

Water WoRDs

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New Testing Methods for Beaches in Michigan

The mission of the DEQ's Water Resources Division (WRD) is to provide clean and safe water resources for our fellow Michiganders. Perhaps no activity symbolizes our mission more than the quintessential warm weather pastime: a day at the beach. Beachgoers expect and demand clean and safe water, yet the tools used to meet those expectations must be improved. No one wants to learn a day or two after their day at the beach that the water was not safe. The WRD is working hard in 2014 to correct that problem by developing 21st century technology to assure the safety of beachgoers before they dive in.

The WRD is providing \$100,000 to the Huron Clinton Metropolitan Authority to purchase monitoring equipment that will allow the rapid testing of samples collected at Lake St. Clair Metropark Beach. The Metropark will be building a new laboratory at the beach to house the equipment and will partner with Wayne State University to develop a Quantitative Polymerase Chain Reaction (QPCR) rapid method for beach testing. This collaboration is part of the Huron to Erie Alliance for Research and Training Freshwater Center that involves the Metropark, Wayne State University, Macomb Community College, and Macomb County Planning and Economic Development. These organizations are working together to enhance water quality along the Lakes Huron to Erie corridor through research, education, and training.



Photo credit: Huron-Clinton Metroparks

The rapid method for testing the water at beaches measures the DNA of bacteria. Current methods for beach testing require one to two days of incubation to grow colonies of bacteria that can be counted. The QPCR rapid method is much faster, providing results in less than four hours. The United States Environmental Protection Agency recently published a rapid test method (Method 1611) for monitoring enterococci in water. However, since the water quality standards for the state of Michigan are based on *E. coli*, the Metropark and Wayne State University researchers will be developing a method similar to Method 1611, but using *E. coli* instead of enterococci.

The project will involve collecting water samples from three beaches (Lake St. Clair Metropark Beach, St. Clair Shores Memorial Beach, and New Baltimore Beach) and then comparing the results using both the current method and the QPCR rapid method. This approach will give researchers the information needed to correlate the results of the old and new methods to determine accuracy in monitoring for compliance with Michigan's water quality standard for *E. coli*.

The water quality standard for *E. coli* requires the collection of at least three samples from a beach with the results being compared to a daily geometric mean standard of 300 *E. coli* per 100 milliliters. After five sampling events within 30 days, the results are compared to a 30 day geometric mean standard of 130 *E. coli* per 100 milliliters.

Health departments are required to notify the public, local officials and the WRD of the test results at a beach within 36 hours. Results are posted at the beach and on the health department's Web site and the [DEQ's "BeachGuard"](#) web site, and distributed to local media. In addition, "myBeachCast" is a mobile phone application created by the Great Lakes Commission that links to the BeachGuard databases in Michigan, Ohio, Illinois, and Indiana.

The development of a QPCR rapid method at beaches will allow results to be obtained within hours instead of days after the samples are collected, preventing beach visitors from swimming in water that does not meet the *E. coli* standard. The rapid method and the equipment needed to run the test may be available for use at the rest of Michigan's beaches as soon as next year. Governor Rick Snyder proposed a \$4 million Water Quality Initiative in the state's budget for fiscal year 2015 that includes a provision for real-time beach monitoring. The ability to identify sources of DNA in surface waters through development of the QPCR rapid method has additional functionality for other monitoring efforts that include identifying sources of contamination and monitoring for invasive species.

In the not-to-distant future, Michigan beachgoers will be able to plan their day at the beach with greater confidence through this cutting-edge technology providing sample results on the morning of the same day the samples were collected.

