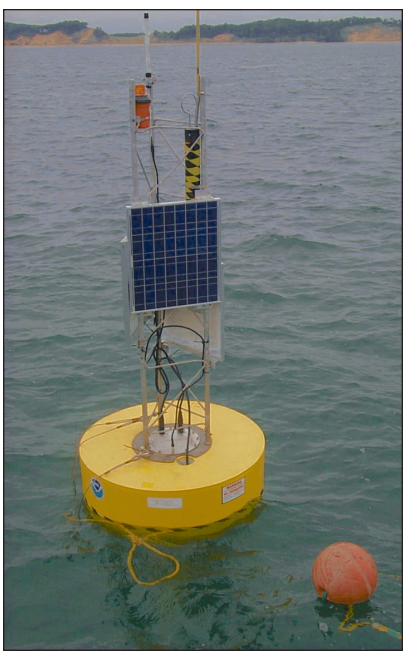
Great Lakes Coastal Observing System

The need for development of regional coastal observing systems has been highlighted recently by a number of studies, as well as by the NOAA Strategic Plan, the National Ocean Partnership Program, and the U.S. Coastal-Global Ocean Observing System (C-GOOS) program. Continual assessment of the status and trends in coastal environments permits identification of perturbations that may signal changes in the ecosystem, puts current trends into an historical framework, allows us to differentiate true environmental change from variance, and provides a context to assess the impact of predicted changes. The development of a Coastal Observing System has also recently been suggested as one of the fundamental needs in the Great Lakes region by the International Association for Great Lakes Research and by the International Joint Commission's Council of Great Lakes Research Managers. C-GOOS has recognized the need for a regional approach that builds on existing programs and infrastructure. NOAA's Great Lakes Environmental Research Laboratory has taken steps to develop a Coastal Observing System for the Great Lakes region following the protocols and design principals of the OCEANS US, National Ocean Research Leadership Council 2002 report to the U.S. Integrated Ocean Observing Systems.

