GREAT LAKES WATER LEVELS

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Detroit District, Corps of Engineers
14 May 2020
NOTES ABOUT GREAT LAKES WATER LEVELS

- Not a depth, but an elevation above sea level, IGLD 1985
- Michigan and Huron = One lake
- Lake-wide daily means → Lake-wide monthly means
- Based on still water, not influenced by meteorological forcing
- Based on a network of water level gauges
- Detroit District Corps of Engineers = keeper of official monthly water level statistics from 1918-2019
- Coordination occurs with Environment and Climate Change Canada
- Primary drivers of water level fluctuations are changing weather patterns and resulting fluctuations in water supply
The Great Lakes Basin

- 14,000 miles of shoreline
- 95,000 square miles of water
- 200,000 square miles of land
- 8 States & 2 Provinces

Outflow regulation
FACTORS IMPACTING WATER LEVELS

- Inflow from Upstream Lake
- Evaporation
- Precipitation
- Runoff
- Net Basin Supply
- Outflow
ANNUAL WATER LEVELS AND THE HYDROLOGIC CYCLE

WINTER

Snow accumulation

SPRING

Snow melt, rainfall, increased runoff

SUMMER

Increased sunshine warms lake water

FALL

Increased evaporation
Decade plus of low water with record lows

Record rise and record highs

Great Lakes Water Levels (1918–2020)

- Lake Superior
- Lake Michigan–Huron
- Lake St. Clair
- Lake Erie
- Lake Ontario

Monthly Mean Level
Long Term Average Annual

The monthly average levels are based on a network of water level gages located around the lakes. Elevations are referenced to the International Great Lakes Datum (1985). Water levels have been coordinated through 2019. Values highlighted in gray are provisional.
GREAT LAKES MONTHLY MEAN WATER LEVELS

Record Highs in 2019

• May: Superior, St. Clair, Erie
• June: Superior, St. Clair, Erie* and Ontario*
• July: Superior, St. Clair*, Erie and Ontario
• Aug: Superior (tied), St. Clair and Erie
• Sep: Superior (tied), St. Clair and Erie
• Oct: None (within 1 inch on Superior)
• Nov: None
• Dec: None (within 1 inch on Michigan-Huron)

*highest monthly mean on record for all months

New Record Highs in 2020

• Jan: Superior, Michigan-Huron, St. Clair (tied)
• Feb: Superior, Michigan-Huron, Erie
• Mar: Michigan-Huron, St. Clair, Erie
• Apr: Michigan-Huron, St. Clair, Erie
WHY ARE LEVELS SO HIGH? – WET PATTERN

Last 3 years (2017-2019), exceptionally wet for the Great Lakes Basin.

NOAA National Centers for Environmental information, Climate at a Glance
# CURRENT WATER LEVELS

The United States Army Corps of Engineers collects and disseminates this water level data in cooperation with NOAA and the Canadian Hydrographic Service. All data are provisional and are referenced to IGLD 1985. Blanks indicate data that are missing or not yet available.

## Great Lakes Water Levels

<table>
<thead>
<tr>
<th>Date</th>
<th>Superior* Daily Mean</th>
<th>Michigan Huron* Daily Mean</th>
<th>St. Clair* Daily Mean</th>
<th>Erie* Daily Mean</th>
<th>Ontario* Adj. Daily Mean</th>
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</thead>
<tbody>
<tr>
<td>01-MAY-2020</td>
<td>602.44</td>
<td>581.89</td>
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</table>

**Mean:** 602.49 | 581.85 | 577.21 | 574.27 | 247.32

## Historic Water Levels

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Superior Avg Last Month</th>
<th>Michigan Huron Avg Last Year</th>
<th>St. Clair Minimum</th>
<th>Erie Minimum</th>
<th>Ontario Minimum</th>
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<tbody>
<tr>
<td>Avg Last Month</td>
<td>602.41</td>
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<td>Minimum</td>
<td>599.61 (1926)</td>
<td>576.57 (1964)</td>
<td>572.24 (1934)</td>
<td>569.03 (1934)</td>
<td>243.14 (1935)</td>
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<td>Long Term Avg</td>
<td>601.61</td>
<td>579.04</td>
<td>574.61</td>
<td>571.92</td>
<td>246.16</td>
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* Mean levels are calculated by averaging the best available gage data at report generation and are subject to change.

** Period of Record 1918 - 2019

6-MONTH FORECAST (MAY-OCTOBER)

**Projectsed Levels (dashed green line):**

- In period of seasonal rise
- April 2020 level was within an inch of the April 2019 level.
- Forecast to be 2 to 6 inches below record high levels over next 6 months.

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### 6-MONTH FORECAST (MAY-OCTOBER)

**LAKES MICHIGAN-HURON WATER LEVELS - MAY 2020**

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<th>FL</th>
<th>MAY</th>
<th>JUN</th>
<th>JUL</th>
<th>AUG</th>
<th>SEP</th>
<th>OCT</th>
<th>NOV</th>
<th>DEC</th>
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<th>FEB</th>
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<tr>
<td>2020</td>
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**2019 Records**

**2020 Provisional Record**

**Projected Levels (dashed green line):**

- In period of seasonal rise
- April 2020 level was 13 inches above the April 2019 level.
- Forecast to be 2 to 4 inches above record high levels through July, near its record high in August, and 2 to 9 inches below record high levels in Sept. and Oct.

For more information, visit: [https://www.lre.usace.army.mil/Missions/Great-Lakes-Information/Great-Lakes-Water-Levels/Water-Level-Forecast/](https://www.lre.usace.army.mil/Missions/Great-Lakes-Information/Great-Lakes-Water-Levels/Water-Level-Forecast/)
6-MONTH FORECAST (MAY-OCTOBER)

2019 Records

2020 Provisional Record

Projected Levels (dashed green line):

- In period of seasonal rise
- April 2020 level was 8 inches above the April 2019 level.
- Forecast to be 1 inch above record high May level, 2 to 4 inches below record highs from June to Sept., and 10 inches below its record high Oct. level.

6-MONTH FORECAST (MAY-OCTOBER)

LAKE ERIE WATER LEVELS - MAY 2020

- **2019 Records**
- **2020 Provisional Record**

**Projected Levels (dashed green line):**

- Likely reached its peak level and remain relatively steady in May.
- April 2020 level was 9 inches above the April 2019 level.
- Forecast to be near its record high level in May, and then 4 to 10 inches below record high levels from June to October.

6-MONTH FORECAST (MAY-OCTOBER)

LAKE ONTARIO WATER LEVELS - MAY 2020

- 2019 Records
- 2020 Provisional Record

Projected Levels (dashed green line):

- In period of seasonal rise
- April 2020 level was 7 inches above the April 2019 level.
- Forecast to be 14 to 20 inches below record high levels, but 9 to 16 inches above average levels over the next 6 months.

KEY POINTS

• Water levels on all the Great Lakes started 2020 higher than 2019.

• Except for Lake Michigan-Huron, all lakes forecast to peak below 2019 levels.

• Water level fluctuations are primarily driven by weather patterns

• Regulation of outflows (St. Marys and St. Lawrence) cannot prevent extreme high or low water levels nor fully control water levels

• Impacts of high water to be felt throughout 2020
Water Level Contacts

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