

# The Journal Times

## MAKE A CONNECTION

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### Local

## Hint: The birds look innocent

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RACINE - Winter is a quiet time in nature but not in the laboratories of people studying the near-shore water quality in Lake Michigan. Last summer's field work is providing new insights into the contamination of water along Racine's beaches.

One day near the end of July 2004, Julie Kinzelman, of the Racine Health Department, and Sandra McLellan, of the Water Institute at the University of Wisconsin-Milwaukee, hustled along North Beach taking water samples before a storm hit. On the water, a research vessel did the same. The two scientists hoped to be able to compare samples taken before the storm with another set taken after.

That happened, and what it showed, Kinzelman said, was that bacterial contamination on that day was coming out of the storm drains but also from the beach, from water oozing through the sand. And on this particular day, the wind was from the southwest, pushing water away from the shore. "All the contributions from runoff and storm water are going into the river, but in this particular instance it wasn't pluming over the beach."

Field work done last summer is pointing at storm water runoff from the beach as a major source of contamination. It's also pointing away from gulls as carriers of human diseases.

At some of the sampling sites, she said, bacteria concentrations hit 10,000 organisms in each 3 fluid ounces of water. When concentrations are 235 or more, officials post swimming advisories. A day later, bacteria counts had fallen to 135 or less, said Kinzelman, the city's microbiologist.

This summer, the two scientists are hoping for a different kind of rainy day, one with a wind from the east so they can see what contaminants might be blown against the shore or held there. "You almost need to go out a couple of different times because you want to capture all these different conditions, because they really do influence where that contamination is going to end up," said McLellan, a scientist at the institute.

They also discovered a trench, a 20-foot-wide low spot behind the lifeguard stands that is attractive to gulls, which defecate there, and to children who play in the water, Kinzelman said. This patch of continually wetted sand looks like a breeding ground for bacteria, she said.

Bacteria concentrations in the trench increased as researchers dug deeper into the sand. The opposite was true elsewhere; bacteria counts were highest near the surface of the sand, she said. "So it seems like the sand does have the potential to act as a filter to filter out bacteria before it reaches the water

table."

It may be that the grade of the beach is important to managing bacterial contamination, Kinzelman said, and the city may consider filling that low spot.

This dynamic isn't unique to Racine. McLellan said the same effect seems present on Bradford Beach on Milwaukee's lakefront.

The focus is on bacteria because they're the basis for swimming advisories. What health workers measure, however, aren't disease-causing organisms, or pathogens. In Racine, they look for *E. coli*, a bacterium which is common in the intestinal tracts of humans and animals. Pathogens are typically found in company with *E. coli*, but *E. coli* are easier to detect.

As yet there's no way to determine where *E. coli* in the water comes from, whether from a human or a gull. This raises a question, one which McLellan is trying to answer: If gull feces are responsible for high *E. coli* counts, are they also carrying human pathogens? Last summer she collected fecal samples which were exposed to several common antibiotics. The idea is to identify human bacterial pathogens based on which organisms live. Human pathogens develop resistance to antibiotics and won't die as readily as animal pathogens, which have little resistance.

McLellan said she has another set of samples to collect this summer to complete her work. But so far, she said, it looks as if gulls don't carry many human pathogens.

Gulls aren't the only potential source of contamination. The acts of people all around Racine are important, too, Kinzelman said.

"If you're going to continue to put inappropriate things down the storm drain, not pick up after your dog, feed the gulls ... it's going to have an impact on the water quality, and it's going to act in opposition to what we're trying to do."

It's been 13 years since people really started talking about the water quality problem and about five since scientists began working in earnest, yet we may be seeing only the first layer of problems, McLellan said. The beach and near-shore environment is a complex system, and once the initial problems are identified, we may see more, she said.

"We didn't have the trench," Kinzelman said. That trench behind the lifeguard stands has been carved out by nature since beach research began. "There's something else now that's interacting, that's a potential source of contamination that needs to be addressed," she said.

It's also important, McLellan said, to recognize also how very far we've come in just those five years of research, and how fortunate this corner of the Great Lakes is to have so many people working on the problem.

We now have a good handle on the physical sources, the pipes and streams, she said. "And we're actually now starting to talk about different management strategies."