

# GREAT LAKES WATER LEVELS

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US Army Corps  
of Engineers®



# NOTES ABOUT GREAT LAKES WATER LEVELS

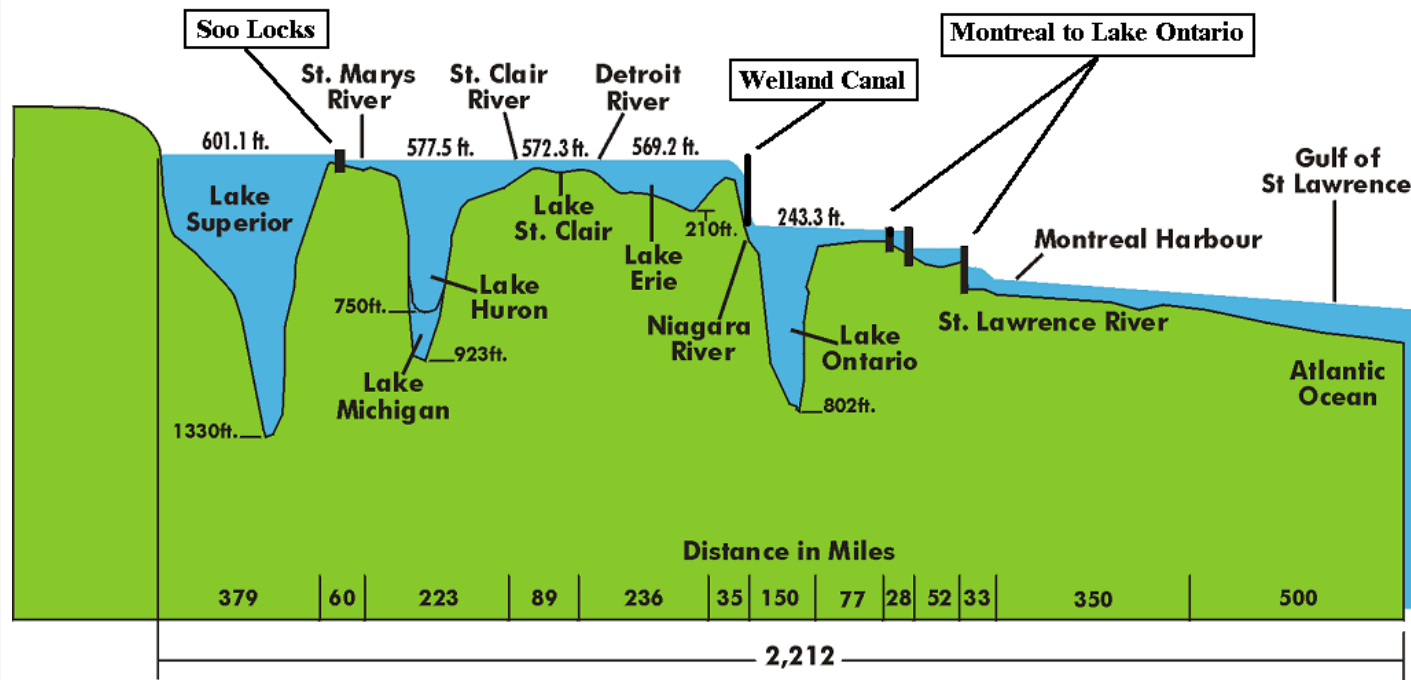


- Not a depth, but an elevation above sea level, IGLD 1985
- Michigan and Huron = One lake
- Lake-wide daily means → Lake-wide monthly means
- Based on still water, not influenced by meteorological forcing
- Based on a network of water level gauges
- Detroit District Corps of Engineers = keeper of official monthly water level statistics from 1918-2018
- Coordination occurs with Environment and Climate Change Canada
- **Primary drivers of water level fluctuations are changing weather patterns and resulting fluctuations in water supply**

