



U.S. House of Representatives
Committee on Transportation and Infrastructure

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April 16, 2008

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SUMMARY OF SUBJECT MATTER

TO: Members of the Subcommittee on Water Resources and Environment
FROM: Subcommittee on Water Resources and Environment Staff
SUBJECT: Hearing on Lake Levels in the Great Lakes

PURPOSE OF HEARING

On Friday, April 18, 2008, at 9:00 a.m., the Subcommittee on Water Resources and Environment will hold a field hearing regarding Lake Levels in the Great Lakes at the University of Wisconsin - Green Bay, located in Green Bay, Wisconsin. The Subcommittee on Water Resources and Environment will receive testimony from representatives from the State of Wisconsin, the United States Army Corps of Engineers, the International Joint Commission, the Port of Green Bay and the Lake Carriers' Association.

BACKGROUND

This memorandum summarizes issues surrounding lake levels in the Great Lakes. It provides a summary of historic lake levels in the Great Lakes, as well an overview of possible causes and those who are affected.

Great Lakes Basin

The Great Lakes are comprised of Lakes Erie, Huron, Michigan, Ontario and Superior. The Great Lakes Basin is shared by eight states (Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin) and two Canadian provinces (Ontario and Quebec). The Great Lakes system includes the Lakes' connecting waterways; the St. Clair, the Detroit, the Niagara and the St. Lawrence Rivers, as well as the Straits of Mackinac, Lake St. Clair and the Welland Canal.

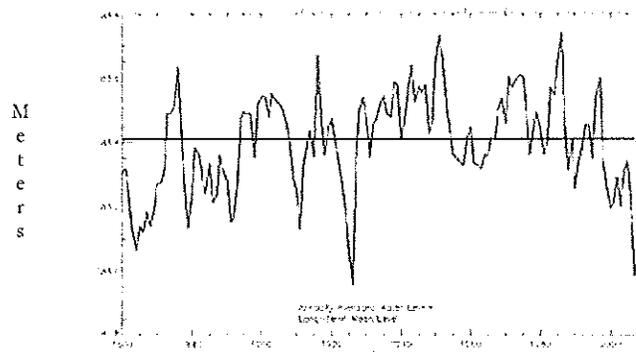
The Great Lakes are significant nationally and internationally because of their abundant natural resources and relationship to the economies of both the United States and Canada. The volume of water stored in the Great Lakes accounts for 20 percent of the world's and 95 percent of North America's surface freshwater. The Great Lakes basin also supports an expanding population and resulting development. An estimated 40 million people rely on the Great Lakes Basin to provide jobs, drinking water, and recreation. Approximately one-seventh of the total population of the United States and one-third of the population of Canada live in the Great Lakes Basin. On average, less than one percent of Great Lakes water is renewed annually.

Historic Lake Levels in the Great Lakes

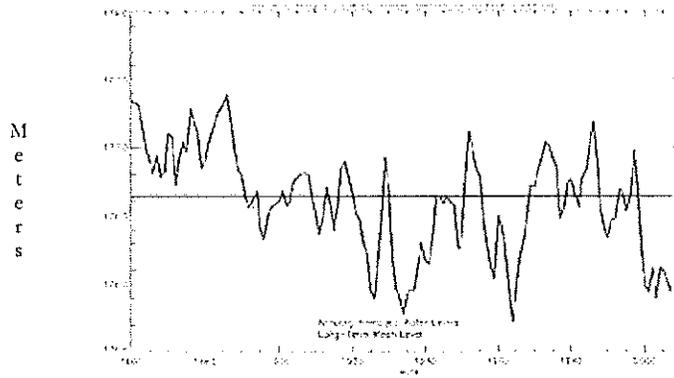
Historically, Great Lakes water levels have experienced significant fluctuation. The National Oceanic Atmospheric Association ("NOAA") keeps detailed data of historic levels in the Great Lakes. The Great Lakes Environmental Research Laboratory ("GLERL"), based in Ann Arbor, Michigan, conducts physical, chemical, and environmental modeling research and closely monitors lake levels along with the Detroit District of the U.S. Army Corps of Engineers. The following charts, provided by NOAA, display the average annual water levels for Lakes Superior, Michigan, Huron, Erie and Ontario. They depict a graphical representation of the historic annual averages for these Lakes from 1800-2007.

