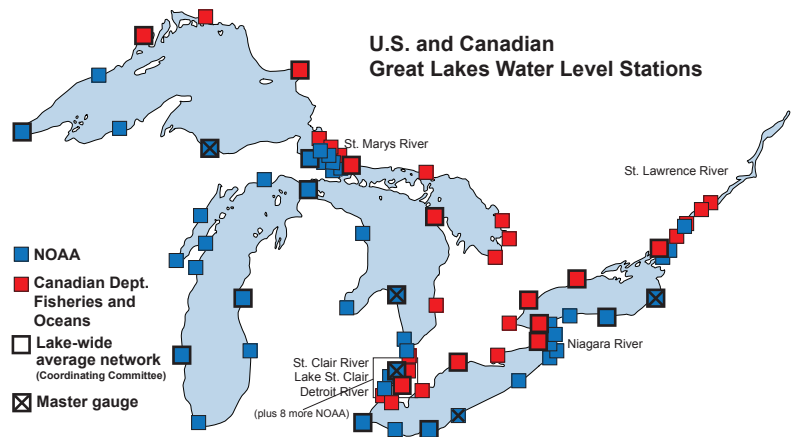


# Great Lakes Water Level Monitoring Stations

The Great Lakes – a massive system of freshwater seas - are home to 40 million people who rely on them as a source of drinking water, recreation, and natural beauty. The water levels of the lakes fluctuate across different time scales. Monitoring these cycles is an important part of NOAA's mission to understand and predict changes in climate, weather, oceans, and coasts.



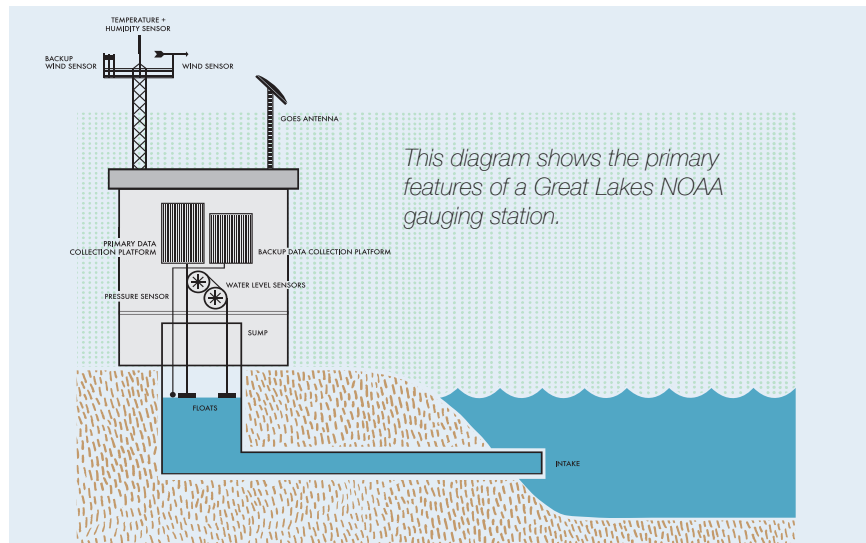
The map above shows water level stations maintained by the NOAA National Ocean Service's Center for Operational Oceanographic Products and Services (CO-OPS) and by our Canadian partners. For the NOAA stations, water levels are recorded at 6-minute intervals and archived at hourly, daily, and monthly intervals. The lake-wide average network is used to calculate average levels used in modeling and forecasts.

## How is water level and weather data used?

- International navigation and regulation
- Planning for coastal development
- Support for spill response and search and rescue
- Monitoring climate change

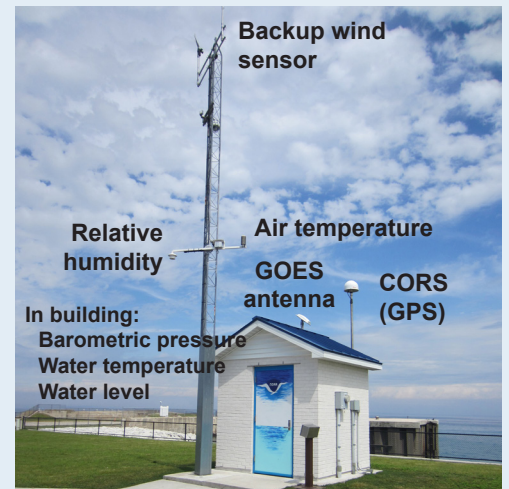
## How does this data support navigation?