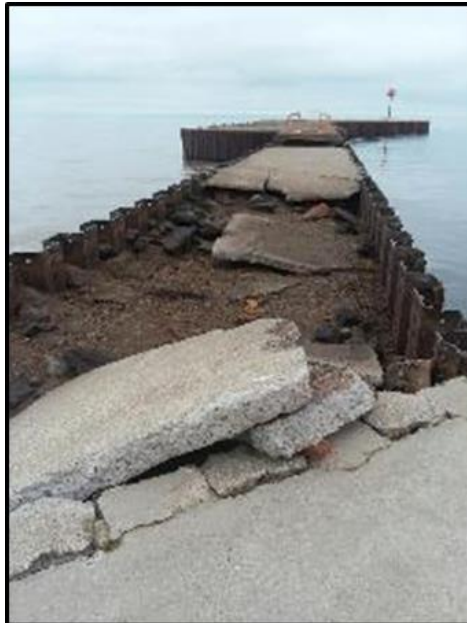
# MONITORING GREAT LAKES WATER LEVELS

## 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



# HIGH WATER PHOTOS FROM ACROSS THE GL



# METEOTSUNAMI AT LUDINGTON



8 foot drop

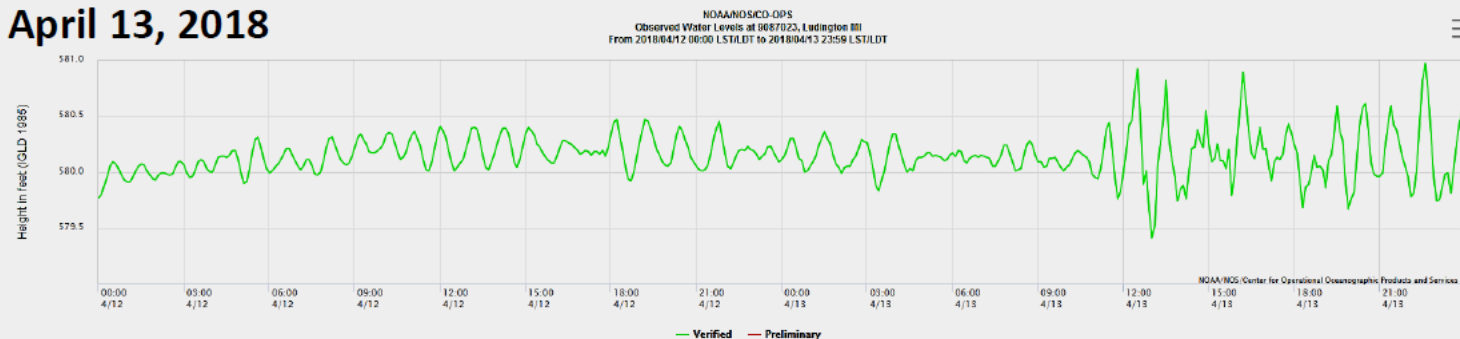


7 foot rise

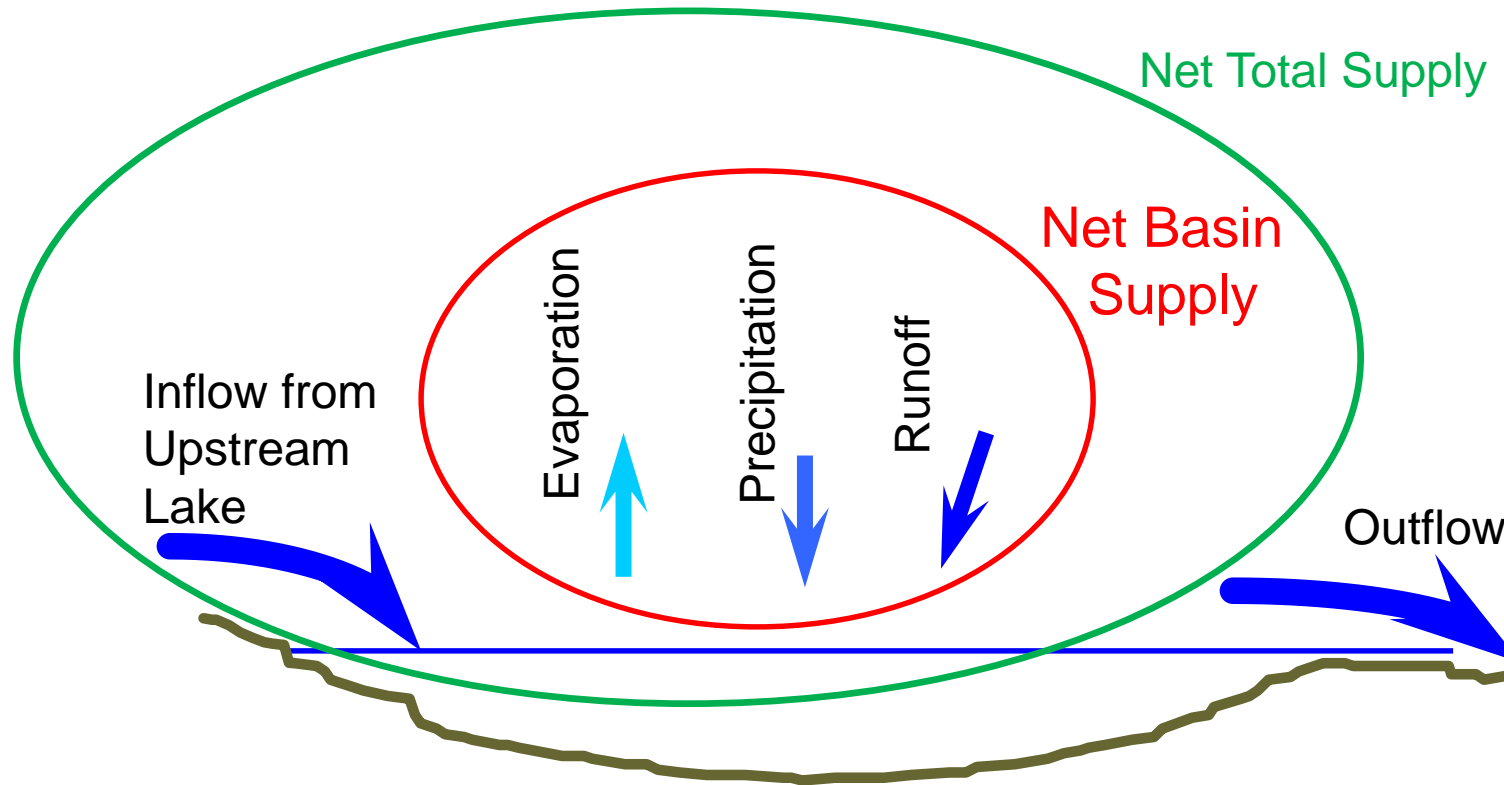


Ludington MI 4/13/18 (Photos: Todd Reed)

