

June 7, 2000



#### **How much have the water levels declined?**

The answer varies from lake to lake. In 1997, the water levels across the lakes were near their record highs. Lakes Erie, Michigan and Huron were about 2 feet above their long-term average water levels. In the past three years, these levels have dropped around 3 feet.

#### **Which lakes have been most affected?**

The greatest decline has occurred in Lakes Michigan-Huron, Erie, the Connecting Channels and Lake St. Clair. Lake Superior has experienced the smallest decline.

#### **What factors control Great Lakes water levels?**

Great Lakes water levels are affected by several natural and man-made factors. The amount of water entering the Great Lakes is determined almost entirely by nature. Precipitation, snowmelt runoff, and groundwater help supply the Great Lakes. Evaporation over the lake surface and drainage basins plays a significant role in water leaving the Great Lakes along with the outflow from each lake.

#### **How often have they been this low?**

Water levels have generally been recorded on the Great Lakes since about 1865. Lakes Michigan-Huron have been lower than today three times since water levels have been recorded, the record low occurred in 1964. Lake Erie was lower than today in 1966, but water levels generally have been lower on this lake than the present time for most years between 1895 and 1942.

#### **What has caused the recent declining water levels?**

Probably the most significant factor during the past three years of declining water levels has been the decrease in snow cover. Snowmelt runoff is responsible for about 40% of the annual water supply into the Great Lakes and is the primary factor in normal springtime rise in water

levels. With little or no snowmelt runoff, water supplies have been significantly impacted.

In addition to decreased snow cover, the evaporation of water from the lake surface has been increased. During prime evaporation periods, the Lakes may lose 1-2" of surface water per week. Warmer than average temperatures have persisted from 1998 through early 2000 across the region, causing less ice cover on the Lakes in winter and increasing the overall evaporation.

Another contributing factor is the lower than normal contribution of groundwater to the lakes through streams and rivers. On average, 42% of streamflow is from groundwater. Measurements of streamflow across the central and southern Great Lakes was showing very low to record low flows this year.

#### **What are the projected water level trends?**

This year's minimal snowpack melted in late February and early March and is already in the system. Tributary flows to the Lakes are below normal and the outlooks are for normal to dry conditions over the basin this spring and summer. With the snowmelt already in the Lakes we will not see the normal seasonal rise in water levels. The outlook is for continued low water levels over the summer with the potential for record lows in the late fall and winter on Lakes Michigan-Huron.

#### **To what degree can the water levels be controlled?**

Limited water level control is achieved by regulating the outflows from Lakes Superior and Ontario, in accordance with the International Joint Commission (IJC) Orders of Approval for each lake. The outflows from the other Great Lakes depend exclusively on their levels.

Regulating the outflow from Lake Superior affects the level of lakes Superior, Michigan-Huron, and to a lesser extent St. Clair and Erie.

Regulating the outflow from Lake Ontario affects levels on the lake and on the St. Lawrence River. It has no effect on levels on the upper lakes since Lake Ontario is separated from them by the Niagara Falls.

**Could the flow out of Lake Superior be increased to raise water level on lakes Michigan-Huron, St. Clair, and Erie?**

Yes, increasing the Lake Superior outflow may raise the water levels on lakes Michigan-Huron and to a lesser extent St. Clair and Erie. This influence on the levels of the lower lakes, however, is small and would require several months to raise the lower lakes an inch or more.

The International Lake Superior Board of Control (ILSBC) uses Regulation Plan 1977-A as the basis for determining Lake Superior outflows. The outflows must take into consideration several factors, including the levels of lakes Superior and Michigan-Huron. The objective of this "systemic regulation" is to help maintain the levels of all three lakes relative to their long-term seasonal averages. Historic ranges of fluctuation and differing drainage basin sizes are considered.

**How much water is being diverted out of the Great Lakes and how much can they affect Great Lake water levels?**

The major diversions in the Great Lakes basin that affect water levels to a measurable extent are: (1) diversions into Lake Superior at Long Lac and Ogoki; (2) a diversion out of Lake Michigan at Chicago; (3) a diversion between lakes Erie and Ontario through the Welland Canal; and (4) the New York barge canal diversion. These diversions have a minor effect on water levels compared to natural factors and regulation of lakes Superior and Ontario.

According to a 1985 report by the IJC, these diversions increase the supply of water to the Great Lakes, resulting in changes to water levels. The long-term effect has been to increase the mean water levels on each of the lakes.

**What have been the impacts on navigation?**

The low water levels have not seriously impacted commercial navigation, since most deep draft navigation channels have been maintained at authorized elevations and shippers are more accustomed to adjusting payloads to match fluctuating water levels.

Many recreational boaters may experience problems at

marinas and harbors that have not been dredged routinely and have become accustomed to the higher than normal water levels of the recent past.

This year, the Corps of Engineers expects to dredge a total of 43 Federal navigation projects on the Great Lakes, which is above the average of 32 projects per year. The Corps also expects to receive about 930 requests for dredging permits around the Great Lakes this year, which is about double the average.

**What are the potential environmental impacts?**

The low lake levels are expected to have both positive and negative impacts. For example, wetlands are not only adapted to variations of lake levels but are dependent on them to maintain habitat diversity. The low levels will create much wider beaches, which is not only good for recreation, but also for shorebirds that require sandy beach areas for nesting.

The low lake levels will dewater much of the coastal habitat used by some 120 species of Great Lakes fishes which spawn in water less than 1 meter deep and also can use these shallow waters as nursery habitat. The effect will be felt most strongly by fish populations that spawn and rear their young in coastal wetlands in the connecting channels and in sheltered embayments.

Lower water levels are also expected to create an increased potential for resuspension and transport of contaminated sediments into the lakes from ships and recreational boats ("prop wash") as well as natural river currents and waves in coastal areas. Many of the "Areas of Concern" have contaminated sediment deposits that have not yet been removed and might be more readily mobilized.

Most production of algae that can cause taste and odor problems in drinking water occurs in the nearshore zone in the Great Lakes. As the water level drops, the shoreline moves toward the center of the lake, and therefore closer to drinking water intakes. If the intakes are not far enough from the shore to avoid this effect, or in deep enough water, they could experience problems.

**For more information:**

*<http://www.lrd.usace.army.mil/gl/lake.htm>*

# Lake Michigan-Huron Historical Levels

