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Scientist questions beach closings

He says as many as half were unnecessary

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The lack of quick, low-cost tests for illness-causing organisms in water is likely prompting municipalities to unnecessarily close Lake Michigan beaches, a federal researcher said Thursday in Milwaukee.

Richard Whitman, chief of the Lake Michigan Ecological Research Station in Indiana, said he couldn't say for sure how many of the hundreds of days of Wisconsin beach closings last year weren't necessary, but it might be as many as half.

Whitman, who spoke to more than 130 scientists and municipal officials attending a beach closing conference at the War Memorial Center, said his ongoing study of Illinois beaches questions the current reliance on testing beach water only for *E. coli* bacteria as an indicator of recent fecal contamination.

Beach sand and mats of algae floating along shorelines both harbor *E. coli* for long periods, said Whitman, a biologist with the U.S. Geological Survey.

E. coli can even survive over winter in beach sand, he said.

The "big surprise" is that bacteria sheltered in sand or algae can repopulate shoreline water with such high concentrations that beaches are closed even when there are no obvious new sources, Whitman said. Such sources would include sewer overflows or heavy rains that either flush contaminants out of storm sewers or wash bird droppings off nearby parking lots.

Growth of *E. coli* bacteria also is temperature-dependent, Whitman said. As the water temperature rises during the summer, *E. coli* concentrations increase.

Whitman suggested that his findings go a long way in explaining last summer's record numbers of beach closings from Racine to Milwaukee and Door County.

Testing this summer

The most intensive round of Lake Michigan beach testing ever will begin this summer, and the number of beach closings could be high again, said other officials at the conference.

Though Whitman urged municipalities not to abandon testing for E. coli because it is the best water quality check in use now, he expressed frustration in an interview that a companion test specifically for an illness-causing pathogen was not available.

Most forms of E. coli are harmless and live in the digestive tracts of humans and warmblooded animals, which includes birds.

The exception is E. coli O157:H7, which produces a toxin that causes severe bloody diarrhea and abdominal cramps and can lead to kidney failure or death.

The non-toxic E. coli do not cause intestinal illness, but they can indicate the presence of other pathogens.

"To protect public health, we also should be measuring pathogens," he said.

That will not be possible this summer, however, because of high costs and long delays of up to five days in current tests for viruses and other disease-causing organisms.

"In lieu of that, we need a surrogate which would tell us that there is a pathogen of human origin also in the water," Whitman said.

Sandra McLellan, an assistant scientist at the Great Lakes WATER Institute in Milwaukee, agreed that researchers "must cut to the chase" and answer the question of whether there are pathogens present when E. coli concentrations rise above federal guidelines for recreational water.

In the meantime, however, McLellan is pursuing one possible surrogate - testing for caffeine in water. The chemical would come only from sewage, and its presence would confirm human waste in the water.

McLellan's study of water quality at Milwaukee beaches has found that E. coli contamination abruptly stops about 10 meters off shore.

"The whole lake is OK," she told those attending Thursday's conference. "We are seeing local contamination problems at beaches."

Julie Kinzelman, a microbiologist with the City of Racine Health Department, said that the U.S. Environmental Protection Agency was searching for other indicators of recreational water quality.

For now, health officials need "to err on the side of caution" and use the E. coli test, she said.

"We also need to be able to identify whether E. coli is coming from a human or non-human source," Kinzelman said.

McLellan's laboratory at the University of Wisconsin-Milwaukee should help municipalities do just that. She is looking for antibiotic resistance in E. coli, a trait that would only be found in bacteria from humans. In addition, she is identifying the genetic makeup of E. coli from humans, gulls, cattle and dogs.

Distinct genetic "fingerprints," or sequences of DNA, will help researchers recognize the source species.

More gulls

As Lake Michigan's water level has receded to near-record low levels in the last year, beaches have become wider and attracted more waterfowl, particularly gulls, said Mark Pfister, an aquatic biologist with the Lake County Health Department in Waukegan, Ill.

"As beach areas increase, we find higher average concentrations of E. coli," he said.

At North Point Marina, the beach increased in size by 255% between 1997 and 2000 while average E. coli concentrations rose 391%.

Pfister consistently found the highest concentrations of E. coli at Waukegan South Beach. There were no storm or sanitary sewers discharging close to it, but it did have the greatest number of gulls among beaches in the county, he said.

Gull feces is loaded with E. coli, according to McLellan. "You would need 1,000 geese to match the E. coli burden from a single gull," she said.

At Racine, health department officials unsuccessfully tried to use distress calls to scare gulls away from North and Zoo beaches, Kinzelman said.

In 2002, high levels of E. coli bacteria in water prompted warning signs to be posted a record number of times at three Milwaukee beaches - 50 days at South Shore out of the 65-day season, 21 days at Bradford and 23 days at McKinley. Signs advising swimmers not to go into the water were put up on 41 days at Klode Beach in Whitefish Bay.

To reduce the number of closings at South Shore Beach in Milwaukee, Rep. Jon Richards (D-Milwaukee) said that county officials are considering moving the beach farther south at the park, away from a large parking lot.

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