April 13, 2018

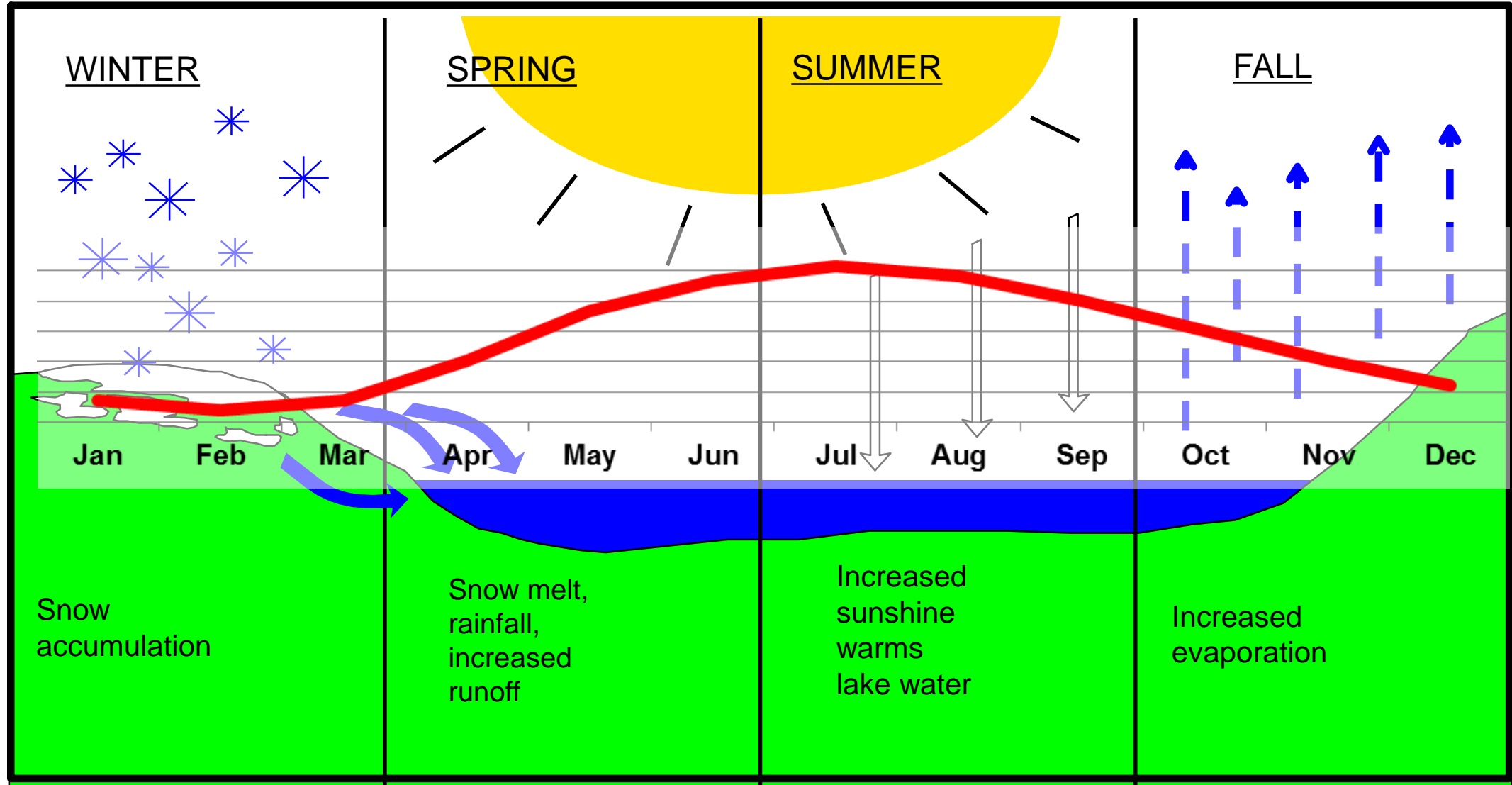


# FACTORS IMPACTING WATER LEVELS





# ANNUAL WATER LEVELS AND THE HYDROLOGIC CYCLE





# CURRENT WATER LEVELS



Date	Superior*	Michigan Huron*	St. Clair*	Erie*	Ontario*
	Daily Mean	Daily Mean	Daily Mean	Daily Mean	Adj. Daily Mean
01-SEP-2019	603.16	581.56	577.10	573.92	247.24
02-SEP-2019	603.20	581.56	577.07	573.90	247.24
03-SEP-2019	603.17	581.60	577.02	573.89	247.22
04-SEP-2019	603.24	581.56	577.04	573.86	247.21
05-SEP-2019	603.18	581.57	577.06	573.87	247.18
06-SEP-2019	603.18	581.53	577.03	573.83	247.15
07-SEP-2019	603.20	581.53	577.00	573.80	247.11
08-SEP-2019	603.18	581.51	577.04	573.84	247.08
09-SEP-2019	603.14	581.49	577.00	573.82	247.02
10-SEP-2019	603.17	581.52	576.94	573.76	246.98
11-SEP-2019	603.23	581.55	576.94	573.76	247.00
12-SEP-2019	603.20	581.54	577.05	573.81	246.95
13-SEP-2019	603.15	581.64	577.00	573.81	246.93
14-SEP-2019	603.28	581.65	576.93	573.80	246.91
15-SEP-2019	603.21	581.64	576.98	573.78	246.86
16-SEP-2019	603.22	581.60	577.00	573.77	246.84
17-SEP-2019	603.21	581.63	577.00	573.78	246.81
18-SEP-2019	603.20	581.61	577.00	573.78	246.77
19-SEP-2019	603.24	581.68	576.98	573.72	246.74
20-SEP-2019	603.24	581.64	576.94	573.68	246.71
21-SEP-2019	603.21	581.62	576.92	573.67	246.69
22-SEP-2019	603.23	581.68	576.86	573.63	246.66
23-SEP-2019	603.28	581.68	576.84	573.56	246.63
24-SEP-2019	603.23	581.69	576.86	573.62	246.62
25-SEP-2019	603.26	581.71	576.77	573.54	246.59
26-SEP-2019	603.28	581.68	576.80	573.53	246.58
27-SEP-2019	603.25	581.69	576.79	573.50	246.55
28-SEP-2019	603.29	581.68	576.88	573.54	246.53
29-SEP-2019	603.26	581.66	576.97	573.62	246.50
30-SEP-2019	603.20	581.66	576.93	573.56	246.44
Mean:	603.22	581.61	576.96	573.73	246.86

