IOOS® INTEGRATED OCEAN OBSERVING SYSTEM

IOOS® in Action: The Great Lakes

Improving Lives and Livelihoods in the Great Lakes

Overview:
Thousands of tools – from satellites above Earth to sensors below the water – continuously collect ocean and coastal data. The Integrated Ocean Observing System (IOOS) is expanding this network of data and making it easier to access and use.

The Great Lakes Observing System (GLOS) is the only freshwater regional component of IOOS. With nearly 11,000 miles of coastline, the region includes eight U.S. states: New York, Pennsylvania, Ohio, Indiana, Illinois, Wisconsin, Minnesota and Michigan. The bi-national region also includes two Canadian provinces.

Major GLOS priorities include:
- Ecosystem health and restoration
- Maritime safety
- Climate and natural hazard adaptation, and
- Water quality - especially related to drinking water and other public health issues.

This IOOS region is expanding and integrating the network of observations and forecasts, as well as coordinating the work of many IOOS partners in the area.

The IOOS Great Lakes Region includes New York, Pennsylvania, Ohio, Indiana, Illinois, Wisconsin, Minnesota, and Michigan, as well as two Canadian provinces.

Monitoring Rapid Earth Change
GLOS worked with many partners, including NOAA's Great Lakes Environmental Research Laboratory, to develop a nearshore observing network that improves monitoring of changing temperature patterns in each Great Lake. This network utilizes a suite of approaches and technologies – including buoys, unmanned underwater vehicles, vessels of opportunity and satellite remote sensing.

Rapid changes in Lake Superior illustrate the importance of this work. During the past 30 years, decreased ice cover and longer periods of thermal stratification – a temperature layering effect in the water – warmed the surface of the lake twice as fast as the air above.

Accurate, high-resolution descriptions of temperatures at various points are essential for models and forecasts of multiple environmental conditions, such as ice cover. The observation team operates several buoys to provide real-time information for models addressing such critical issues as drinking water quality, beach closure forecasts, and toxic algal bloom predictions.

Aiding Public Health and Safety
The corridor that connects Lake Huron to Lake Erie is important for commercial shipping. It is also home to more than 150,000 recreational boats, several swimming beaches, and drinking water intakes for surrounding communities. It is one of the most heavily industrialized areas in the Great Lakes basin.

The Huron-Erie Corridor Waterway Forecasting System is a model-based system for defining and depicting water levels and currents in connecting channels between Lakes Huron and Erie. The model output, operated by NOAA's Great Lakes Environmental Research Laboratory, provides 3D water level and water current nowcasts and 48 -hour forecasts. GLOS developed a web mapping application that utilizes this information. The project responded to stakeholder calls for a forecast to aid the shipping industry, search and rescue efforts, spill tracking, and water quality monitoring.

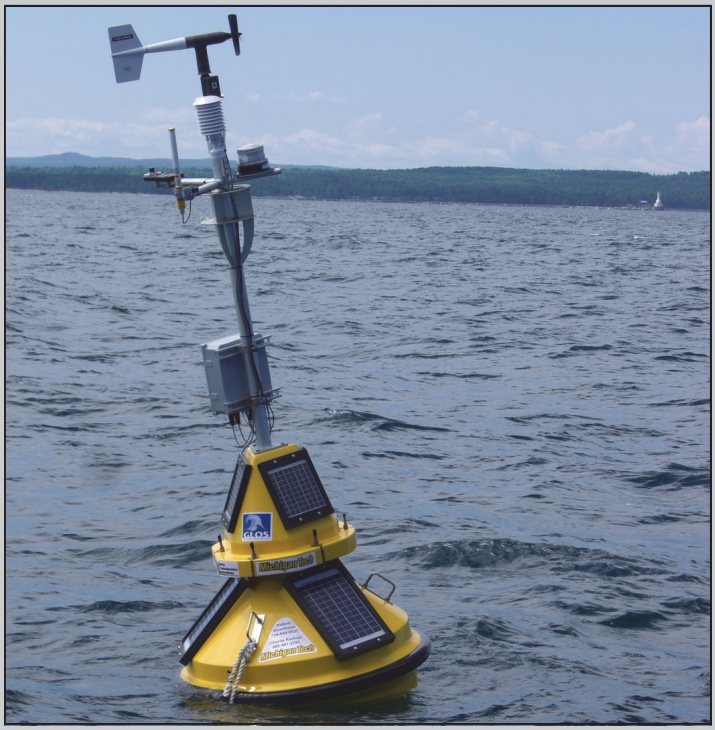
IOOS regional members engaged local water treatment plants, health departments, and industries along the river, as well as the U.S. Coast Guard, the U.S. Environmental Protection Agency, and the Canadian government, to develop a custom product to serve as a resource for spill planning and response. GLOS calibrated the Huron-Erie Corridor Waterway Forecasting System model to results from a dye release study. This generated a series of spill simulations captured in a spill reference library. The library provides models in an easy-to-use format and provides information essential for effective response.

Serving Recreational Boaters
Great Lakes IOOS members and New York Sea Grant are working with boaters around the Upper Saint Lawrence River to understand what information is needed when deciding to spend the day on the water. This information will support and enhance other efforts to model water levels and flows. Regional IOOS members will also develop a customized web application that allows boaters to access NOAA models along with real-time data and other information of interest to harbor communities.

The project originated in response to growing pressures surrounding water level issues on the St. Lawrence River. Through a series of outreach workshops with local boaters, GLOS will identify and work to address needs for additional data or custom tools to help boaters plan fun, safe trips.

Growing a Modeling Community
GLOS created the Great Lakes Model Inventory—a collection of information on more than 150 regional models and decision-support applications. In 2011, regional IOOS members released a web interface that allows easy record searches. It also provides scientists with the ability to update content and add more models and applications as they develop.

This dynamic inventory fosters communication, not only among modelers, but between modelers and resource managers in the Great Lakes region.



Left: Water utilities, beach managers, mariners, and recreational boaters all need water level, water flow, and current forecasts along the Great Lakes and the St. Lawrence River. The Great Lakes Observing System responds to this need with a water flow model for the Huron to Erie corridor displayed on their website in easy to understood formats. The region is also improving buoy coverage among our nation's largest freshwater resource to expand access to weather, wave, and temperature data. Credit: Guy Meadows

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