Handling High Waters: Your Guide to Rising Lake Levels

Deanna Apps, Lead Forecaster, US Army Corps of Engineers
Nick Bonstell, Director of Emergency Management, Ottawa County
Ronda Wuycheck, Coastal Management Program Manager, Water Resources Division, Department of Environment, Great Lakes, and Energy

We love where you live.
Today’s Presenters:

Deanna Apps,
Lead Forecaster
US Army Corps of Engineers

Nick Bonstell,
Director of Emergency Management,
Ottawa County

Ronda Wuycheck,
Coastal Management Program Manager
Water Resources Division
Department of Environment,
Great Lakes, and Energy

We love where you live.
GREAT LAKES WATER LEVELS

Deanna Apps
Hydraulics and Hydrology Office
Detroit District, Corps of Engineers
14 July 2020
MONITORING GREAT LAKES WATER LEVELS

Daily Average Water Levels Based on Lake-Wide Average Network

- **Lake Superior**: Duluth, Marquette, Pt. Iroquois, Thunder Bay, Michipicoten
- **Lakes Michigan-Huron**: Harbor Beach, Ludington, Mackinaw City, Milwaukee, Tobermory, Thessalon
- **Lake St. Clair**: St. Clair Shores, Belle River
- **Lake Erie**: Toledo, Cleveland, Port Stanley, Port Colborne
- **Lake Ontario**: Oswego, Rochester, Toronto, Kingston, Port Weller, Cobourg
Current Daily Water Levels

Great Lakes Water Levels (Feet)

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 NGVD 1988. Blanks indicate data that are missing or not yet available.

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<th>Date</th>
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<th>St. Clair*</th>
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Lake Superior

Lake Michigan-Huron

Lake St. Clair

Lake Erie

Lake Ontario

Historic Water Levels

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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

Lake levels average levels are based on a network of water level gages located around the lakes. LTA and record levels are computed from a period of record of 10/16 to 2019

Elevations are referenced to the International Great Lakes Datum (1985).

ANNUAL WATER LEVELS AND THE HYDROLOGIC CYCLE

WINTER
- Snow accumulation

SPRING
- Snow melt, rainfall, increased runoff
- Increased sunshine warms lake water

SUMMER
- Increased evaporation

FALL
- Increased evaporation
Great Lakes Water Levels (1918–2020)

Lake Superior

Lake Michigan–Huron

Lake St. Clair

Lake Erie

Lake Ontario

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.
Decade plus of low water with record lows

Record rise and record highs
6-MONTH FORECAST (JULY-DECEMBER)

- 2019 Records
- 2020 Provisional Record

Projected Levels (dashed green line):

- In period of seasonal rise
- June 2020 level was 6 inches below June 2019 level.
- Forecast to be 4 to 8 inches below record high levels over next 6 months.

6-MONTH FORECAST (JULY-DECEMBER)

• 2019 Records
• 2020 Provisional Record

Projected Levels (dashed green line):

• Water level forecast to remain fairly steady this month

• June 2020 level was 5 inches above the June 2019 level.

• Forecast to be 1 to 2 inches above record high levels through August, 2 inches below record high in Sept., and 6 to 10 inches below record high levels Oct. to Dec.

6-MONTH FORECAST (JULY-DECEMBER)

LAKE ST. CLAIR WATER LEVELS - JULY 2020

- 2019 Records
- 2020 Provisional Record

Projected Levels (dashed green line):
- Beginning period of seasonal decline
- June 2020 level was 1 inch above the June 2019 level.
- Forecast to be 2 to 3 inches below record highs from July to Sept., and 9 to 10 inches below record high levels Oct. to Dec.

**6-MONTH FORECAST (JULY-DECEMBER)**

**PROJECTED LEVELS (dashed green line):**

- Beginning period of seasonal decline
- June 2020 level was 2 inches below the June 2019 level.
- Forecast to be 2 to 4 inches below record high levels July through Sept., and 9 to 12 inches below record high levels Oct. to Dec.

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**LAKE ERIE WATER LEVELS - JULY 2020**

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<th>Year</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
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*CHART DATUM: 569.2 FEET (173.5 METERS)*

[View source](https://www.lre.usace.army.mil/Missions/Great-Lakes-Information/Great-Lakes-Water-Levels/Water-Level-Forecast/).
6-MONTH FORECAST (JULY-DECEMBER)

LAKE ONTARIO WATER LEVELS - JULY 2020

- 2019 Records
- 2020 Provisional Record

Projected Levels (dashed green line):

- In period of seasonal decline
- June 2020 level was 24 inches below the June 2019 level.
- Forecast to be 12 to 24 inches below record high levels, but 7 to 11 inches above average levels over the next 6 months.

