

Why are the Beaches Closed So Often?

Beaches can be closed for numerous reasons. Some of these reasons include dangerous swimming conditions, no lifeguards present, and high levels of bacteria. The beach model predicts whether the level of *E.coli* in the water will be higher than the threshold set by EPA. To protect the public, conservative features are built into the model to prevent opening the swimming areas when the *E.coli* levels are high. We would rather the swimming areas be closed than allow the public to swim in unsafe water.

What Data Do We Look At?

We use a vast amount of data from different sources in our modeling software. We receive data from the National Weather Service, National Oceanic and Atmospheric Administration, and USGS, as well as field data received locally from the beach. Some variables used in the model include: water and air temperature, rainfall, the speed and direction of wind, and numerous other factors. The more data that are available, the better we can understand the physical processes at these beaches.

Do Other Beaches Have These Problems?

All public bathing beaches need to assess water quality and there are various methods of doing so. Fecal indicator bacteria testing and microbial source tracking are two methods that are commonly used to analyze water quality. All beaches are subject to different conditions, which can result in varying levels of water quality. Weather, tidal patterns, location, animal activity, human activity, etc., can all impact water quality. Therefore, it is important to understand physical processes surrounding the beach to understand what can impact water quality.

For More Information

Visit the Erie County Department of Health's webpage on beaches:
<http://www2.erie.gov/health/index.php?q=beach-program>

Erie County Department of Health



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Public Health
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Beach Program

What Do We Do?

Our goal is to protect public health while allowing the beaches to remain open as much as possible. Beach water naturally contains bacteria, and if levels are elevated above a threshold value the water is considered unsafe for swimming. Beach water quality is monitored by measuring the amount of the bacteria, *Escherichia coli* (*E.coli*), in the beach water. Samples are collected from the water at each beach and analyzed for *E.coli* through culture-based methods. It requires 24 hours to culture the bacteria.

To reduce the time needed to determine if the water is safe for swimming, we use mathematical models to predict water quality. These models use weather and water data to predict the level of bacteria.

How do the Models Work?

We use a software program, *Virtual Beach*, the United States Environmental Protection Administration's statistically based modeling approach to water quality forecasting. We are using this method for all the permitted public beaches on Lake Erie in Erie County. Each beach has its own unique model based on historical data. This modeling approach involves the collection of weather and other environmental data each morning before the beaches are scheduled to open. Most information is tabulated by the United States Geological Survey's NowCast data compilation service.

The models predict whether the New York State Sanitary Code limit of 235 *E.coli* colony forming units per 100 mL (cfu/100 mL) will be exceeded. The statistical modeling approach is more accurate than any other method we have available to us for predicting water quality.

What is *E.coli*?

E.coli are bacteria that are found naturally in the guts of humans, animals, and naturally growing in the environment. Most strains of *E.coli* have little to no

effect on humans; however some strains can be more dangerous. For example, *E.coli* O157:H7 is one of the most dangerous strains, and causes diarrhea and vomiting, and sometimes more serious illness.

E.coli is used as a Fecal Indicator Bacteria (FIB), which is used to assess water quality. Fecal indicator bacteria may be associated with sewage and storm water runoff containing animal droppings. These bacteria are used in assessing water quality as it can indicate the presence of fecal matter and pathogens.

When high levels of *E.coli* are predicted at a beach on a given day, the beach operators close the beach. When our model predicted that *E.coli* concentrations are likely to be low, the beach may remain open. Some days the model cannot be run because there isn't enough data available. On these days the latest bacteriological sample result is used to predict the *E. coli* level. For more information on *E.coli* please visit the Center for Disease Control's webpage on *E.coli*: <https://www.cdc.gov/ecoli/general/index.html>

What Beaches Do We Work With?

The beach program includes the five public beaches on Lake Erie. These beaches are Woodlawn Beach State Park and Hamburg Beach in the Town of Hamburg, and Bennett Beach, Evans Town Park Beach and Lake Erie Beach in the Town of Evans. Woodlawn Beach State

Park and Bennett Beach are open to the public; you do not need to be a town resident to visit these beaches. **Who Else do We Work With?**

We work with other government agencies such as the New York State Parks, the New York State Department of Health and the United States Geological Survey to keep the public safe and informed about beach water quality.

How Can I Tell When the Beach is Closed?

Using this website, <https://ny.water.usgs.gov/maps/nowcast/?state=NY> you can check the status for all of the beaches that the Erie County Department of Health monitors. This site is updated daily, upon the beach manager's final decision to open or close the beach.

