



US Army Corps
of Engineers
North Central Division

GREAT LAKES LEVELS
UPDATE No. 54
1989 ANNUAL SUMMARY
JANUARY 3, 1990

Highlights

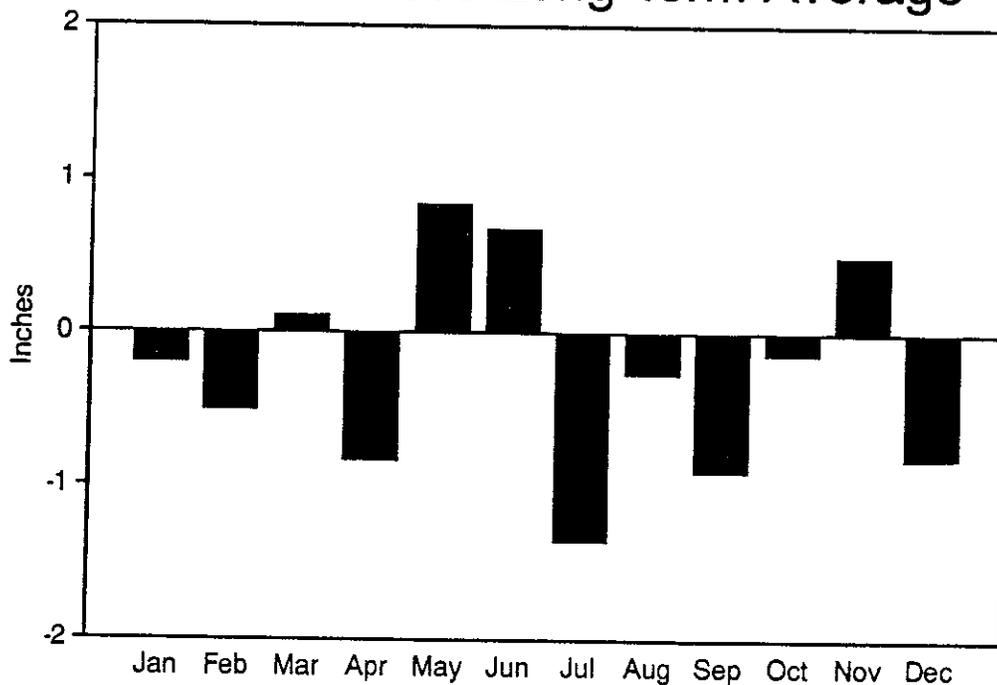
In retrospect, the year 1989 continued a trend towards lower precipitation and declining lake levels that had begun in 1987. Lakes Superior and Michigan-Huron levels remained near- to below-average throughout the year. Lakes St. Clair and Erie, although declining remained above the long-term average in 1989. Lake Ontario began the year below average and finished the year at about average.

Precipitation

Across the Great Lakes basin, the winter of 1988-89 was dry; December 1988 and January and February 1989 all received below average precipitation. There was

very little snow cover in the basin until March, when above-average precipitation brought a heavy snow pack to the northern U.S. portion of the basin, particularly in the Upper Peninsula of Michigan. The snow melted under ideal conditions, resulting in very few flooding problems. May and June were wetter than average, especially on the Lake Erie and Lake Ontario basins. The next four months were dry, resulting in seven of the first 10 months of 1989 having below-average precipitation. With November being wetter than average and December drier than average, the cumulative precipitation for the Great Lakes basin in 1989 was about 2.9 inches below average. Figure 1, below, compares 1989's monthly precipitation to long-term average.

Great Lakes Basin Precipitation - 1989
Inches Above Long Term Average



Lake Levels

At the beginning of 1989, Lakes Michigan-Huron water levels were near long-term average. Lake Ontario began 1989 below average while Lakes Superior, St. Clair and Erie were all slightly above average.

Lake Superior's water levels were slightly above average until August 1989, after which time it remained below average, ending the year near Low Water Datum (LWD). Although the average and end-of-year levels for Lake Superior were less in 1989 than in 1988, the peak elevation occurred two months earlier than usual and was slightly higher than in 1988.

Lakes Michigan-Huron levels remained near average in January and February. March's level fell below average and, except for seasonal fluctuations, declined the remainder of the year, ending at about 0.4 foot above LWD. This is the closest that Lakes Michigan-Huron have been to LWD since early 1967. The peak level for 1989 was well below 1988's peak.

Lake St. Clair water levels started and ended the year above the long-term average. There was minor retardation of flow in the St. Clair River due to abnormal ice conditions at the end of February. This resulted in a temporary increase in water level of about two feet along lower portions of the river; however, there was no flood damage to property as a result of this event. The peak level in 1989 was about the same as in 1988.

