

## Safe and Prosperous Transport: Water Level Prediction in the Great Lakes



**Changes in water level have an impact on the shipping industry. For every inch that the water level drops, 270 tons less in cargo can be shipped for a 1,000-foot-long ship. The port authority also loses revenue as a result.**

When low water levels prevail in the Great Lakes, commercial navigation, recreational boating, marinas, beaches, fishing, homeowners, and the aquatic ecosystem are adversely affected. In 2000, during a low level period, lake carriers transporting iron ore, coal, grain, and other commodities were forced to “light load,” carrying 5-8 percent fewer goods. Also, marinas spent millions to dredge boat slips, channels, and harbors.

*Impacts*  
**Enhancing economic value and keeping ships and cargo moving through safe port-to-port transport**

Addressing a need for Great Lakes’ water level prediction, OAR’s Great Lakes Environmental Research Laboratory (GLERL) developed the Great Lakes Operational Forecast System. Deemed operational in 2005, the system provides lake carriers, mariners, port managers, emergency response teams and recreational boaters with present and future conditions of water levels, currents and water temperatures.

The Great Lakes Operational Forecasting System combines two NOAA products: “nowcasts” for present conditions and “forecast” guidance for future conditions. Both use information generated by a three-dimensional hydrodynamic model that uses real-time data for winds and other meteorological parameters to predict water levels, currents and temperatures at thousands of locations throughout the five lakes. Key products include data plots and animated map plots of water levels, currents, and temperatures. “Nowcast” conditions are updated hourly, while 30-hour forecasts are produced four times daily.

The transition of the Great Lakes prediction system to operations at NOAA’s National Ocean Service was a joint effort between OAR’s GLERL, National Ocean Service, private industry (Aqualinks.com), and academia (Ohio State University).

*Images, top to bottom: The Great Lakes; low water levels on the Great Lakes can significantly impact shipping and commerce.*