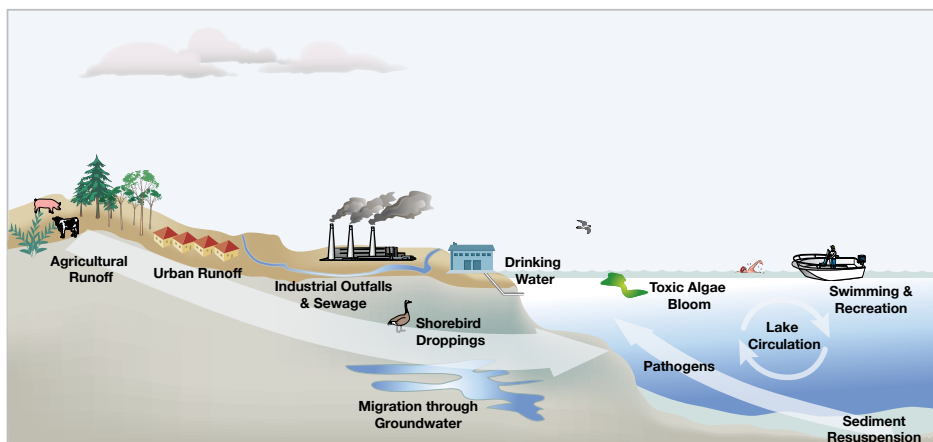


# CENTER OF EXCELLENCE FOR GREAT LAKES AND HUMAN HEALTH



## Why is this Important?

The Great Lakes are the nation's single most important aquatic resource and can impact human health.

- ◆ Largest freshwater source in the world.
- ◆ 10% of the population in the U.S.
- ◆ 90% of U.S. surface water supply.
- ◆ Provide drinking water to 40 million U.S. and Canadian citizens.
- ◆ Over 500 recreational beaches.
- ◆ \$4 billion commercial and sport fishing business.

There are many factors that contribute to ocean health and in turn, human health. The aim of the Center is to understand the interactions between these factors using hydrology, climate, meteorology, and other scientific disciplines. The work at the Center focuses on tying these processes together to create better predictions of water quality, beach closures, and the occurrence of harmful algal blooms.

## Water Quality

Communities across the Great Lakes use basin water for drinking, bathing, and other household uses. A variety of contaminants can adversely impact drinking water, including microorganisms such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, or wildlife. Both drinking water and recreational waterborne outbreaks, as well as the recognition of other potential waterborne pathogens have been on the increase in recent years. As a result, the Center is developing methods to better understand and predict sources of drinking water contamination.

We are developing an integrated, spatially distributed, physically-based water quality model to evaluate both agricultural non-point source loadings from soil erosion, animal manure, and pesticides, and point source loadings at the watershed level. More information on this project can be found at: [http://www.glerl.noaa.gov/res/Task\\_rpts/2000/wrcroley05-6.html](http://www.glerl.noaa.gov/res/Task_rpts/2000/wrcroley05-6.html)

The NOAA Center of Excellence for Great Lakes and Human Health (CEGLHH) focuses on understanding the inter-relationships between the Great Lakes ecosystem, water quality, and human health.

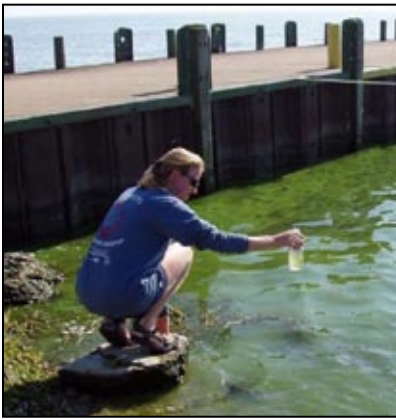
The Center employs a multidisciplinary approach to understand and forecast coastal-related human health impacts for natural resource and public policy decision-making, and develop tools to reduce human health risks associated with three research priority areas:

**beach closures**  
**harmful algal blooms**  
**drinking water quality**

## The Center is:

- ◆ Conducting research including laboratory work, field experimentation and computer modeling.
- ◆ Applying new technologies and develop capabilities to provide public-domain forecasting methods.
- ◆ Developing a strong outreach and education program for public and user communities.
- ◆ Raising awareness of Great Lakes human health issues.

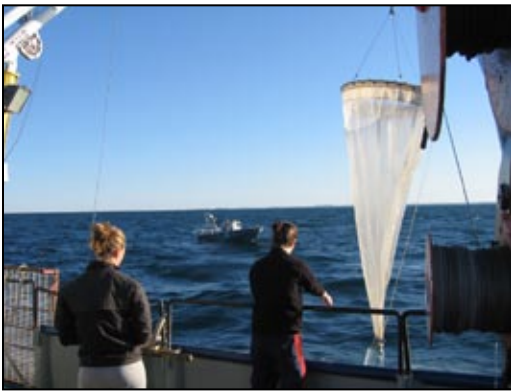




## Beach Closure Forecasting

Current methods for assessing recreational water quality are based on concentrations of *E. coli* incubated over at least 18 hours, which can result in people unintentionally swimming in contaminated water as well as lost revenues and beach time. Contamination by bacteria, viruses, and protozoa in recreational waters are a major health risk and having accurate measures of water quality is critical to human health in coastal areas. The Center is developing new methods for beach closure forecasting using combined research on lake transport modeling from GLERL and expertise on microbiological source tracking from MSU and USGS.

In 2006 and 2007, field experiments are focused in the nearshore area around Grand Haven, MI and the Grand River. The combination of a major river, relatively simple shoreline geometry, and low-slope, regular bathymetry makes this an ideal site for developing, testing, and refining a nested-grid hydrodynamic model. There are also several highly utilized and often contaminated beaches in this area. We have developed an operational nowcast and a 48-hour forecast for the Grand Haven area for winds, surface water temperatures, surface currents, and vertically averaged currents: <http://www.glerl.noaa.gov/res/glcfs/gh/> and <http://www.glerl.noaa.gov/res/glcfs/ghf/> for the Grand Haven forecast.



## Harmful Algal Blooms

There are many species of single-celled organisms living in the Great Lakes, including algae. When high nutrient or light levels are present, these organisms can reproduce rapidly, creating a dense population called a bloom. Some of these blooms are harmless, but when the blooming organisms contain toxins, other noxious chemicals, or pathogens, it is known as a harmful algal bloom, or HAB. HAB's can cause the death of nearby fish and foul up nearby coastlines, and produce harmful conditions to marine life as well as humans. The goals of the Center are to develop models for cyanobacteria using hydrodynamics as well as determine the factors that influence and trigger toxic blooms.






[http://www.glerl.noaa.gov/res/Task\\_rpts/2006/aisdyble06-1.html](http://www.glerl.noaa.gov/res/Task_rpts/2006/aisdyble06-1.html)



## Outreach

CEGLHH uses a multidisciplinary approach to translate scientific information and research into materials to aid health officials, local governments, and communities in making sound environmental decisions. In order to translate scientific materials into a concise, easily understood format and identify community needs, outreach is critical. CEGLHH's Outreach Coordination serves two roles, identifying and assessing user needs (related to Great Lakes and human health) and disseminating scientific information, technology, and research materials to aid health officials, local governments, and communities.

<http://www.glerl.noaa.gov/res/Centers/HumanHealth/>

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