ANSWERS TO FREQUENTLY ASKED QUESTIONS

ABOUT E. COLI AND THE PINE RIVER

1. *What is E. coli?*

   E. coli is a bacterium that is found naturally in the environment. Some kinds of E. coli live in the intestines of animals, including people and are excreted with feces. Most E. coli are harmless, but others cause illness, either diarrhea or other symptoms. The E. coli that can cause diarrhea can be transmitted through contaminated water or food, or through contact with animals, people or fish. Usually an illness caused by E. coli is mild, but one kind of E. coli called Shiga-toxin producing E. coli can cause serious illness which can be fatal to susceptible people.

2. *I heard that the Pine River contains E. coli bacteria from people. Why is that important?*

   There are three reasons why human E. coli in rivers and lakes is important. The first is that by itself, E. coli can cause illness, although serious illness from E. coli in the water is probably uncommon. The second reason human E. coli is important is because it indicates that human feces are in the water, and that means that lots of other disease-causing organisms are there, including Giardia, Campylobacter, Dysentery and Hepatitis A. The third reason E. coli is important is because—along with animal manure and fertilizers—it overloads rivers and lakes with nutrients including nitrogen and phosphorus that cause problems such as eutrophication (dead zones) and toxic algae blooms that can kill fish and make water undrinkable.

3. *How do we know people become ill from pathogens in rivers and lakes?*

   Many pathogens in the water cause diarrheal illness. Most of the time people who get diarrhea don't go to the doctor, and if they do go, they are unlikely to be tested to see what caused their illness. And even if they are tested and the result is positive for a waterborne pathogen, that isn't proof it came from the river. Instead, researchers have done studies at beaches comparing the rate of diarrheal illness among people who enter the water compared with those who did not. For example, a 2006 study in Environmental Health Prospect found that 8.6 percent of people who went swimming had acute diarrhea within one week compared to 1.3 percent of those who did not.

4. *How does human E. coli get in the water?*

   Human E. coli gets into rivers and lakes from two main sources: The first is from rural homes that do not have a septic system and discharge feces directly into drains and creeks. The second is from septic systems that have failed and no longer clean wastewater properly. It is estimated that 10 to 15 percent of rural homes do not have a working septic system. Regulations about septic systems vary widely in Michigan. In many places, local public health departments lack the authority to search for such illicit discharges.

5. *How can we be sure there is human E. coli in the water?*

   Many rivers and lakes in Michigan are tested for E. coli by the Michigan Department of Environmental Quality (MDEQ) on a five-year schedule. Other organizations like conservation districts test for E. coli as part of their watershed management plans. These tests look at average E. coli levels over a month. The results must be below 130 E. coli per 100 milliliters for the water to be considered safe for swimming. The

operators of swimming beaches, such as state and national parks, may also test for E. coli on a daily basis. The results of daily testing must below 300 E. coli per 100 milliliters. If there are more than 1,000 E. coli per 100 milliliters in a daily sample you shouldn't even touch the water. All of these tests reliably show high levels of E. coli in many Michigan rivers and lakes. According to studies done by Alma College, the Pine River in Alma (The Mill Pond) has levels of E. coli unsafe for swimming throughout the summer and has several days, in most summers, where you shouldn't even touch it.

In addition, researchers can determine whether the source of E. coli is likely to have been human beings by conducting DNA analysis or other methods, such as using trained dogs. DNA results are still pending for the Pine River, but results from nearby rivers such as the Maple and Flat show that 80 to 100 percent of samples contain human E. coli.

6. *Does the Mid-Michigan District Health Department conduct daily monitoring of the Pine River?*

   The health department does not conduct daily monitoring. Daily monitoring is done at beaches such as state and national parks where there is a paid operator who is required to do sampling as part of their contract. There are no such beaches on the Pine River. The health department has no additional funding for monitoring.

   But in many places, daily monitoring is being dropped because researchers have concluded that it is not effective in reducing illness. The main reason is that it takes too long to get test results. Furthermore, we know enough about E. coli to know when to avoid the water even without test results. Rain flushes E. coli out of drains and moves it through the ground water. It is best to avoid the river for 48 hours after a rain storm. Places that have dropped beach monitoring have opted for public education about pathogens in water. They do things such as place educational signage at beaches just like the ones near the Pine River.

7. *What can be done to improve water quality?*

   There are three main things that need to be done to improve water quality:

   a) We need to change the Mid-Michigan District Health Department's Environmental Health Regulations so that it has the authority to search for illicit septic waste discharges. This will reduce E. coli and other pathogens in the water.

   b) We need to ensure that management practices on farms are effective in keeping animal waste out of surface waters. This will both reduce pathogens and also reduce the amount of nutrients contributing to declines in water quality, including eutrophication and toxic algae blooms.

   c) We need to reduce that total amount of nitrogen and phosphorous from both farms and lawns that are causing declines in water quality.

All of these things can be addressed together through a comprehensive watershed management plan. Gratiot County, through the leadership of the Gratiot Conservation District, is completing such a plan right now.

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