Lake Erie water levels began the year about three inches above the long-term average and ended the year at long-term average. Due to above average rainfall in May and June, the seasonal rise was somewhat greater than average. The peak level for 1989 was slightly higher than in 1988.

Lake Ontario water levels began 1989 below average. The level rose about six inches in April, due in large part to a program of reduced outflows for the purpose of bringing the lake closer to the

average level. Nonetheless, April's level was still below average. With much greater than average rainfall in May, and a continuation of the reduced outflow program until the 19th, the level at the end of May was above average for the first time in 15 months. Less than average precipitation during the last half of the year caused the lake to end the year at the average level.

Storms

1989 was a quiet year in relation to storms. There were no damaging storm events.

Lake Regulation

The two lakes whose outflows are regulated, under the authority of the International Joint Commission (IJC), are Lakes Superior and Ontario. In 1989, the outflows for Lake Superior were in strict accordance with Plan 1977, the prescribed regulation plan. Plan 1977 attempts to balance the water levels of Lakes Superior and Michigan-Huron so that their levels are about the same, relative to long-term average.

For the first nine months of the year, Lake Superior outflows were more than average because the water levels of Lakes Michigan-Huron were lower, relative to average, than Lakes Superior's level. As Lake Superior levels fell below average and became relatively worse off than Lakes Michigan-Huron's, the Lake Superior outflows for October through December were less than average.

The outflow regulation plan for Lake Ontario is Plan 1958-D. The outflows prescribed by Plan 1958-D are influenced by precipitation over the basin (determining the amount of water flowing into the lake from its own basin) and by the level

of the upstream lakes (determining the water to flow in from Lake Erie).

The first quarter of 1989 showed dry conditions on Lake Ontario's basin. The low winter Lake Ontario levels and lack of a snow pack going into the spring raised the prospect for continued low water levels into the summer. This raised concerns about potentially adverse environmental conditions and decreased recreational boating opportunities on Lake Ontario and in the St. Lawrence River during the summer months. Consequently, the International St. Lawrence River Board of Control (St. Lawrence Board) implemented a plan to discharge less water than called for by Plan 1958-D. The intent was to bring Lake Ontario levels close to average at a faster rate than called for by strict adherence to Plan 1958-D.

This program, known as underdischarging, augmented lake levels by storing water on the lake. The underdischarging took place during April and May, coinciding with the spring runoff of the Ottawa River, a major tributary which enters the St. Lawrence River just upstream from Montreal Harbour. High precipitation and resultant high water supplies in May and June further augmented the storage, thereby eliminating the concern for low summer lake levels. The summer and fall months were uneventful on Lake Ontario and the St. Lawrence River.

An extremely cold December resulted in concerns for early winter ice problems on the St. Lawrence River. Ice problems developed at Montreal starting on December 7th. Lake Ontario outflows were reduced that day to help form a stable ice cover at Montreal. Outflows were reduced on December 21st to help in ice formation in the international portion of the St. Lawrence River. The St. Lawrence Seaway was closed to navigation on December 23. Close coordination between the power and navigation entities forestalled major difficulties to either interest.

International Joint Commission Study

Phase I of the IJC Reference Study was completed in May. The Project Management Team submitted the Phase I Report in August. The findings of the report emphasized the need for a basin-wide approach to problem solutions rather than problem-specific approaches as used in the past. The study pointed out the changing human positions, values and institutions relative to water levels and flows. The Phase I recommendations were as follows: (1) the federal governments not undertake commitments toward planning or funding works to control levels and flows in the Great Lakes-St. Lawrence River Basin watershed until there is more consultation with interests and a more comprehensive evaluation of the impacts of such works on the environment. (2) The International Joint Commission communicate its operational objectives regarding Lake Ontario and Lake Superior levels so as to promote reasonable expectations among concerned interests. (3) The federal governments issue a statement on federal policy goals regarding water issues.

A continuing part of the Reference Study involves a large-scale survey of shoreline residential property occupants (Canadian and U.S.) on the Great Lakes, their connecting channels and the St. Lawrence River. The details of this survey were given in the November Update. Detailed analysis of the survey data is continuing at present. The product contemplated is a report complete with extensive graphical exposition. Information on availability of this report to interested parties will be in a future announcement.

In Phase II of this Study, the full range of the inventory of measures and the process of evaluation will have to be reviewed and matured. Phase I proved to be a learning process and it is now possible to see the strengths and weaknesses of the present approach and some of the

implications for the development of future evaluation methods. Phase II will have a major emphasis toward the development of an overall strategy. There will always be a need for specific attention to local situations, but these must be assessed in the context of an overall strategy for the Basin. The challenge will be to give full consideration to basin-wide issues while focussing on local exigencies.

