New Approaches May Improve *E. coli* Monitoring for Beaches

The USGS Great Lakes Science Center is studying more effective, reliable, real-time alternatives for monitoring swimming waters for E. coli *bacteria.*

Great Lakes beaches are occasionally closed to swimming due to high counts of *E. coli* bacteria. These bacteria are used as an indicator of sewage contamination, which can contain harmful pathogens that cause minor to serious illness. Scientists at the USGS Great Lakes Science Center (GLSC) have been studying the sources, survival, and predictability of *E. coli* bacteria to help inform beachgoers of risks and to improve monitoring effectiveness.

All swimming beaches on the Great Lakes are encouraged to be

monitored for *E. coli*, according to the BEACH Act of 2000. At present, the *E. coli* assay requires a 18-24 hour incubation, so results are not available until the day after samples are collected. Due to this delay, people unknowingly swim in contaminated water or are turned away from safe water. Recent research by GLSC scientists at the Lake Michigan Ecological Research Station has shown that *E. coli* may be more widespread than previously suspected and may occur naturally in some environments. GLSC scientists are working to improve monitoring methods.

Using data on water and air conditions, GLSC scientists hope to develop a predictive model that relies on readily available information to determine whether conditions are safe for swimming. Ideally, this model would be used across entire regions such as

southern Lake Michigan. Investigations of historical monitoring data have shown that there is some predictability to *E. coli* counts within regions, but local conditions and bacteria events must be incorporated for more accurate predictions.

E. coli contamination of our beaches not only poses a human health threat to visitors, but it affects tourism, the economy, and the region's image. USGS is working with community and state beach managers to make beach monitoring more effective and to solve this difficult problem.

Goals:
- **Develop predictive models for *E. coli* at Great Lakes beaches**
- **Study sources of *E. coli* including beach sands, shallow groundwater, and beach algae**
- **Improve effectiveness of *E. coli* monitoring to protect public health**