September Statistics	Historic Water Levels				
	Superior	Michigan Huron	St. Clair	Erie	Ontario
Avg Last Month	603.21	581.77	577.30	574.21	247.81
Avg Last Year	602.69	580.52	576.18	573.03	245.18
Minimum	600.46 (2007)	576.64 (1964)	571.98 (1934)	568.83 (1934)	242.49 (1934)
Maximum	603.22 (1985)	581.96 (1986)	576.90 (1986)	573.59 (1986)	247.41 (1947)
Long Term Avg**	602.17	579.10	574.48	571.46	245.21

New Record Highs Reached in 2019

May: Superior, St. Clair, Erie

June: Superior, St. Clair, Erie\* and Ontario\*

July: Superior, St. Clair\*, Erie and Ontario

August: Superior (tied), St. Clair and Erie

September: Superior (tied), St. Clair and Erie

\*highest monthly mean on record for all months

Period of Record is 1918-2018



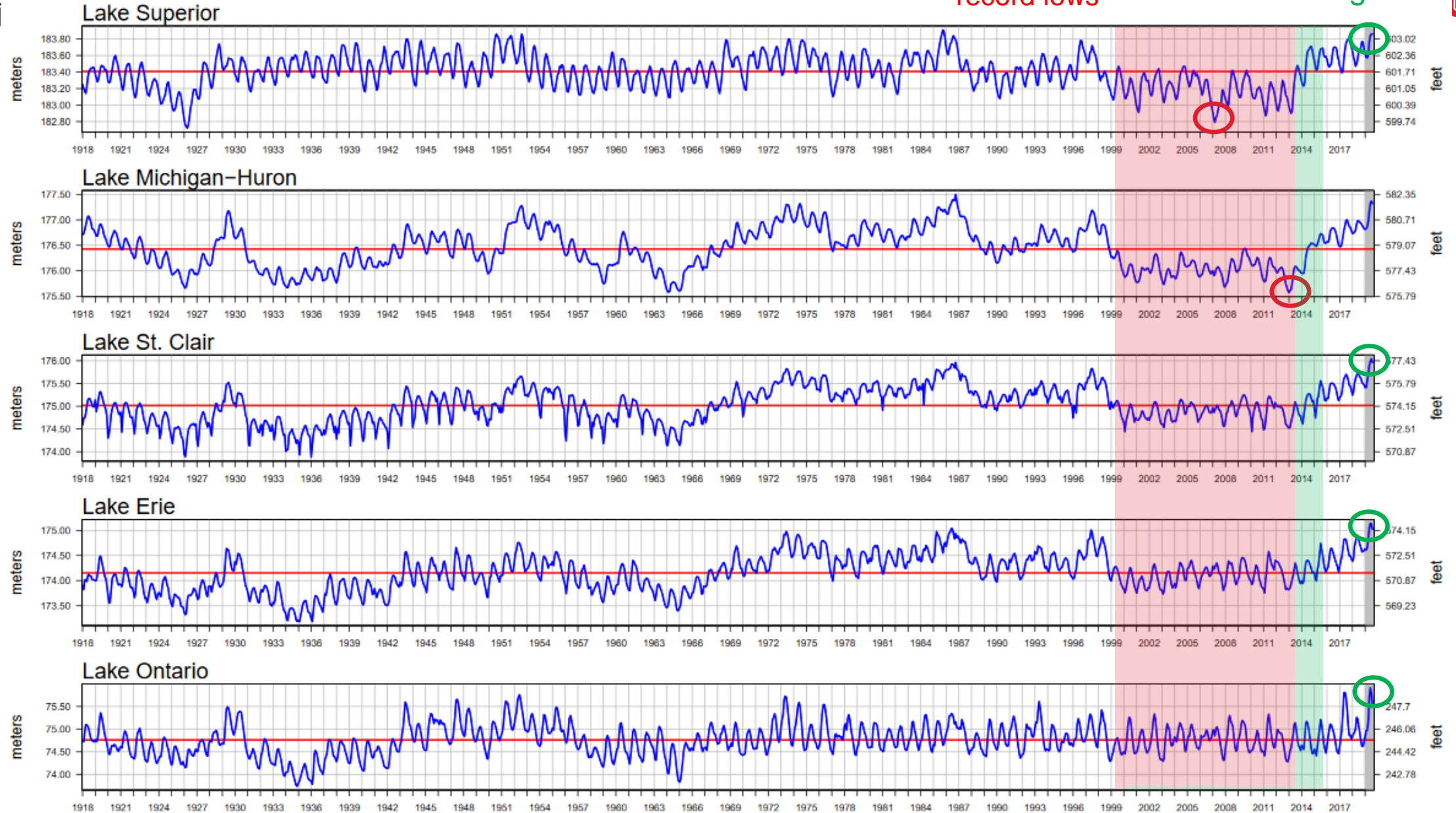
## Great Lakes Water Levels (1918–2019)

