<ul style="list-style-type: none"> Increases in injuries and deaths caused by travelling accidents 	High	Medium	Intermediate	Easy
			<ul style="list-style-type: none"> Less opportunities to practice and pass on traditional knowledge and cultural practices 	Medium	Medium	Intermediate	Easy
			<ul style="list-style-type: none"> Road closures block access to the nearest grocery stores and medical facilities in Fort Simpson 	High	Strong	Long	Difficult
	<ul style="list-style-type: none"> Ice on lakes and rivers is much thinner than in the past 	<ul style="list-style-type: none"> Ice in winter does not freeze as thick, making travel more difficult and dangerous 	<ul style="list-style-type: none"> Increases in injuries and deaths caused by travelling accidents 	Medium	Medium	Intermediate	Moderate
	<ul style="list-style-type: none"> Break up is shorter and happens quicker (early May) 	<ul style="list-style-type: none"> Trapping season ends about a month sooner Increased chances of flooding of roads and in the community (e.g. air strip) in the spring 	<ul style="list-style-type: none"> Reduced availability of country foods in the community resulting in more dependence on store bought foods 	High	Medium	Long	Moderate
			<ul style="list-style-type: none"> Less opportunities to practice and pass on traditional knowledge and cultural practices 	Medium	Medium	Intermediate	Easy
			<ul style="list-style-type: none"> Health risks and physical and emotional stress associated with flooding and road closures 	Medium	Medium	Intermediate	Difficult
	<ul style="list-style-type: none"> Water is warmer in lakes and rivers and they are ice free for longer 	<ul style="list-style-type: none"> More children swimming in the summer Longer boating season Need to check fish nets more often so fish do not spoil 	<ul style="list-style-type: none"> Health benefits and risks associated with swimming 	Medium	Weak	Short	Easy
			<ul style="list-style-type: none"> More opportunities to harvest fish; however, more time and energy needed to monitor fish nets 	High	Strong	Short	Moderate
	<ul style="list-style-type: none"> Water from the Jean Marie River and Mackenzie River leaves a film in cups, as well as water from melted snow 	<ul style="list-style-type: none"> Water is murkier and gray in colour Water from the rivers and lakes is not suitable for drinking, and even treated water in the community is not a trustworthy source of drinking water 	<ul style="list-style-type: none"> Potential for increases in gastro-intestinal and other water borne diseases from water contamination 	High	Strong	Intermediate	Difficult
			<ul style="list-style-type: none"> Less safe water sources on the land 	High	Medium	Long	Difficult
	<ul style="list-style-type: none"> Lower Water level in Mackenzie River, and other lakes and rivers 	<ul style="list-style-type: none"> Changes when navigating the Mackenzie River to avoid any new hazards such as shoals and sand bars 	<ul style="list-style-type: none"> Potential for increased boating accidents resulting in injury or death 	Medium	Medium	Long	Moderate