Levels of Lakes Michigan and Huron experienced record highs in both 1886 and 1986. These lakes also experienced record low water levels that coincided with the Dust Bowl during the 1930s. It is important to note that all of the Great Lakes have exhibited sharp decline since 1997. Lakes Superior, Michigan, and Huron have displayed a drastic decline in that time. Although Lake Superior is still below its historical annual average, it is about eight inches higher than it was at this time last year.

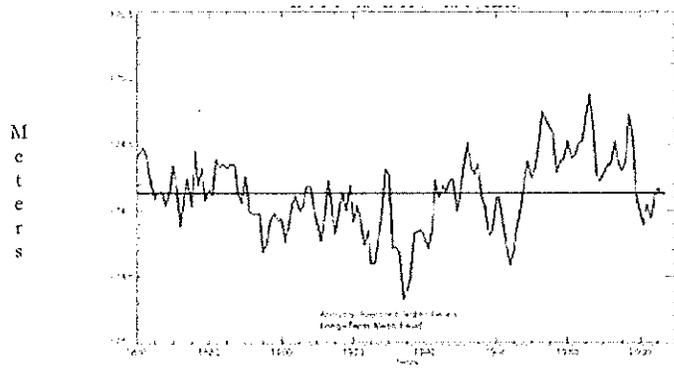
Lake Superior Water Levels in Meters (1800-2007)



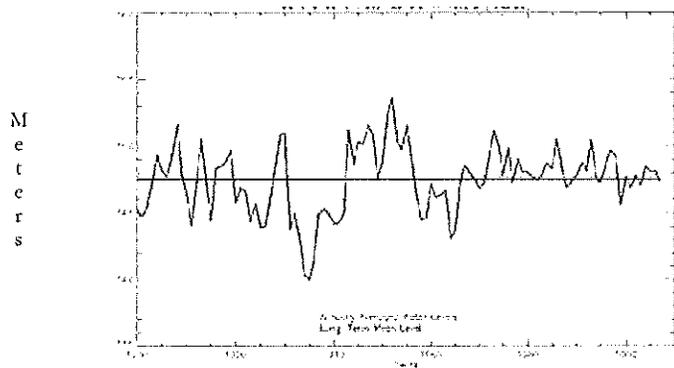
Lakes Michigan and Huron Water Levels in Meters (1800-2007)



Lake Erie Water Levels in Meters (1800-2007)



Lake Ontario Water Levels in Meters (1800-2007)



Causes of Fluctuating Lake Levels

In general, lake levels are directly related to the amount of water in the Great Lakes Basin and its hydrologic cycle. The amount of precipitation falling on the lakes and runoff from the basin's watershed directly impacts lake levels. By natural processes, the Great Lakes Basin experiences declines in water levels through evaporation and transpiration, and by way of the outflow through the St. Lawrence River.

Lake levels also fluctuate seasonally. These variations of water levels are based mainly on rainfall patterns and runoff to the Great Lakes. Lake levels are at their lowest point during the winter when runoff from precipitation is locked up in snow and ice, and cool dry air passes over the lakes increasing evaporation. Lake levels are generally at their highest during the summer when snow has melted and runoff increases.

The natural hydrologic cycle of the Great Lakes Basin is marked by high or low lake levels. Global climate change, affecting the current warming trend, has been cited as a potential cause of low lake levels in the Great Lakes. For instance, shorter, warmer winters result in less ice cover allowing more water to escape through evaporation. Climate change causes more frequent cycling of high and low water levels events. While the lakes are currently experiencing low lake levels, as recently as the 1980's the region experienced a period marked by near record high water levels.

Current Status of the Great Lakes Lake Levels

The Great Lakes' levels are currently much lower than their average annual water levels. The region is experiencing a prolonged period of higher air temperatures. These increased air temperatures result in higher rates of evaporation, as well decreased ice cover over the Great Lakes. This changing hydrologic cycle has contributed to decreased water levels in the Great Lakes Basin.