PORTS (Physical Oceanographic Real-Time System) provides the maritime community with reliable real-time observations of water levels and weather conditions to ensure safe passage of freighters through narrow locks and connecting channels.



## How does NOAA measure Great Lakes water levels?

Water enters the station house through a valve-controlled intake pipe into a 'stilling' well (sump), which effectively removes wind and wave effects. Six-minute average water levels are recorded and transmitted via GOES satellites to CO-OPS where all data is verified. The data is available online at hourly, daily, and monthly average intervals. These measurements are highly accurate (+/- 0.003 meters for monthly means).



NOAA/NOS/CO-OPS water level station at Mackinaw City, MI. Many stations are equipped with meteorological sensors similar to this one.



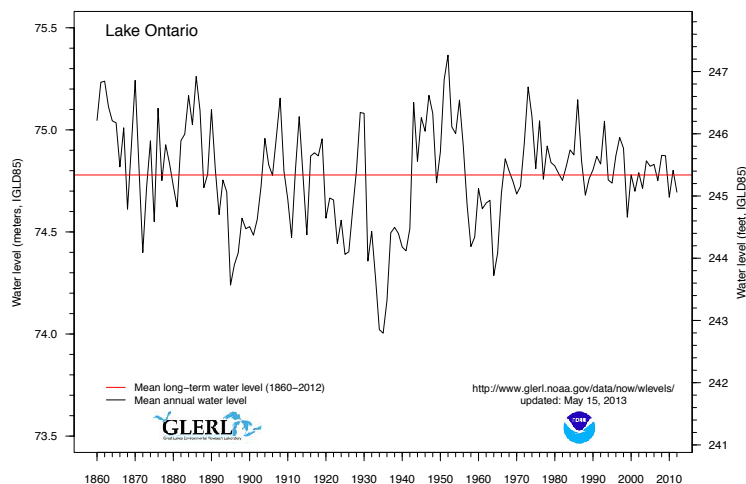
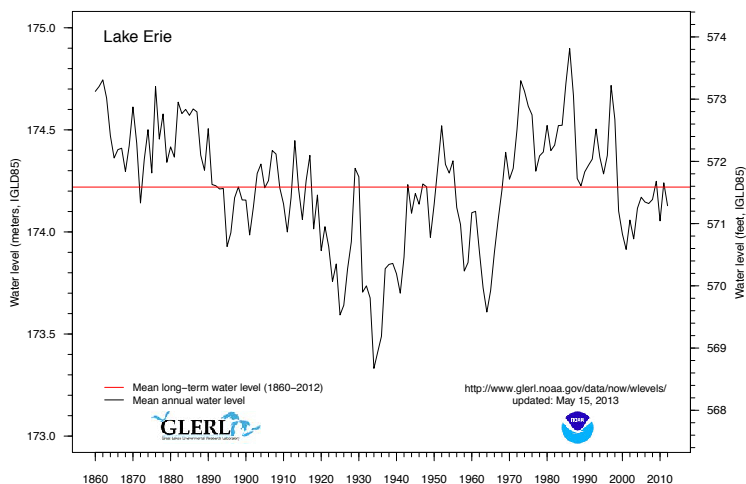
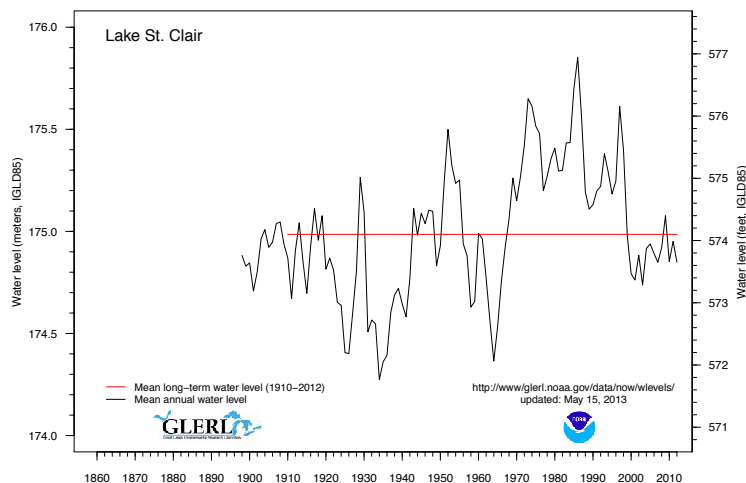
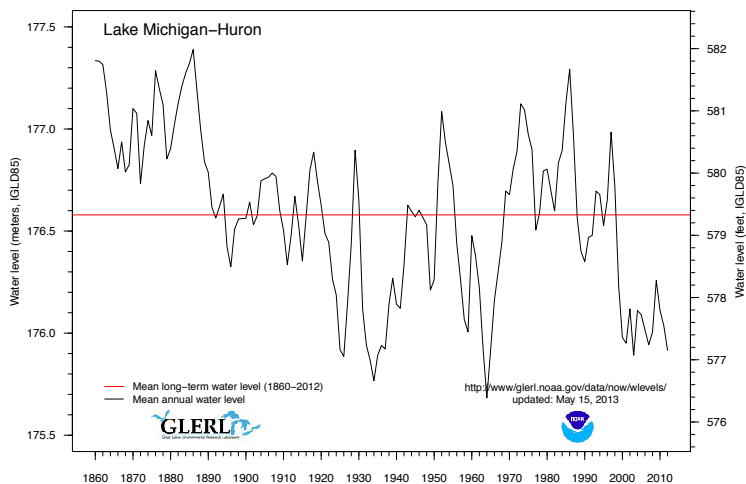
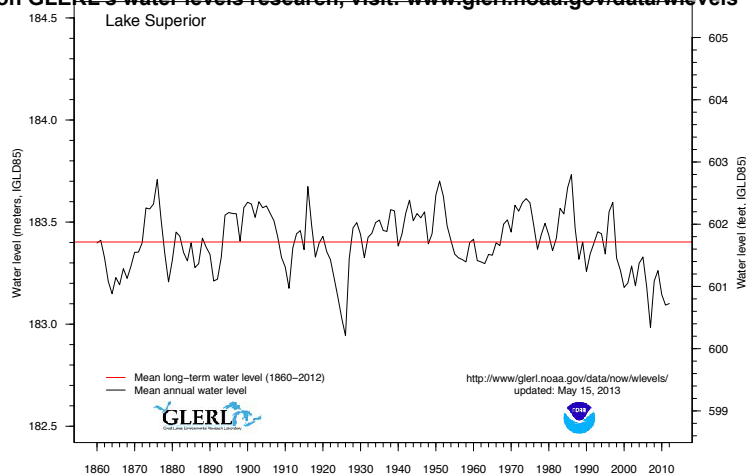
The NOAA Soo Locks PORTS provides real-time data for seven sites from Point Iroquois to DeTour Village. Water level and meteorological data can be accessed via web or phone. The lock operators use this data for precise control of the locks.

