

# International Joint Commission

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## What factors affect Great Lakes Water Levels?

Great Lakes water levels are largely determined by the supply of water provided to the system. The total supply of water to each Great Lake includes precipitation over the lake, runoff from the surrounding basin and inflow from an upstream lake, minus evaporation from the surface of the lake.

- Water levels rise and fall in seasonal cycles, with annual highs typically occurring in the summer and annual low levels in winter.
- Water levels also fluctuate on a long-term basis in response to persistent wet or dry conditions that may last for a number of years.
- In general, water levels rise when the amount of rain and snow on the lakes and runoff from tributary streams is greater than evaporation.
- Levels decline when rain and snow are below normal and evaporation is above normal.
- Declining annual ice cover and warmer water temperatures increase the potential for evaporation when water is open and there is a large difference between air and water temperatures.
- Since the late 19<sup>th</sup> century, Lake Michigan-Huron has been lowered by about 16 inches due to dredging and other channel changes in the St. Clair and Detroit Rivers. The International Upper Great Lakes Study found that erosion since 1962 had caused another 3 to 5 inches of lowering, however, erosion is not ongoing.
- The diversion at Chicago has lowered Lake Michigan-Huron by about 2 inches.
- The Long Lac and Ogoki diversions into Lake Superior have raised Lake Michigan-Huron 4 inches.
- From 1968 through 1998, levels of Michigan-Huron were relatively high and often above the long-term average, reaching record highs in 1973 and 1986.

### Climate Change Adds to Future Uncertainty Regarding Water Levels

*There is considerable uncertainty regarding future trends in Great Lakes water levels. A recent comprehensive review (International Upper Great Lakes Study, 2012) of factors affecting water supplies indicates that over the next 30 years, lakes Superior, Michigan, Huron and Erie are likely to continue to fluctuate, but still remain largely within the historical range. While lower levels are likely over the next 30 years, the possibility of higher levels at times cannot be dismissed. For more details, visit [www.iugls.org](http://www.iugls.org)*

## What are current conditions?

- In December 2012, Lake Michigan-Huron fell below the monthly record low set in 1964.
- In January 2013, the level of Lake Michigan-Huron fell to the lowest level recorded for any month since 1918.
- Superior, Michigan and Huron have been below average for 14 years, the longest such period since 1918.
- As a result of recent above average water supplies, Lake Michigan-Huron rebounded slightly to elevation 576.13 in February, climbing a bit above the record low of 576.10. However, the lake remains about 27 inches below its long-term average.
- While still below their long-term averages, the other Great Lakes are not expected to reach record low levels this winter (see table).

### February Lake Levels (feet above sea level)

Superior	600.24	12 inches below average
Michigan-Huron	576.13	27 inches below average
St. Clair	572.64	9 inches below average
Erie	570.41	5 inches below average
Ontario	244.48	3 inches below average

# What is Adaptive Management?

Since our ability to moderate extreme water levels is limited, the IJC believes that an adaptive management strategy is necessary to provide people with the information they need to address risks related to future extreme water levels.

- Adaptive management provides a structured, iterative approach for improving actions through long-term monitoring, modeling and assessment.
- With this approach, decisions can be reviewed, adjusted and revised as new information and knowledge becomes available or as conditions change.
- This strategy bring scientists on both sides of the border together to work on monitoring long-term trends in water supplies, extreme weather events and other factors affecting risk.
- Adaptive management will help shoreline communities, boaters, shipping and other Great Lakes users prepare to cope with long-term water level fluctuations and extremes.

## Can the level of Lake Michigan-Huron be restored?

- While there is no short-term solution, restoring levels of Lake Michigan-Huron to compensate for past dredging by placing structures in the St. Clair River is technically feasible.
- While such measures could produce benefits, there could also be adverse impacts. For example, structures would lower water levels downstream and could potentially affect spawning grounds for the Lake Sturgeon.
- The IJC is reviewing the exploratory analysis conducted by its International Upper Great Lakes Study of measures that could restore levels of Lake Michigan-Huron and will soon be making recommendations regarding next steps. The U.S. and Canadian federal governments are ultimately responsible for deciding to initiate any further study or other action.

## Where does the water in each Great Lake come from?

The following chart shows the hydrological components of Great Lakes water flows.