The U.S. Army Corps of Engineers ("Corps") releases a "Monthly Bulletin of Lake Levels for the Great Lakes"¹ as a public service. For April 2008, precipitation was below average in the Lake Superior Basin, near average in the Lake Michigan-Huron Basin, and well above average in Lakes Erie and Ontario Basins. In addition, precipitation in the Lakes Superior, Michigan-Huron, and Ontario Basins was near average over the last year, while Lake Erie Basin experienced precipitation that was 12 percent above average.

While recent precipitation levels have been high, lake levels continue to vary across the region. According to the Corps, the average water levels for the month of March for Lakes Superior and Michigan-Huron were 11 and 21 inches below their long term monthly average (1918-1999), respectively. Lake St. Clair was an inch lower than its long term average, and Lakes Erie and Ontario were eight inches above their long term averages.

¹ Data for the USACE monthly bulletin is provided by the National Ocean Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, and the Marine Environmental Data Service, Department of Fisheries and Oceans, Canada. Historic and projected lake levels are derived by the U.S. Army Corps of Engineers, Detroit District.

The Corps is currently advising boaters to be aware of hazards to navigation due to the conditions, especially during periods of high winds when levels can fluctuate greatly.

Effects of the Current Water Levels in the Great Lakes

Periods marked by high or low water levels in the Great Lakes place a tremendous amount of stress on the economy and hardships on those who live in the surrounding area. High water levels are just as common as low lake levels and often result in as much damage. For instance, from 1985 through 1987, the region endured above average rainfall causing record high water levels. These high water levels combined with storm waves caused a remarkable amount of destruction on the shoreline as a result of rapid coastal erosion. In particular, the shoreline of Lake Superior in Northwestern Wisconsin was undercut by large waves and eroded as much as 15 to 20 feet in one day.

The current status of the declining water levels impacts a number of aspects of the environment as well as human interests:

Aquatic and Coastal Ecosystems: Low water levels greatly impact aquatic and coastal ecosystems. From the standpoint of the natural coastal ecosystems surrounding the great lakes, fluctuating lake levels are a natural process that benefits those systems. Fluctuating levels result in periodically inundated phases, followed by dry phases. In general, plants and wildlife life benefit from warmer, shallower phases that allow for more sunlight. With a decrease in water levels, the region has experienced a net gain in wetlands. A shallower interface between the water line and shores has stimulated growth of wetlands plants in some areas.

However, threats to those systems occur when human intervention results in modifications that alter these natural processes. For instance, an owner of a lake front property could see the benefit in destroying aquatic vegetation along a shoreline, without realizing the environmental ramifications of these actions. As these shoreline plants are destroyed, the lakes have a reduced capacity to process nutrients and to produce food for smaller organisms that provide the basis of the food chain.

Commercial Navigation: Lake levels are of critical importance to the shipping industry in the Great Lakes Basin. 80 percent of the American steel industry is based in the Great Lakes Basin and relies on water transportation. A number of steel mills in the Basin were built without rail access in order to take advantage of waterborne commerce and the ease and accessibility provided by their shoreline location. As water levels drop steel mills and other factories will be adversely affected. Declining lake levels inhibit access to existing docks and cause commercial ships to engage in a process called 'light loading'. Light loading is a term used when a barge or ship is forced to leave dock carrying less cargo than the ship's designed carrying capacity.

According to the Lake Carrier's Association, depending on the size of the vessel, a ship is forced to 'light load' by as much as 50 to 270 tons of cargo for each inch of draft. For example, last fall, Lake Superior was at a record 30 inches below its average annual water level. Their largest vessel was forced to 'light load' by 8,100 tons of cargo which would provides enough material to produce 6,000 cars.

Power Production: The region is home to a significant amount of our nations' industry, including energy production, mining, steel production and automobile manufacturing. Low water levels greatly reduce the ability of existing hydroelectric stations to generate power because there is less water to power the systems. There are currently two hydroelectric power plants on the United States side of the St. Mary's River. To remain efficient, these plants rely heavily on the flow and timing of this river. When flows are low and energy production falls, consumers are forced to purchase power from other sources.

