

Water Levels of the Great Lakes



If you wander down the shores of Lake Michigan nowadays, it's difficult not to notice that beaches seem curiously wide. Rocks that were once barely visible now jut from the waves. Marina docks seem built too high for the boats that pull up to them. A glance at the pilings tells why: the dark line marking the lake level of previous years is three feet above the water. Between 1998 and 2002, the level of Lakes Michigan and Huron dropped at the fastest pace ever recorded. Lakes Superior and Michigan-Huron are at their lowest levels since 1926 and 1965, respectively. Lake Erie is the lowest since 1966. Long-time residents have been reminded of the droughts of the 1930s and 1960s when water levels also fell dramatically. Many more have grown concerned about the impact upon recreational boating, the shipping industry, and the environment.



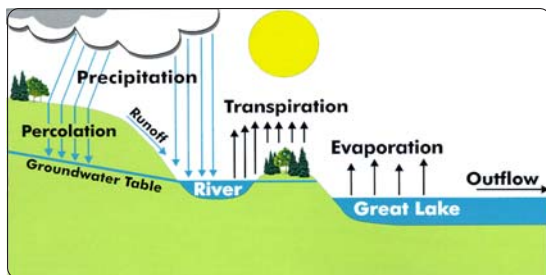
Photo by Greg Lang.

Low lake levels at Old Mission Point lighthouse in Lake Michigan.

into "light-loading," carrying 5 percent to 8 percent less goods, sending prices higher. Additionally, marinas spent millions to dredge boat slips, channels, and harbors along Great Lakes coasts. Nuclear and hydropower plants that use Great Lakes water for cooling and energy generation, respectively, either spent millions of dollars to relocate their cooling pipes or didn't generate enough power to meet customer demands.

Why do Lake Levels Fluctuate?

Great Lakes water levels respond to changes in their water supplies, including the precipitation falling on the lake, the runoff from their land basins in rivers and streams, and evaporation from the lake surfaces. The primary driving factors are precipitation and air temperatures. Lower precipitation leads to lower runoff as does higher air temperatures. Higher air temperatures also result in higher evaporation. The ice cover on the Great Lakes also decreases the evaporation during the winter.



Source: *Living with the Lakes*, U.S. Army Corps of Engineers; Great Lakes Commission, 1999.

The Hydrologic Cycle

Why are Water Levels Low Now?

Since the fall of 1997, we have had decreased precipitation over the Great Lakes basin, particularly in the upper lakes and have experienced significantly above-average air temperatures. This has resulted in lower-than-normal water supplies. In addition, for the winters of 1998-2002, the ice cover was much below-average, also significantly contributing to the decreasing water levels through increased evaporation. Although the winter of 2003 has been colder than the last five winters, the preceding fall brought below-normal precipitation to the basin.

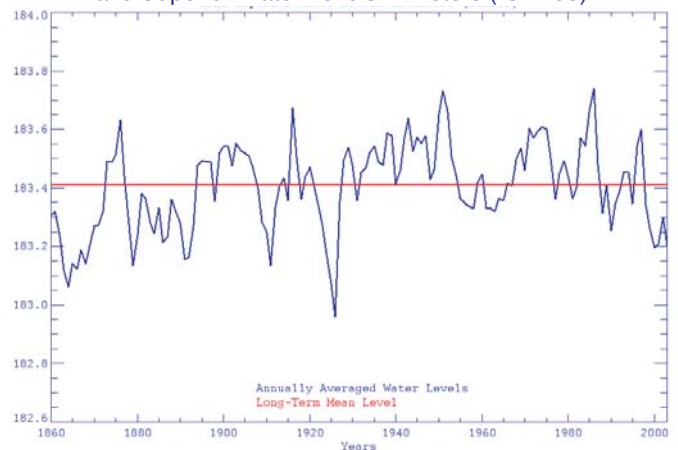
Who is Affected by Lower Lake Levels?

The present low lake levels affect many interests, including commercial navigation, recreational boating, marinas, beaches, fishing, cottage and homeowners, water quality, and the aquatic ecosystem. For example in the year 2000, the Lake Carriers that transport iron ore, coal, grain and other raw cargoes were forced

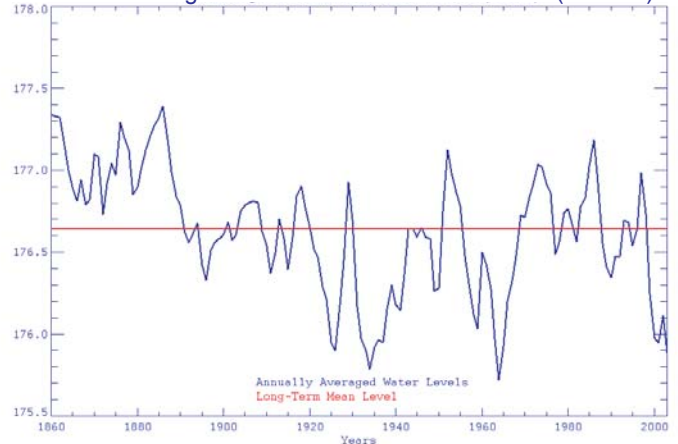
What are the Current Conditions?

The following four graphs show the annual water levels for all lakes, updated through 2003. For the past 35 years, the lakes were above or near their long-term average level. Presently, all of the lakes are at or below their long-term average; particularly in Lakes Michigan and Huron.

