



GLERL

Great Lakes Environmental Research Laboratory



Changing water levels can have both positive and negative impacts on water-dependent industries such as commercial shipping. NOAA water level data plays a critical role in water management and operations throughout the Great Lakes.

*Photo: Poe Lock in Sault Ste. Marie, Mich.
Credit: U.S. Army Corps of Engineers, Michelle Briggs.*

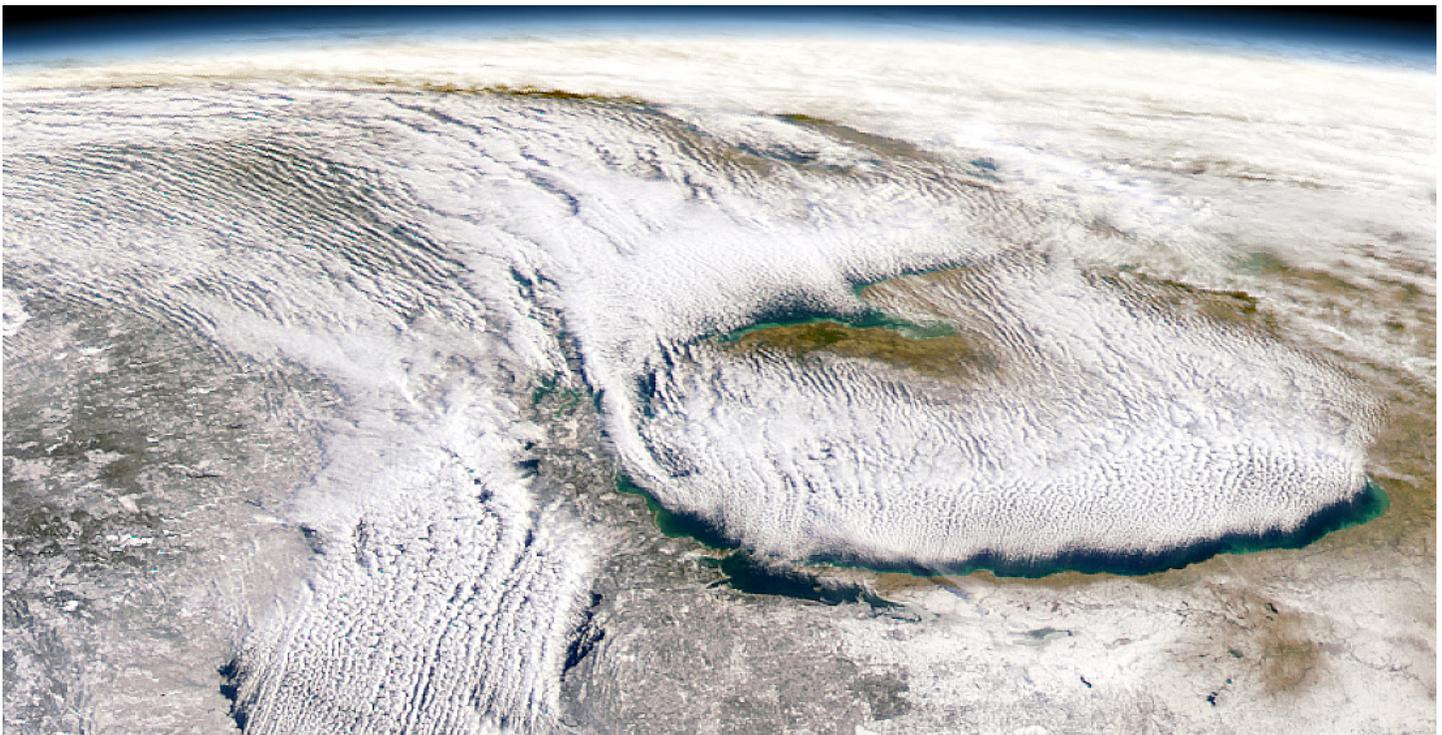
Water Levels

The Great Lakes comprise the largest freshwater lake system by surface area on the planet. Water levels of the lakes fluctuate dramatically in response to a variety of factors. Over the last decade, the Great Lakes have seen dramatic changes in water levels—from an extended period of low water ending in 2013 to a dramatic rise in water levels resulting in the record highs we are experiencing today. Changing water levels can have both positive and negative impacts on water-dependent industries such as shipping, fisheries, tourism, and coastal infrastructure including coastal roads, piers, and wetlands. The National Oceanic and Atmospheric Administration Great Lakes Environmental Research Laboratory (GLERL) research analyzes components of the Great Lakes water cycle (runoff, over-lake precipitation, over-lake evaporation) to improve models, which are used by agencies and industry to plan for water management and operations.



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This NASA satellite image of the Great Lakes (Lake Superior on the bottom, looking east) shows over-lake evaporation as well as over-land lake effect snowfall. Understanding over-lake evaporation is a current focus of NOAA GLERL's water levels research.

NOAA GLERL drives the advancement of water level forecasting through:

Observations

Monitoring Great Lakes water levels is an important part of NOAA's mission to understand and predict changes in climate, weather, oceans, and coasts. NOAA Great Lakes water level data constitute one of the longest high-quality hydrometeorological data sets in North America, with United States' reference gauge records beginning in 1860. Great Lakes water levels are continuously monitored by U.S. and Canadian federal agencies in the region through a binational partnership. NOAA GLERL scientists synthesize these observations to form a foundation for research and forecasting. For water levels monitoring information, data, and analyses visit, NOAA GLERL's Great Lakes Water Levels Observations webpage at www.glerl.noaa.gov/data/wlevels/#observations.

Research

NOAA GLERL scientists use observations of past and present lake conditions and weather forecasts to inform their research on short-term and seasonal water level projections. NOAA GLERL's cutting-edge research focuses on better quantifying key factors for prediction of water levels. These key factors include over-lake precipitation, over-lake evaporation, and runoff. New research is taking a look at the relatively unknown contribution of groundwater by way of sinkholes at the bottom of the lakes. This information is essential to our understanding of the Great Lakes water cycle and, ultimately, improvement and implementation of the National Water Model. For more, visit NOAA GLERL's Great Lakes Water Level research homepage at www.glerl.noaa.gov/data/wlevels.

Forecasting

NOAA GLERL's models and analyses are an integral part of the official 6-month Great Lakes forecast, which is generated by the U.S. Army Corps of Engineers and coordinated with Environment and Climate Change Canada each month. These forecasts are important to water-dependent industries. For example, the commercial shipping industry uses the forecast to plan and optimize their routes and loads for the coming shipping season. For more, visit NOAA GLERL's Great Lakes Water Level Forecasts webpage at www.glerl.noaa.gov/data/wlevels/#modelsAndForecasts.

