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. The lakes have experienced record high levels over the last two years, less than a decade after an extended period of low water ending in 2013—showcasing the dramatic changes water levels can experience from year to year. Changing water levels can impact 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) analyzes and researches 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.
Forecasting

NOAA GLERL’s models and analyses are an integral part of the official 6-month Great Lakes water levels 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.

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.

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 understanding 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.

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