Great Lakes High Water

Multiple record high levels were set on the Great Lakes in 2018 resulting in increased risks from erosion and coastal flooding. The U.S. Army Corps of Engineers, Detroit District, is committed to ensuring public safety while providing technical expertise and assistance during this time of high water around the Great Lakes.

During response operations, our emergency management office conducts emergency operations to save lives and protect improved properties. In the event of natural disasters such as flooding, emergency permit procedures can be achieved to expedite permits to reduce further damage, and protect life and property. The Corps of Engineers has authority to provide technical and planning assistance for floodplain management planning, the Great Lakes hydrology and hydrology office forecasts and monitors water levels of the Great Lakes and the conditions that lead to water level fluctuations.

Water Level Contacts

John Allis
313 226 2137
John.t.allis@usace.army.mil

Deanna Apps
313 226 2979
Deanna.Apps@usace.army.mil

Helpful Links

- Apply for a Permit
- Check Permit Application Status
- USACE, Detroit District, Role in Emergency Management
- International Lake Superior Board of Control
- Environment and Climate Change Canada
- Michigan Sea Grant
- NOAA - Great Lakes Environmental Research Laboratory
- Living on the Coast Booklet
- Sandbagging Instructional Video

Frequently Asked Questions

- Click Question to expand Answer

  - Why are water levels on the Great Lakes so high? How long is this expected to last?
  - Does the U.S. Army Corps of Engineers have control over Great Lakes water levels?
  - My shoreline is eroding, can the U.S. Army Corps of Engineers help?
  - My property is flooding, can the U.S. Army Corps of Engineers help?
  - What type of shoreline project requires a permit?
How can the Army Corps of Engineers help my community?

1. Immediate emergency assistance
2. Long-term solutions
USACE DISASTER RESPONSE

– USACE has the authority to provide disaster response assistance to communities in response to flooding
  • Technical Assistance: knowledge products (e.g. data, maps, training)
  • Direct Assistance: flood fight supplies (e.g. sandbags, HESCO) on a reimbursable basis

– Erosion cannot be addressed by USACE under emergency response authorities

– A request for assistance must be made from the State Emergency Management Agency to USACE

– Questions about emergency management?
  • Contact your local emergency management agency (city or county)
  • USACE Detroit District Emergency Management: CELRE-EOC@usace.army.mil
USACE RESPONSE TO EROSION

– USACE is a regulatory agency that has permitting authority for work along the lakeshore in conjunction with EGLE
  • For more information visit: https://www.lre.usace.army.mil/Missions/Regulatory-Program-and-Permits/Apply-For-A-Permit

– USACE also has the ability to complete studies and/or construction to address erosion and/or other flood mitigation issues at the community level under non-emergency authorities
  • To learn more about the full catalog of USACE programs visit: https://www.lre.usace.army.mil/Missions/Planning/Technical-Planning-Assistance/
Emergency Management for Coastal Communities
How did we get here?

- Record Rainfall (1, 3, and 5 Year)
- 2019-2020: High Lake Michigan Water Levels combined with Strong Storms
- Historic Erosion and Long Term Flooding
Lakeshore Erosion

• First noticed Erosion in Early June, 2019
Lakeshore Erosion
Lakeshore Erosion
Lakeshore Erosion

184M°  51 NM/h  4.5NM (05:46)
Lakeshore Erosion
Lakeshore Erosion
Lakeshore Erosion

Further Assessment of Critical Infrastructure

Determine a way to ensure access to Section 19 Funds and other Programs as Created

Continue Overflights and Ongoing Documentation with the State of Michigan
Flooding
Flooding
Flooding
Flooding
Partnerships
Contact

Nicholas Bonstell
nbonstell@miottawa.org
Resilient Coastal Communities
Living with the Highs and Lows on Michigan’s Coast

Michigan Coastal Management Program
Water Resources Division
Ronda Wuycheck, Program Manager
517-420-5921 | wuycheckr@michigan.gov
Michigan Coastal Management Program

Celebrating 40+ years on the fresh coast
Michigan Coastal Management Program

Michigan Coastal Program established in 1978

A state-federal partnership with the National Oceanic and Atmospheric Administration

Federal-state-local partnership structure

Coastal communities are key
Mission

To protect, preserve, restore, enhance, and wisely develop the coastal natural resources and cultural heritage on the nation’s longest freshwater coastline.
Great Lakes Water Levels

- Water levels are cyclical with periods of low and high water
  - Influenced by Weather
    - precipitation, ice cover, air temperatures, and evaporation

- All the Great Lakes are currently at or near record highs
Impacts
Lake Michigan Water Levels and Shore Erosion
What Are the Lanes?