— Monthly Mean Level — Long Term Average Annual

Decade plus of  
low water with  
record lows

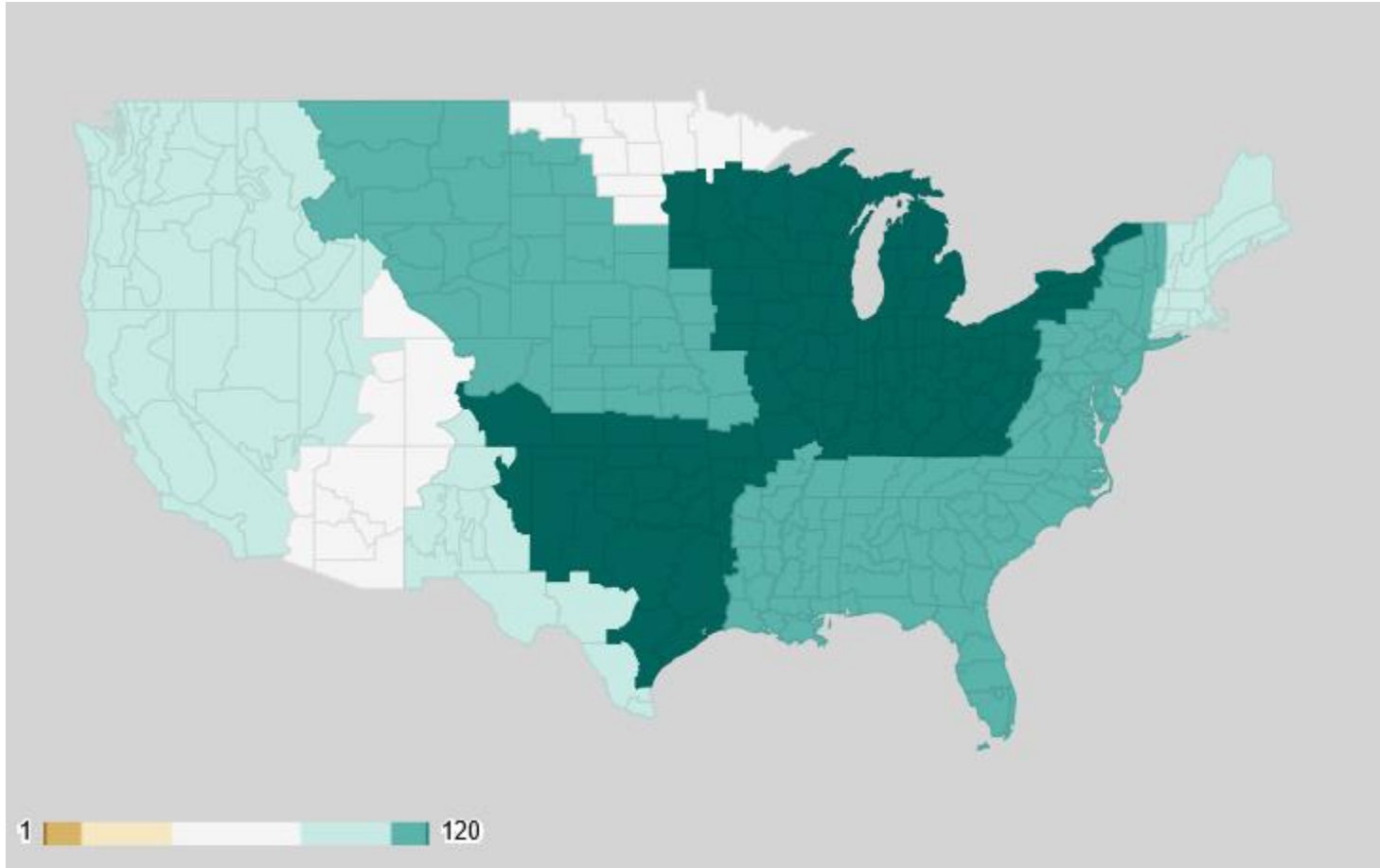
Record rise and  
record highs

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# 60 MONTH PRECIPITATION RANKS

