



**Water Quality Information for Traditional Drinking Water Sources:
Elim, Alaska**

Recent Activities:

The Water and Environmental Research Center (WERC) is conducting research that will help determine how a changing climate will affect traditional water resources on the Seward Peninsula. The initial stages of this study include locating and testing traditional sources (lakes, rivers, springs, etc.) that are currently used for drinking water. In June 2005, one of our graduate students, Erin Strang, did some preliminary sampling from Turner and Iron Creeks. Water quality results from these samples are listed below.

Results:

Sample Name	Total Coliforms*	<i>E. coli</i> *	<i>Giardia</i>
Turner Creek	2.3 coliforms/100 mL	<1 <i>E. coli</i> bacteria/100 mL	0 cysts/Liter
Iron Creek	34.6 coliforms/100 mL	3.1 <i>E. coli</i> bacteria/100mL	0 cysts/Liter

* Results are averages of 3 samples and are "Most Probable Numbers" determined using Colilert and the IDEXX Quanti-Tray 2000.
NOTE: 100 mL is about ½ a coffee cup full of water. 1 Liter is approximately 1 quart (the size of an average water bottle).

Discussion:

Total coliforms are naturally occurring bacteria that can be found in both the environment (nutrient-rich waters, soil, decaying plants) and in animal feces. Most of them are harmless. It is normal to find coliforms in surface water such as rivers and lakes, but total coliform should be inactivated by effective treatment, and therefore present in no more than 5% of a month's treated water samples.

[www.epa.gov/safewater/mcl.html#mcls]

E. coli is a coliform that can be found in the feces of humans and animals, including birds. It is normal to find low levels of *E. coli* in surface water, but it does indicate fecal pollution from some warm blooded animal. The U.S. Environmental Protection Agency (EPA) requires that *E. coli* be absent from drinking water. For swimming, the average value is not to exceed 200 *E. coli* (or other fecal coliforms) per 100 mL. [www.epa.gov/safewater/mcl.html#mcls; www.dec.state.ak.us/regulations/pdfs/70mas.pdf]



Giardia is a parasite that lives in the intestines of infected humans and other animals, such as beaver. It is passed in the feces and can be found in many rivers and lakes throughout North America. The Environmental Protection Agency requires a maximum level of zero *Giardia* cysts for treated drinking water. [<http://www.epa.gov/safewater/mcl.html#micro>].

Turner Creek and Iron Creek are not treated with any chemicals, such as chlorine, so these preliminary tests indicate that the water is of fairly high quality in its natural state. However, it is important to remember that surface water, such as a running river, will change from day to day and from place to place within the river. This is especially true of *Giardia*, since the cysts are scattered throughout the water and may not be caught when a sample is taken.



Future Work:

In order to predict the ways in which traditional drinking water sources will be changing in the future, WERC needs to return to these sources multiple times. This will allow us to collect valuable information about the ways in which water quality, permafrost, precipitation and ground water are changing around these sources. We are particularly concerned with collecting conductivity and temperature data on a regular basis and hope to be able to hire local people to help us with this in the future.

Contact Information:

If you have any questions regarding this project, or you know of a local drinking water source that is not currently being considered in this study, please contact:

Dan White – (907)474-6222, ffdmw@uaf.edu

