

**Listening to the Lake Radio Program**  
**Beach Bacteria and Lake Superior Beach Monitoring Program**  
**5/18/05, KUMD Radio, Duluth, MN**

*(Opening music)*

Welcome to Listening to the Lake. My name is Marie Zhuikov and I work for the Minnesota Sea Grant Program, which is part of UMD. Sea Grant is a public education and research program that focuses on Lake Superior. We're bringing you this show through the generous support of KUMD twice a month to help keep you in touch with what's happening with the big pond in our front yards – Lake Superior.

The focus of our first show is bacteria found in the water and the Lake Superior Beach Monitoring Program. The monitoring program is about to go into full swing for the season, looking for harmful bacteria along Lake Superior's beaches. But first, I'd like to let you know what's happening on the lake today. Here's what the lake has to say near the Lakewalk on 21<sup>st</sup> Avenue East.

*(Enter lake sounds)*

It's cold and windy by the lake. The water temperature on the western end averages a little less than 37 degrees today. The nearshore marine forecast calls for an east wind around 15 knots. Showers and thunderstorms likely. Waves 2 to 3 feet. A small craft advisory is in effect. The chance of showers lasts through the night with waves 1 to 3 feet.

*(Fade out lake sounds)*

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Heidi Bauman, coordinator of the Lake Superior Beach Monitoring Program, is probably one of the only people to get sick in the last few years from mucking around in contaminated beach water. When she first began testing along Lake Superior two years ago, she unconsciously put her pen in her mouth.

*"I happened to do that on a day where there was a sewage overflow. So now, I do not put anything in my mouth, and we carry antibacterial foam in the cars so in between each site we can do up our hands."*

Other than this ironic case, no other incidents of illness from swimming or kyacking in contaminated water were reported to health officials in the last few years. Even so, the Minnesota Pollution Control Agency is participating in the beach monitoring program as required at the national level by the Environmental Protection Agency. National beach monitoring is an offshoot of the Clean Water Act passed in 2000. Beginning May 23 and spanning every Monday this summer, Bauman and her team will test 39 beaches from Duluth to Grand Marais.

They are looking for *E. coli*, a type of bacteria that in and of itself is usually not harmful. Rather it can indicate the presence of other disease-causing organisms in the water and an increased risk for illness.

Minnesota Sea Grant water education coordinator, Barb Liukkonen, says *E. coli* is used as an indicator because testing for it is inexpensive and relatively easy.

*"E. coli is a part of or a member of a larger class of bacteria called coliform bacteria, rod-shaped or column-shaped bacteria. And coliform bacteria occur everywhere in nature. But the fecal coliform bacteria come from the intestines of warm-blooded animals. So humans, livestock, wildlife, pets, and E. coli is a member of that fecal coliform group, and when we detect E. coli, then we know that fecal coliform and evidence of fecal contamination is in the water."*

Liukkonen says people can contract many different illnesses if they drink contaminated water.

*"They range from the big bad diseases that we have all heard about – the cholera and typhoid, which are waterborne, to simple nausea, maybe diarrhea. A lot of times people who get a waterborne illness don't realize it's from the water. It's not really serious. They either think they ate something or they may think they have the flu...a lot of waterborne illnesses go unreported."*

Even though *E. coli* tests are easy and inexpensive, the drawback is they take a day to process, allowing the bacteria colonies to grow enough to be identified in the lab. That means beaches are posted with 'no water contact' advisories a day after the contamination has occurred. Liukkonen says work is being done to develop an 8-hour test but that it's not available yet.

Another confounding factor for the beach testing program is that not all of the *E. coli* found in the water is necessarily harmful to humans. Randall Hicks, a microbial ecologist at UMD and his colleague Michael Sadowsky on the Twin Cities campus are working on two research projects that could have implications for the beach testing program.

The first looks at whether *E. coli* can take up residence in the plants and sediment in the water. It's often assumed that *E. coli* found during beach monitoring comes from bacteria washed into the water from the land. It could be that some is present all of the time in sediment and water plants (also called periphyton). On windy days, when the water churns, these resident bacteria could be released into the water. It's not clear whether these bacteria cause any harm to humans, however.

Hicks and his team have been researching this issue for a year and plan to continue it this summer.

*"Some of our preliminary data indicates that yes, there are E. coli found in sediments and in periphyton and they actually increase during the summer in the periphyton to fairly high levels, which might be eroding and releasing E. coli into the water."*

The other research project uses a genetic fingerprinting technique to help pinpoint the sources of the *E. coli* that are closing beaches.

*"I think that when we now close beaches or put out warnings on beaches, certainly the question that people have is where are these organisms coming from, and that's what our research hopefully can shed some light on."*

*"If they turn out to be organisms or bacteria that are from sediments, periphyton or animals other than humans, then we may look at this pollution problem in a slightly different way. In some cases we may be able to use the information we have to help mitigate certain sources. In other cases, we may not be able to do anything."*

*"We may not be able to remove the bacteria from the sediments. I doubt anybody advocates shooting all the gulls in the harbor to get rid of the E. coli that they might be contributing. Beyond that, if we identify there are other major contributors besides humans, the next question really becomes one of risk...what's the relative risk of an indicator organism coming from a bird versus a human."*

To help complete their library of *E. coli* samples from different animals, Hicks is looking for help from the public.

*"In the fall, we could really use the help of hunters who hunt in the St. Louis River who hunt for ducks or geese, or in the surrounding areas and inland areas that are near this region, who would be willing to take a little Q-Tip type swab out with them when they go duck hunting. And when they are successful at shooting a duck or a goose, taking a swab for us and then sending it back to us so that we can isolate E. coli that we know have come from that particular species of duck or goose, for example."*

Hunters can contact Randall Hicks at 726-7263 or through his e-mail, which is rhicks@d.umn.edu. He will add your name to a list and contact you in the fall when the waterfowl season is open.

To learn more about the Lake Superior Beach Monitoring program or to check for beach advisories, you can visit their Web site at [www.mnbeaches.org](http://www.mnbeaches.org) or call the beach monitoring hotline at 725-7724.

This has been Marie Zhuikov for Listening to the Lake from the Minnesota Sea Grant Program at UMD.