Other Activities

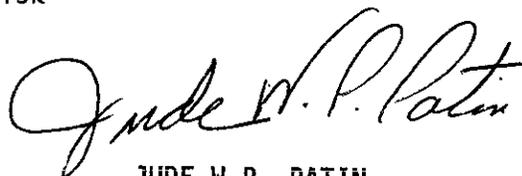
The Working Committee of the St. Lawrence Board is presently collecting data from different interests (power, navigation, riparian, recreation boating and environmental interests) in order to develop criteria for a new Regulation Plan for Lake Ontario. The new Regulation Plan, when completed, will be submitted to the IJC for approval.

The Corps of Engineers recognizes the need for developing a long-term strategy for implementing geographic information system (GIS) technology. The GIS technology will be useful in characterizing the Great Lakes shoreline and for studies on flooding, erosion, storm surge and wave modeling, wetland monitoring and multi-layered map making.

The Corps of Engineers, in conjunction with the Federal Emergency Management Agency's National Flood Insurance Program, has developed a wave runup methodology for use on the Great Lakes. Its purpose is to identify flood plain areas along the Great Lakes shoreline and establish flood risk zones within these areas.

Great Lakes states and provinces have been preparing plans to restore and protect the environmental quality of the lakes. Remedial Action Plans (RAPs) are underway for the 42 areas of concern identified by the IJC. Civil and environmental organizations have been actively involved in RAP development. The Corps of Engineers has supported RAP development as a part of its missions to navigation maintenance and wetlands protection. Continued public involvement in RAP development and implementation will be necessary. Contact your state environmental agency or the USEPA Great Lakes National Program Office (312-353-2117) for more information on RAPs.

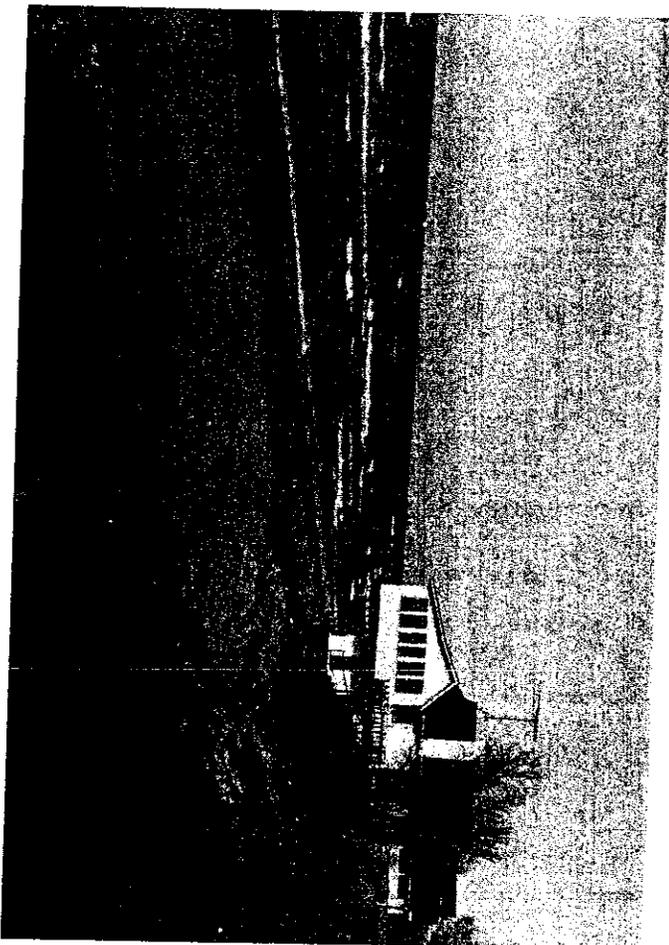
In 1989, the North Central Division began exploring how to apply Corps expertise to enhancing the environment of the Great Lakes Basin. In partnership with Federal and State agencies, the Corps began development of a Great Lakes Environmental Action Program (Great LEAP) which consists of three facets. The first facet, habitat enhancement, would center on the design and construction of such projects as restoring wetlands, managing sedimentation and constructing islands. The second facet, habitat remediation, would be to assist state and local governments in implementing their RAPs for Great Lakes Areas of Concern. The third facet involves the expansion of the Corps' data collection efforts in such areas as wetland delineation and sediment quality, along with improved coordination/consolidation of Great Lakes data collection and management activities.



JUDE W.P. PATIN
Brigadier General, U.S. Army
Commander and Division Engineer



8 September 1986



29 March 1989

The Corps' 1980-1981 beach nourishment project, at New Buffalo, Michigan, has also provided a significant benefit to riparians at a considerable distance downdrift. The lower lake levels of 1988 assisted in accreting the material to form a beach in Michiana, Michigan. (Photo credit: Charlie Johnson, Corps of Engineers)