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Sun, Sand, Surf—and Science

Posted on July 25th, 2008

By Jennifer Yauck



No dogs allowed” may be the rule at Bradford Beach, but a pair of Border collies have an exemption for the summer. That’s because as they dash up and down the sandy shore along Lake Michigan, these trained dogs are doing a special job: keeping the gulls away.

“It’s a low-tech solution for getting rid of disease-carrying birds,” said Sue Black, director of the Milwaukee County Parks Department. “It’s been very successful.”

The decision to call in the canine patrol owes some of its inspiration to past beach studies conducted by Great Lakes WATER Institute scientist Sandra McLellan and her lab staff. Through intensive field studies, McLellan discovered that a substantial proportion of the E. coli bacteria responsible for triggering closings at Bradford and other Milwaukee beaches came from gull droppings.

Now, science will continue to play a role in guiding management strategies at Bradford as the Parks Department leads a public-private partnership effort to revitalize the beach and obtain Blue Wave certification. The certification, granted by the nonprofit Clean Beaches Council, is bestowed on beaches nationwide that meet specific criteria for water quality, habitat conservation, safety, services, and education, among other things.

For the next five years, several WATER Institute researchers will lend their expertise to monitoring and the assessment of cleanup efforts at the beach, which has started coming back to life after being largely neglected in recent years.

Water Quality Monitoring

A key tool of the project is a monitoring buoy that will be stationed offshore in about 25 feet of water. The buoy will be outfitted with instruments that monitor a variety of water conditions, including temperature, pH, dissolved oxygen, conductivity, turbidity, and fluorescence.

The buoy is capable of collecting data at night and during bad weather, meaning it will provide information not easily obtained by human samplers, said Tom Consi, the scientist who developed the system. This information will give researchers a more complete picture of the dynamics that promote the presence of bacteria and algae at the beach, helping them pinpoint ways to control both.

In addition, Consi said the buoy could eventually make real-time management of the beach possible. Specifically, it could alert officials to conditions that indicate declining water quality so that they can take samples and close the beach if necessary. Down the road, the system could even be made to take samples and signal a closing automatically.

As a complement to the buoy data, the researchers will also take frequent measurements of water conditions in the swimming zone near the shore. Additionally, they will keep a literal eye on this nearshore zone with the aid of a beach camera. The camera will alert them to significant events such as the beaching of smelly Cladophora algae, said scientist Harvey Bootsma, a Cladophora expert.

The camera will be paired with instruments that collect weather data, including temperature, humidity, and wind speed and direction. Bootsma said the combination of weather, video, and water data will allow the researchers to relate water quality in the beach area to weather events. This, in turn, is useful for making near-term water quality predictions and further informing beach management decisions.

All of the data will be made available to the public on the WATER Institute website, said computer scientist Tom Hansen. “The website will be a resource for people who want to view the conditions at the beach or learn more about the beach environment,” he said.

Rain Garden Assessment

Also as part of the project, McLellan will assess whether new rain gardens installed along Lincoln Memorial Drive reduce the number of bacteria getting to the beach and lake from another source, stormwater runoff. Prior to the gardens' installation, runoff from the nearby bluffs drained directly onto the beach through seven storm sewer outfalls. The rain gardens, filled with native grasses and plants, are designed to contain that runoff so that the bacteria it carries eventually die off without reaching the beach.

McLellan's team will analyze sand and water samples collected from various beach sites and compare their data to several years of "pre-garden" data obtained from the same sites.

Officials expect the gardens will capture about 90 percent of rain events, missing only some of the exceptionally heavy downfalls. But McLellan cautioned that beach management involves some "trial and error" because every beach is unique. "Ultimately, we hope to show the rain gardens are working well, but if they're not, we'll show how to make them better," said McLellan.

Jennifer Yauck is a science writer at the Great Lakes WATER Institute. GLWI (glwi.uwm.edu) is the largest academic freshwater research facility on the Great Lakes.



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