

# Research delivers near real-time water quality results

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Ongoing research by Mercyhurst University biologists intended to expand and expedite testing for potential pathogens in beach water at Presque Isle State Park has resulted in a new method that delivers near real-time water quality results.

Mercyhurst biologist Dr. Steven Mauro, who has been instrumental in local [beach water](#) research the past five years, said the system is being piloted at Presque Isle this summer and represents a collaboration of Mercyhurst, Penn State Behrend, the Regional Science Consortium and Pennsylvania Department of Conservation and Natural Resources.

Testing for *E. coli* bacteria is the standard for assessing recreational [water quality](#). However, the conventional method of microbial plating to enumerate colonies of fecal indicator bacteria typically takes 24 hours or more to achieve a reliable reading. The new procedure uses a combination of [computer predictions](#) and quantitative PCR (qPCR) to isolate and identify [bacterial DNA](#) and gets the job done in two hours, limiting the amount of time during which swimmers are exposed to water that is potentially hazardous.

Not only might this emerging technology be of benefit to evaluating Erie's beach water but, if proven to deliver consistently accurate results, could well be used by recreational [water managers](#) across the country, Mauro said.

Here's how it works. Penn State Behrend statistician Dr. Michael Rutter

developed a computer program that measures real-time conditions, including wind direction and speed, water temperature and wave height among other factors and predicts when conditions are ripe for *E. coli* contamination. Mauro monitors the program's assessments and, if contamination is suspected, takes samples from local beach waters and processes them back at his Mercyhurst lab using state-of-the-art [DNA technology](#). If the qPCR confirms *E. coli* contamination, Mauro reports his findings to Presque Isle State Park officials who can then make informed decisions on posting advisories.

"I can go to the peninsula first thing in the morning and have results by 10 or 11 a.m. the same day," Mauro said.

In any beach-going season, he added, the collective qPCR results are expected to be 90 percent accurate. However, as this particular pilot project begins, Mauro said both the conventional and new methodology will be used to ensure the most accurate determinations of beach water safety.

Testing will be completed by Mauro with support from trained Mercyhurst science students and interns from the Regional Science Consortium.

Meanwhile, Mauro and his students recently published their research on the new qPCR methodology in the *Journal of Environmental Management*. Co-authors included recent Mercyhurst graduates Surafel Mulugeta, Ryan Hindman, Adam M. Olszewski, Kaitlyn Hoover, Kendall Greene and Matthew Lieberman.

Provided by Mercyhurst University

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