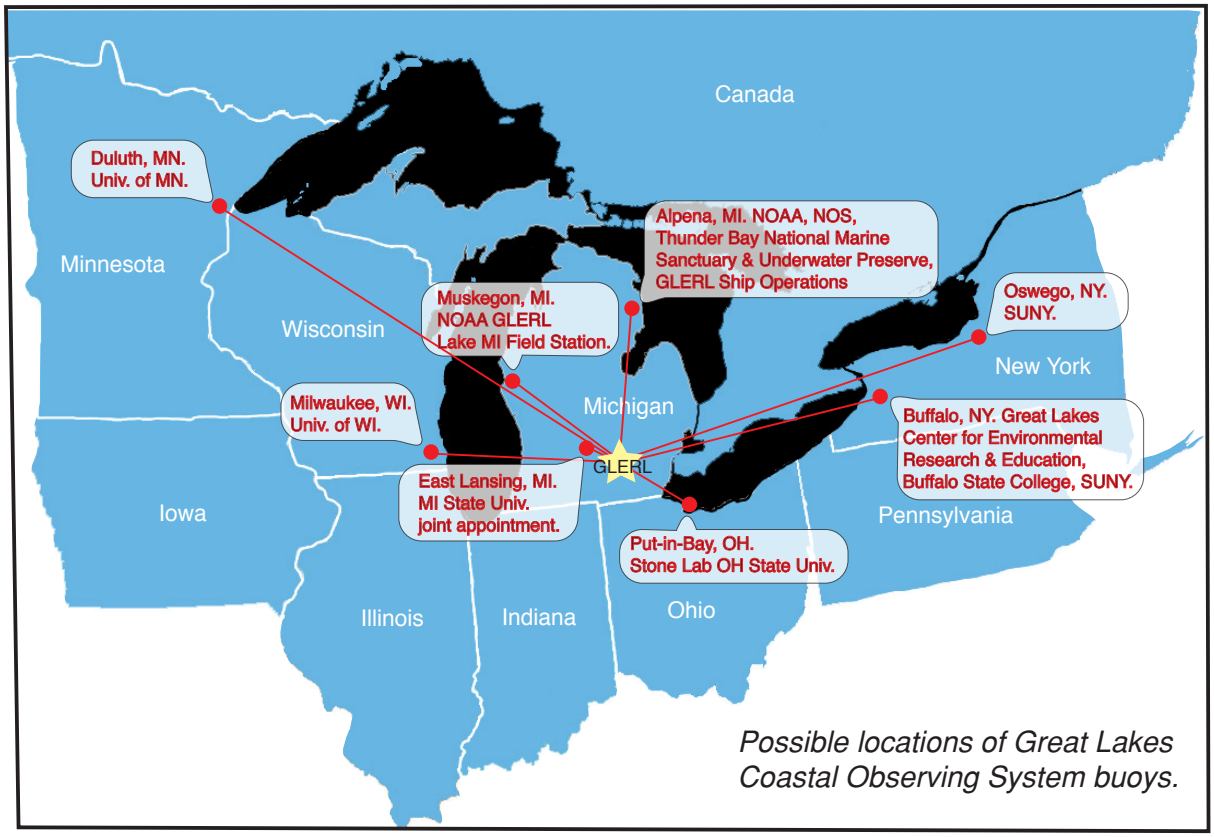
GLERL proposes to develop a Regional Integrated Coastal Observing System. This system will consist of a network of universal buoy-based hubs that will take measurements for comparisons across the Great Lakes. These buoys will have sensors that are standard throughout the Great Lakes and have the capability to plug in any sensor and ship the data to shore in real-time for web display. These buoys are already being tested at GLERL. The goal is to establish at least two buoys per lake at locations near University field stations for joint operation and partnership (e.g. Universities of Wisconsin, Minnesota, Michigan, and Ohio, and the State University of New York have already agreed to these partnerships). Specific locations will be determined by forecast operational needs, relevance to scientific data collection, availability of university partners, and relevance to the general public. Measurements collected in real-time will be distributed via the Internet. Each system will collect meteorological data and provide sub-surface measurements of chemical, biological, and physical parameters. The buoy-based system uses a high bandwidth wireless Internet connection to collect data from remote sites. The sub-surface data hub will permit controlled access to multi-institutional users through guest ports. The system has been designed to provide environmental data to state, federal, and university researchers and resource managers. This is an important contribution to NOAA's leadership in supporting and promoting observation system development among Great Lakes universities and non-governmental organizations.



Examples of buoy systems.

What is the goal?

- Collect long-term data sets for physical, biological, chemical, and meteorological parameters in the Great Lakes.
- To develop versatile, portable observatories.
- Deploy the observatories in each of the Great Lakes.
- Develop partnerships with universities/ states to operate and maintain the observatories.
- Common, core database.
- Real-time data display for users.



Possible locations of Great Lakes Coastal Observing System buoys.

Why are Long-Term Monitoring and Assessment needed ?

Understanding and predicting changes in an ecosystem require basline observations on natural scales of variability to:

- Identify perturbations and changes.
- Put current trends into historical framework.
- Provide context to assess impact of predicted changes.

Current Observing Systems

- Satellite (CoastWatch)
- Coastal Forecasting
- Water Levels
- Ice Climatology
- Bathymetry
- Ship-based Biological
- Meteorological Stations
- Webcams
- Precipitation
- Thermistor Chain
- Models

Examples of Current Users

- **Commercial Shipping**
  Water level forecasts, waves, ice conditions.
- **Coast Guard**
  Search and rescue, currents.
- **Boaters**
  Waves, webcams, meteorlogy.

- **Sportsfishing Community**
  Satellite thermal fronts, bathymetry.
- **Education and Museums**
  Live imagery.
- **Marina Operators**
  Water level forecasts.

- **Scientists**
- **Power Industry**
  Water levels, temperature.
- **Municipal Water Intakes**
  Temperature.
- **Hazmat**
  Currents.

GLERL
Great Lakes Environmental Research Laboratory