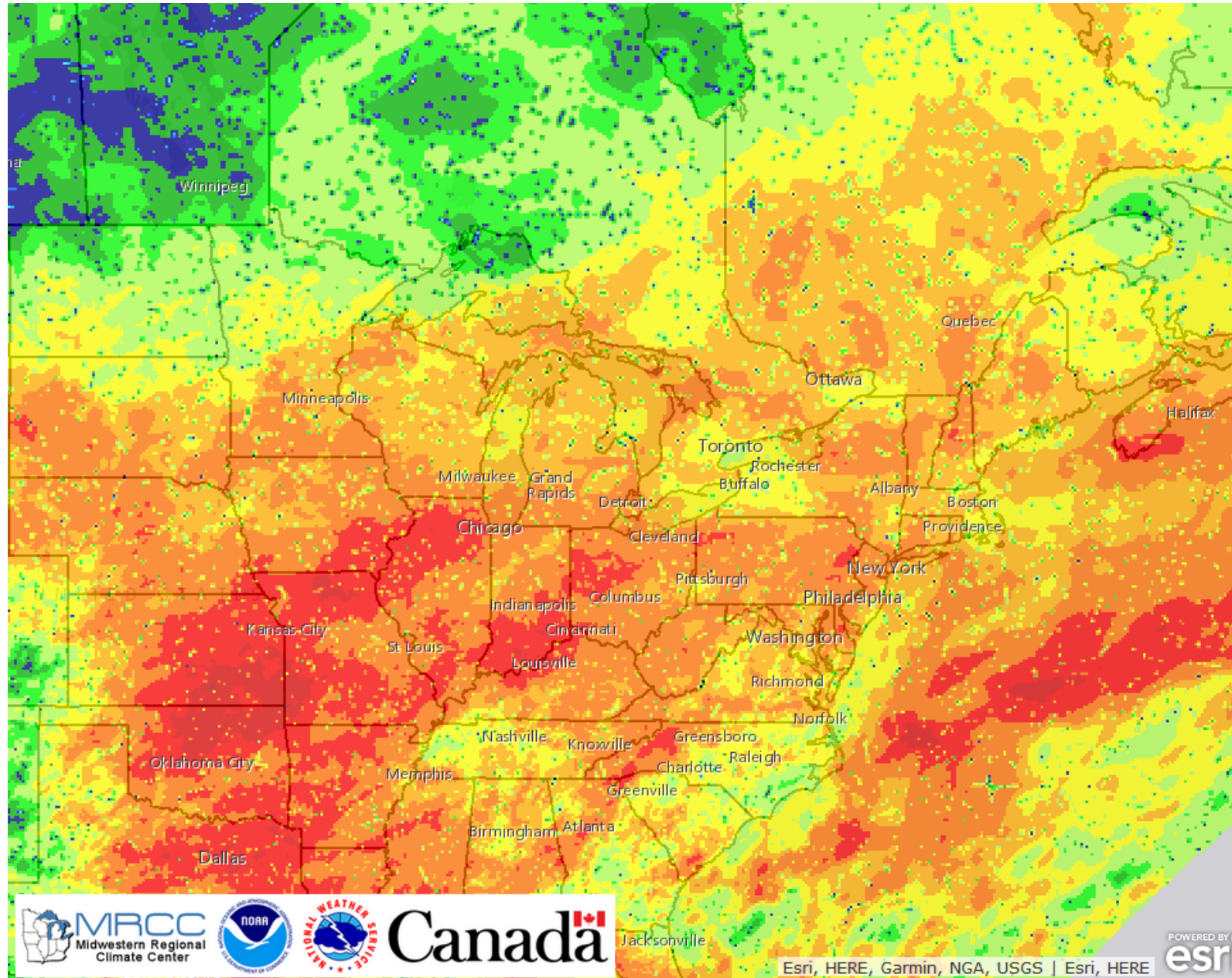


The 60 month period ending 31 AUG was the wettest in 120 years of record for the Great Lakes Basin

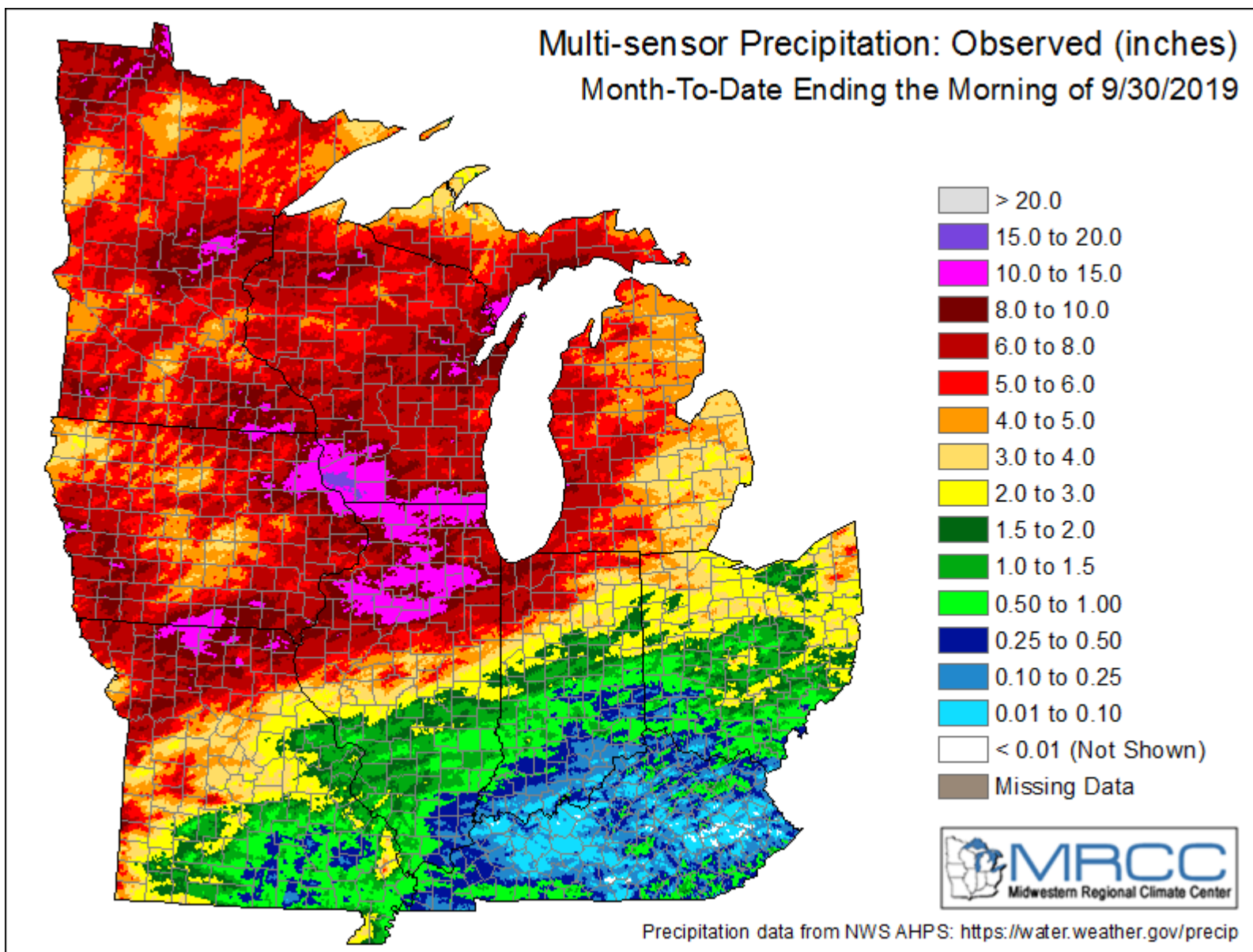
NOAA National Centers for Environmental information, Climate at a Glance: Regional Mapping, published September 2019, retrieved on September 30, 2019 from <https://www.ncdc.noaa.gov/cag/>