Recreational Boating: The Great Lakes Commission estimates that there are more than 1,800,000 recreational boats in the Great Lakes States and Ontario. The viability of the recreational boating industry is closely tied to water levels and is adversely affected by low water levels. Owners of property with water-only access, such as a dock or a pier, may lose their access to the water. Boaters are also put at risk of running aground on previously unexposed objects such as rocks, sand bars, submerged vessels and tree stumps.

Water Quality: Low lake levels adversely affect water quality in three ways. First, lower lake levels potentially affect water quality by inhibiting the ability of the waters to naturally process excessive levels of nutrients and toxic substances. Second, as a result of increased dredging to keep shipping corridors viable, water quality may be affected by the toxins that are contained in sediment which are distributed and reintroduced into the water. Third, as the volume of water decreases, a concentration of toxins in the remaining water is likely.

Council of Great Lakes Governor's

The Council of Great Lakes Governors ("CLGC") is comprised of the Governors of the Great Lakes States as well as the Canadian Provincial Premiers from Ontario and Quebec. The CLGC, through the Great Lakes Water Management Initiative, is responsible for creating innovative and common conservations standards for the Great Lakes that will manage water diversions, withdrawals, and consumptive use proposals.² On December 13, 2005, the Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement was signed by the Great Lakes Governors and Canadian Premiers of Ontario and Quebec. At the same time, the Great Lakes Governors endorsed the Great Lakes-St. Lawrence River Basin Water Resources Compact.

Once ratified, the Great Lakes-St. Lawrence River Basin Sustainable Resources Compact establishes a Great Lakes Basin Water Resources Council, comprised of the Governors of the signatory parties, that reviews proposals for water withdrawals, diversions, and consumptive use proposals involving water from the Great Lakes Basin. In addition, the Compact requires signatory states to develop and implement water conservation programs that will protect and improve the Great Lakes Basin ecosystem. In order to be achieve full enactment as an interstate compact, the Compact needs to be approved by each state legislature, as well as the United States Congress. If fully ratified, the Compact would serve as a binding agreement among all parties to implement conservation standards for regulating water withdrawals from the Great Lakes Basin.

² According to the Great Lakes-St. Lawrence River Basin Compact adopted by the states of Illinois, Indiana, Michigan, Minnesota, New York, Ohio and Wisconsin and the Commonwealth of Pennsylvania, "Consumptive use means that portion of the water withdrawn or withheld from the basin that is lost or otherwise not returned to the Basin due to evaporation, incorporation into products, or other processes."

The Great-Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement (Agreement) is a non-binding agreement containing the commitment of the Great Lakes States and the Provinces of Quebec and Ontario to utilize a standard for regulating water diversions and withdrawals from the Great Lakes Basin. The Agreement essentially serves as an informative guide for signatory parties to develop and utilize water management and withdrawal procedures.

Outlook

The Great Lakes Environmental Research Laboratory working under NOAA makes monthly and annual water supply and lake level forecasts based on current conditions in the Great Lakes Basin in conjunction with NOAA's long term climate predictions. NOAA has predicted the re-emergence of a La Niña event that will result in above average temperatures as well as a slight increase in precipitation for the lower Great Lakes. NOAA anticipates that the average annual water levels for all the Great Lakes will remain at or below last year's historically low average. A similar La Niña event during 1997 produced historic low water levels in the across the region.

The International Joint Commission is currently engaged in a five-year, \$14.6 million study to examine the declining water levels in the Great Lakes. The study examines water management practices used in the Upper Great Lakes and potential factors that affect water levels, including climate change. The study also evaluates the impacts of water levels on the ecosystem and human interests. The physical changes to Lake St. Clair are being examined as one potential reason for the declining levels, and a remediation option. A report based on this study will be released in 2012.

More importantly, there is a general agreement that total water withdrawal and consumptive use of water from the Great Lakes will increase. Increasing stress on an already overwhelmed system could have a drastic impact on the Great Lakes ecosystem as well as the 40 million residents in the region who rely upon the Lakes for recreation, power production, economic viability and transportation.

WITNESSES

PANEL I

The Honorable Matt Frank
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PANEL II

The Honorable Rob Cowles
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The Honorable Dave Hansen
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PANEL III

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