For more information:

- [tidesandcurrents.noaa.gov](http://tidesandcurrents.noaa.gov)
- [tidesandcurrents.noaa.gov/ports/index.shtml?port=sl](http://tidesandcurrents.noaa.gov/ports/index.shtml?port=sl)
- [www.glerl.noaa.gov/data/now/wlevels/levels.html](http://www.glerl.noaa.gov/data/now/wlevels/levels.html)
- [www.isdm-gdsi.gc.ca/isdm-gdsi/twl-mne/index-eng.htm#s5](http://www.isdm-gdsi.gc.ca/isdm-gdsi/twl-mne/index-eng.htm#s5)

## Great Lakes Long-Term Hydrographs, 1860-2012

Great Lakes water levels constitute one of the longest high quality hydrometeorological data sets in North America, with reference gauge records beginning in 1860. These levels are collected and archived by NOAA's National Ocean Service and their Canadian counterpart, Department of Fisheries & Oceans, Canadian Hydrographic Service. A hydrograph provides a way of seeing seasonal and yearly changes in the flow or discharge of a waterway. The hydrographs for the Great Lakes period of record illustrate different water regimes over time. Lake-wide average levels are plotted from 1918 to present. Lake-wide average levels are plotted from 1918 to present. For the period from 1860 to 1917, the master gauge is plotted.



The water levels graphed above are relative to the International Great Lakes Datum-1985 (IGLD85), the vertical height reference used in the Great Lakes/St. Lawrence River system for engineering, charting, channel dredging, navigation safety, power generation, and water resource management. Coordinated between the United States and Canada, the datum origin is defined as mean sea level at Father Point/Rimouski, Quebec at the mouth of the St. Lawrence River. IGLD must be updated approximately every 30 years to account for changes in the land surface following the retreat of the glaciers during the last ice age, referred to as glacial isostatic adjustment (GIA). The current datum, IGLD 1985, was implemented in 1992.