REGION	VALUE	RANK (120 YEARS)	1901-2000 MEAN	ANOMALY
Great Lakes Basin	189.23"	120	163.86"	25.37"

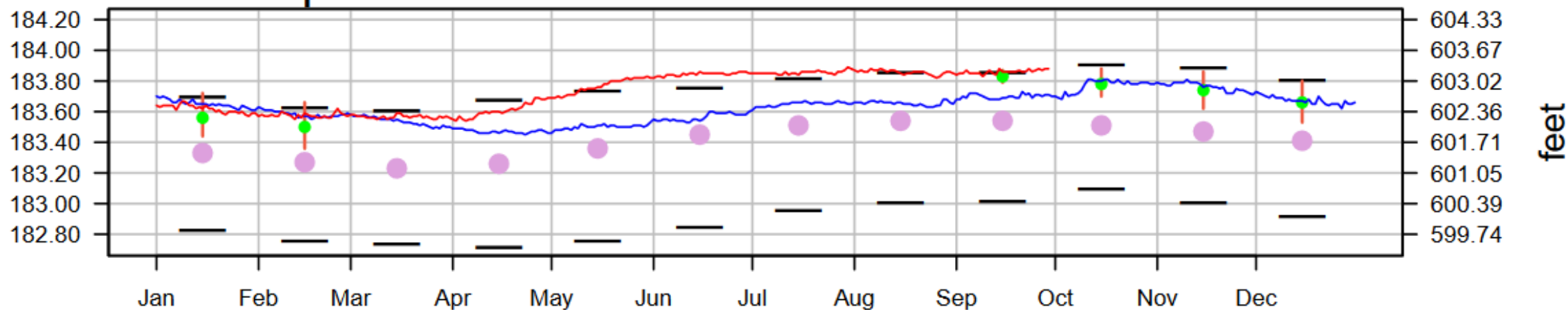
# 60 DAY PRECIP TOTALS ENDING JUNE 19



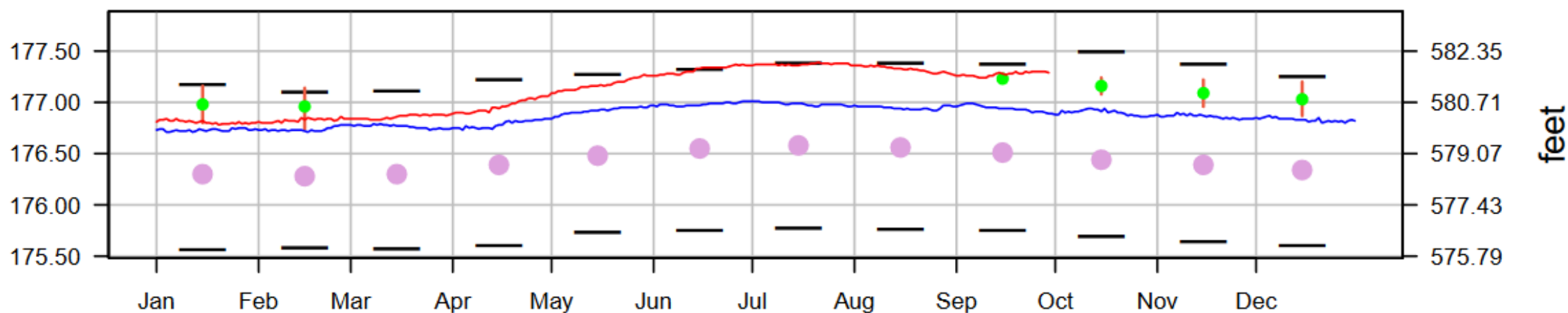
# SEPTEMBER PRECIPITATION



## Lake Superior

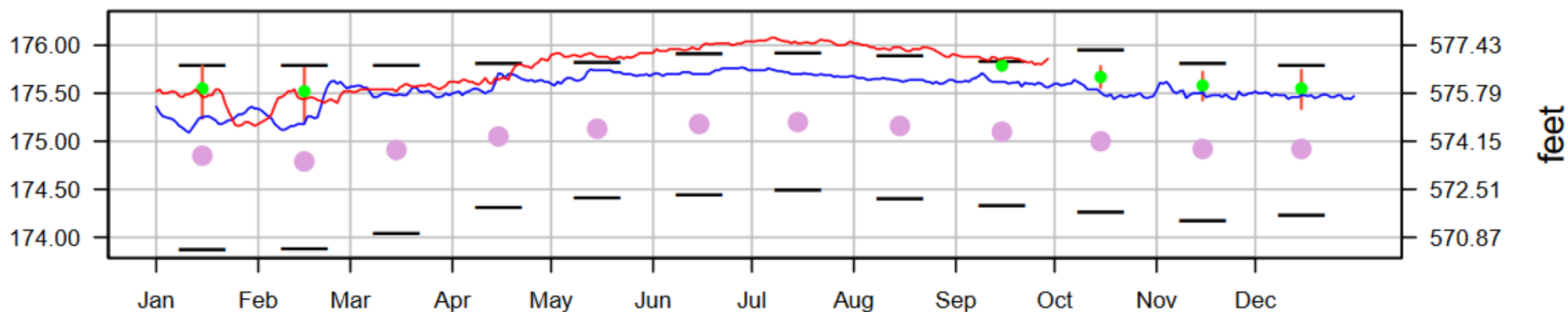


## Lake Mich-Huron

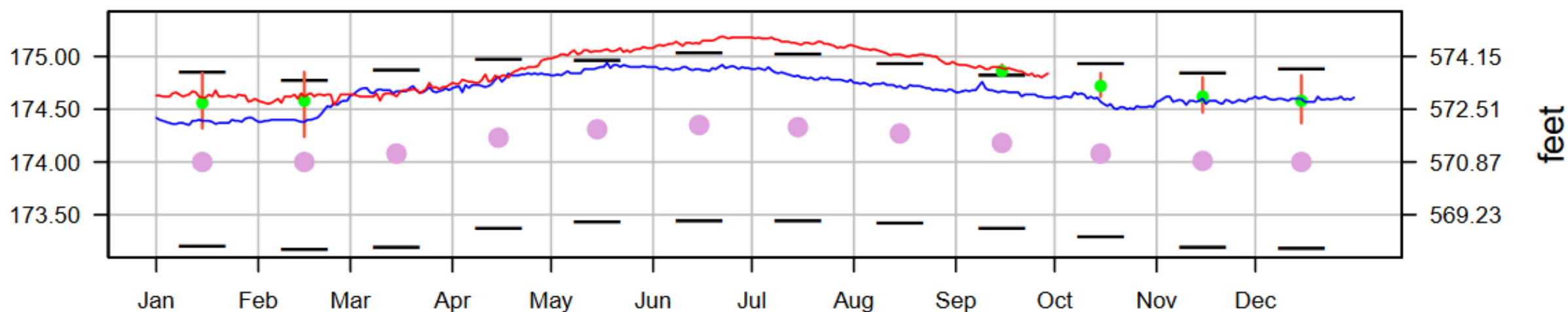




## Lake St. Clair



## Lake Erie



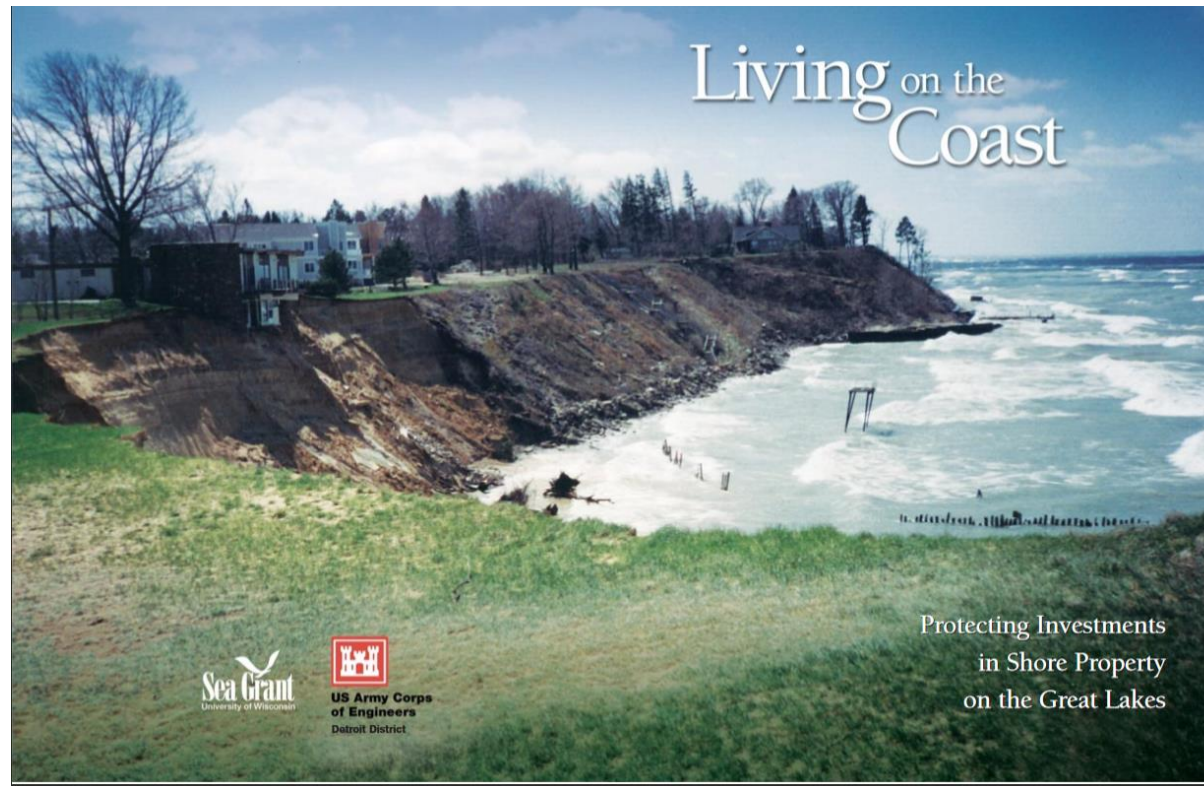


# LIVING ON THE COAST

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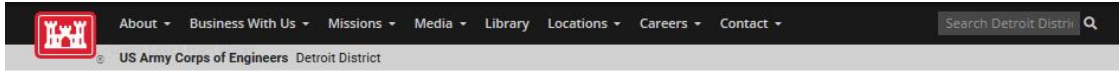
<https://www.lre.usace.army.mil/Portals/69/docs/GreatLakesInfo/docs/CoastalProgram/Living%20on%20the%20Coast%20Booklet.pdf?ver=2016-06-06-105107-683>





HTTPS://WWW.LRE.USACE.ARMY.MIL/ABOUT/GREAT-LAKES-HIGH-WATER/

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## Great Lakes High Water

Multiple record high levels were set on the Great Lakes in 2019 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 activated 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 flood plain management planning. The Great Lakes Hydraulics and Hydrology Office forecasts and monitors water levels of the Great Lakes and the conditions that lead to water level fluctuations.



## 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?



- [Emergency Management Office](#)
- [Hydraulics and Hydrology Office](#)
- [Outreach Office](#)
- [Regulatory Office](#)
- [Public Affairs Office](#)

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