National Weather Service
Weather Forecasts
Winds, Waves, Rain
Potential/Expected Impacts of Weather

US Army Corps of Engineers
Great Lakes Water Levels
Measuring, Reporting, Forecasting
Record Keeping - Declaring Record Levels

https://www.lre.usace.army.mil/Missions/Great-Lakes-Information/

Michigan Department of Environment, Great Lakes and Energy
Shoreline Protection

http://michigan.gov/ShoreLands
EGLE Action – Assisting Customers

- New webpage: Great Lakes High Water Levels (Michigan.gov/HighWater)
  - General water level information
  - Contractor List
  - Permit application assistance
  - FAQ document

- Customer assistance on-call (8:30-4:30, M-F):
  - Environmental Assistance Center (800-662-9278 or EGLE-assist@Michigan.gov)
  - Identify that you are calling about high-water levels
Consequences of Hardened Shore Structures

Hardened shore protection structures (e.g., sea walls, revetments) minimize coastal erosion.

BUT ALL hard shore protection structures
• Eventually fail, imposing great costs to repair, enlarge, move, or remove;
• AND ALL armoring severely degrades and even eliminates entirely the natural beach in the meantime.

Dr. Richard Norton – U of M

Ottawas Lane, Baldwin Twp, Iosco Co.
Public Access to Public Trust Resources

(Beaches and Great Lakes Bottomlands)
Community resilience is defined as the sustained ability of a community to understand and use available resources to respond to, withstand, and recover from adverse situations.
A hazard-ready community is able to absorb, adapt, and rebound from changes in Great Lakes water levels, coastal storms and floods.
Managing Coastal Hazards

Manage coastal hazards by developing scenario-based decisions that protect lives and property, and improving hazard understanding and awareness.
The Coastal Resilience Team (CRT)
Partnering to Create Hazard-Ready Coastal Communities

- Incorporate resilience principles into plans and ordinances.
- Create information and resources supporting local action.
“80-Year View” of Coastal Change

- Bluff and shoreline positions
  - 1938
  - 1980
  - 2009
  - 2016
- Complete for Lower Peninsula Lake Michigan and Huron

http://geospatialresearch.mtu.edu/czmp
Adaptation Strategies

Coastal Resilience

- Protect
- Accommodate
- Retreat
- Avoid
Protect
Setback Ordinance

- Prevent damage to private property
- Preserve public trust lands
Accommodate
Retreat
Avoid
MCMP Grant Assistance

• **Who is Eligible:** Eligible applicants include coastal communities (e.g., local units of government, cities, counties, villages, and townships), regional planning agencies, educational institutions, Tribal governments, and not-for-profits 501(c) organizations located within the approved [programmatic boundary](#).

• **Grant Amount:** Planning projects can be no less than $10,000 and no greater than $100,000. Site-specific low-cost construction projects can be no less than $10,000 and no greater than $200,000.

• **How to Apply:** Grant Funding Opportunities are released annually in October with a December application due date.

• **Who do I contact for questions:** For general or technical questions, the Focus Area Coordinators listed on the MCMP webpage.

• For more information, visit the Coastal Management Program webpage: [www.michigan.gov/coastalmanagement](http://www.michigan.gov/coastalmanagement).
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Weston Hillier  
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Madeleine Gorman  
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Michigan Department of
Environment, Great Lakes, and Energy

800-662-9278
Michigan.gov/EGLE

Follow us at: Michigan.gov/CoastalManagement

Follow us at: Michigan.gov/EGLEConnect
Upcoming Webinars

Register for the upcoming webinars here: http://www.mml.org/coronavirus

10 am, July 22, 2020 - What’s Happening Inside MDOT’s Local Agency Program

1:30 pm, July 23, 2020 - Coronavirus Emergency Supplemental Funding Town Hall

12 pm, July 27, 2020 - MML Monday Morning Live

We love where you live.