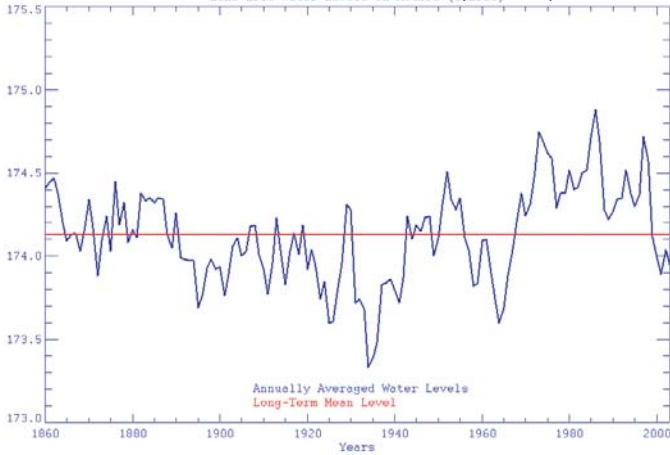
Lake Superior Water Levels in Meters (IGLD55)



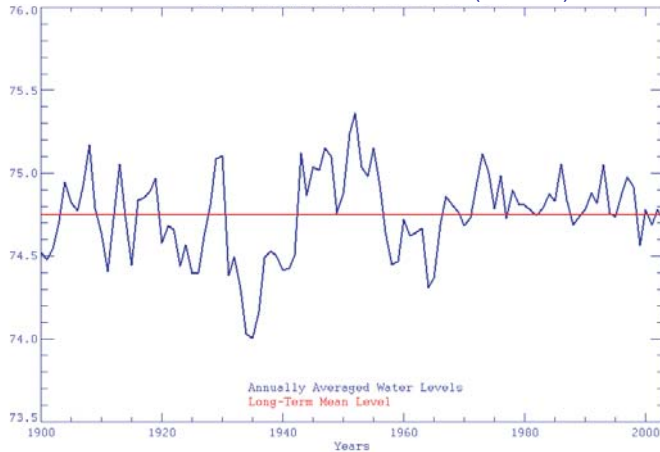
Lake Michigan-Huron Water Levels in Meters (IGLD55)



Lake Erie Water Levels in Meters (IGLD55)



Lake Ontario Water Levels in Meters (IGLD55)



How do these lows compare with past lows?

Despite the low water levels we are currently experiencing, they are not the lowest levels on record. In the early 20th Century the levels of Lakes Michigan and Huron were lower than they are at present, and in 1964 -- their record low -- they were about 12 inches below their present level. The other lakes have been lower in previous years as well. In 1926, Lake Superior was 14 inches below its present level. In 1934 Lake Erie dipped 28 inches lower.



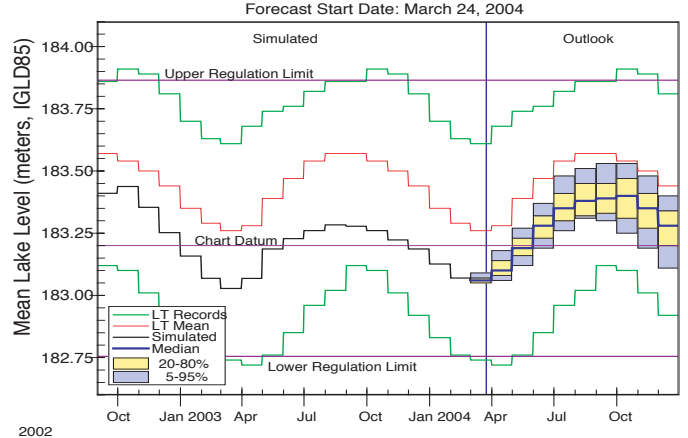
Low lake levels in Lake Erie at Ashtabula, OH, May 18, 2001. Photo by F. Lichtkoppler, Ohio Sea Grant.

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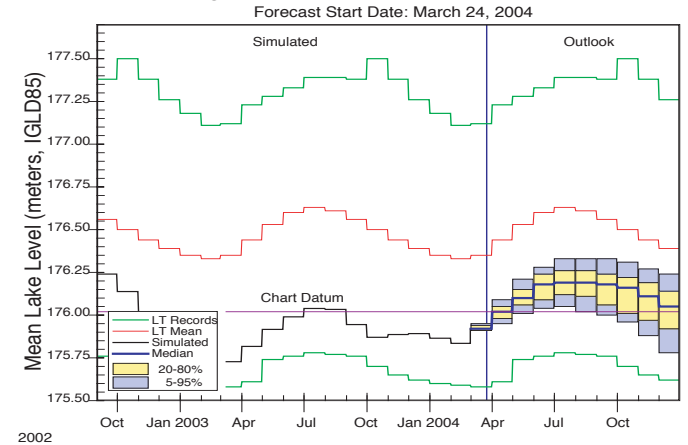
What is the outlook for 2004?

GLERL has the ability to make water supply and lake level forecasts 1-12 months into the future based on current basin hydrology and NOAA's long-term climate outlooks. As shown below, we expect the lakes to be below their long-term mean for this year.

Lake Superior Mean Lake Level (meters, IGLD85)



Lake Michigan-Huron Mean Lake Level (meters, IGLD85)



Lake Erie Mean Lake Level (meters, IGLD85)

