

GREAT LAKES WATER LEVELS

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Michigan High Water Coordination Summit



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 1918-2019 and provides the official forecast of lake-wide mean water levels
- Coordination occurs with Environment and Climate Change Canada
- **Primary drivers of water level fluctuations are changing weather patterns and resulting fluctuations in water supply**

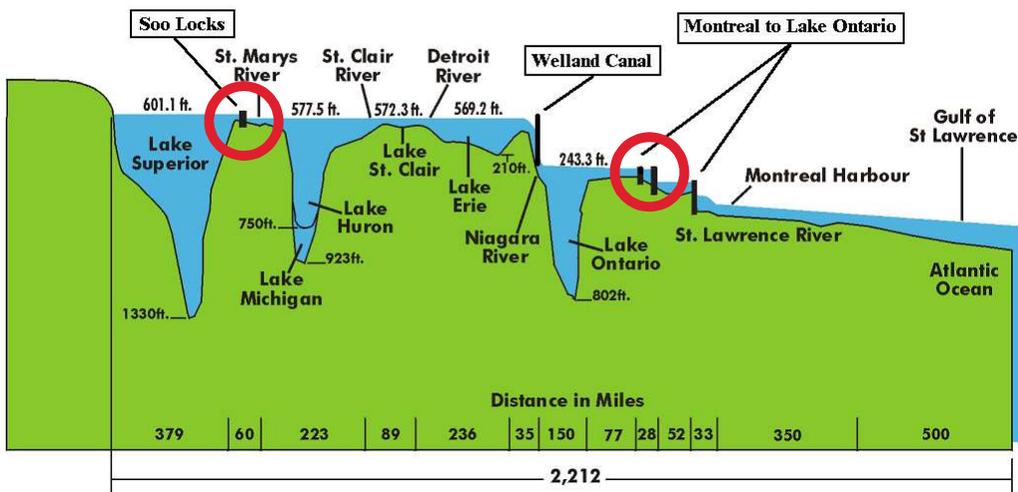


MONITORING GREAT LAKES WATER LEVELS



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

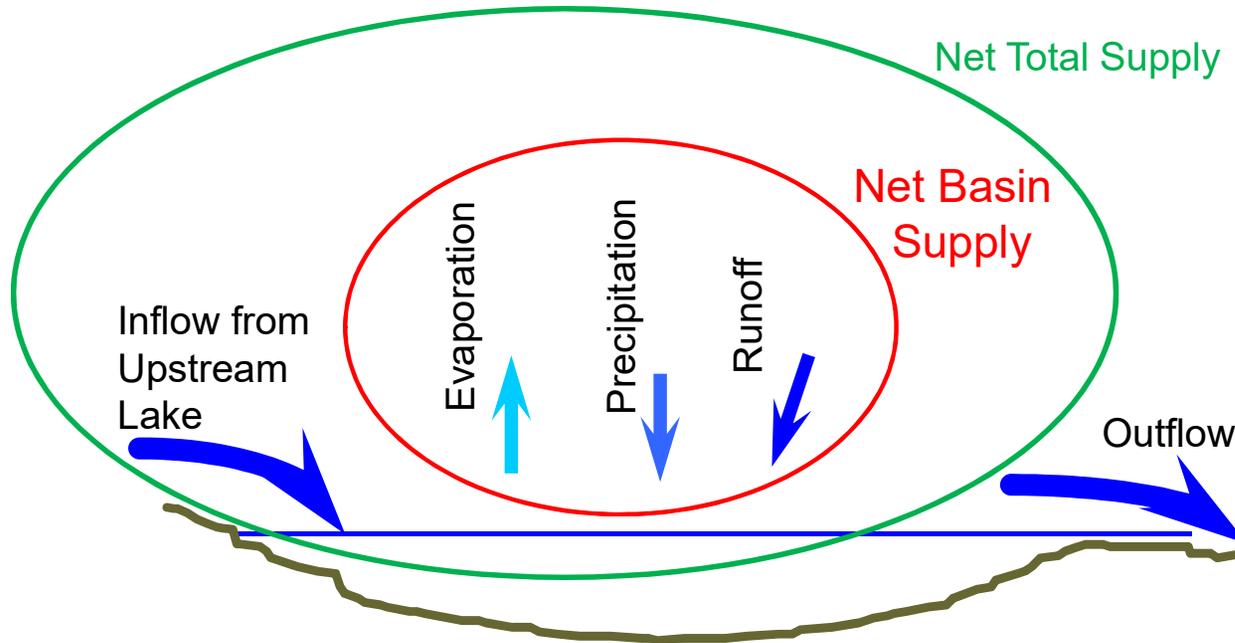


 Outflow regulation

 Diversions

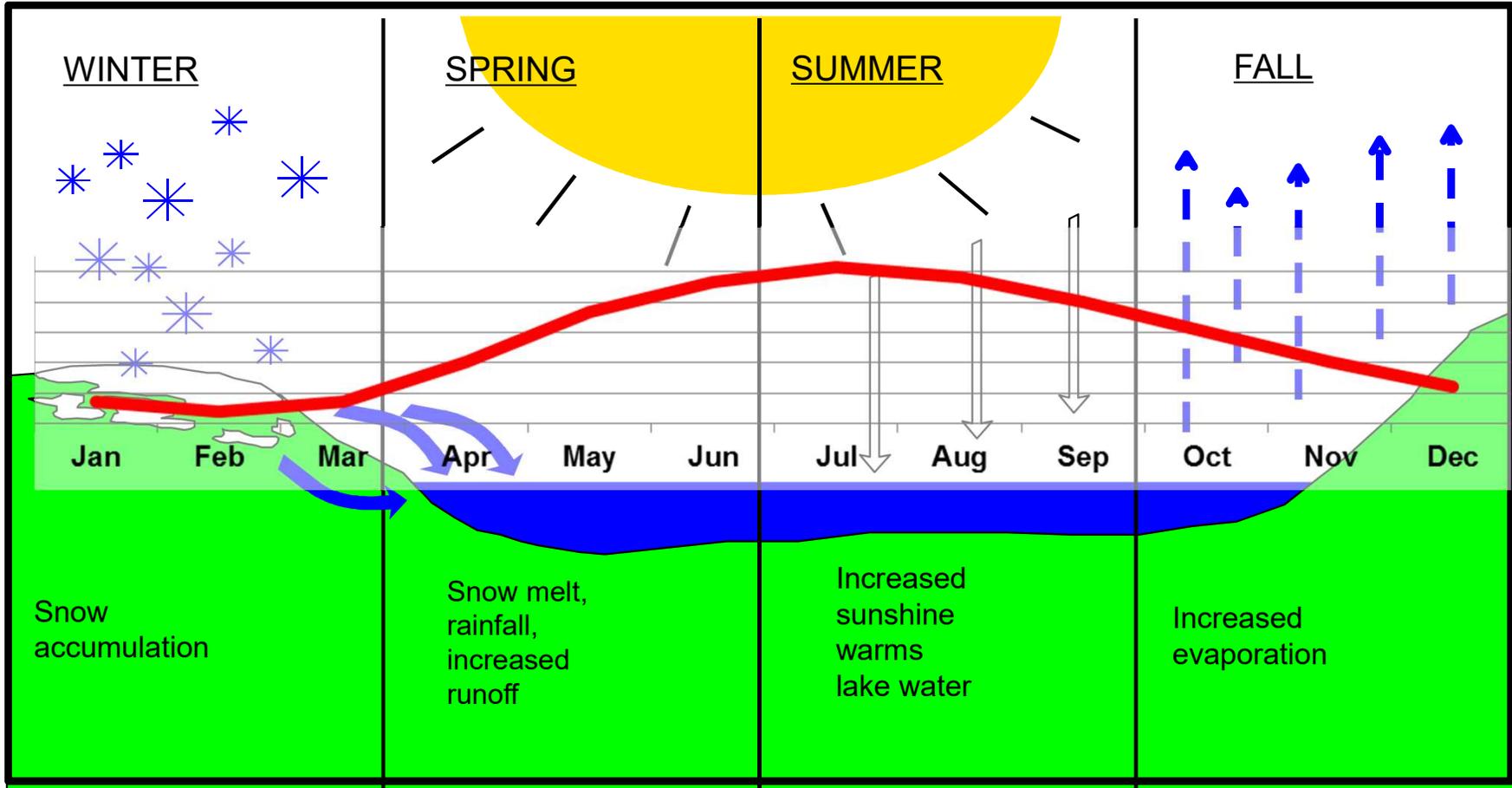


FACTORS IMPACTING WATER LEVELS





ANNUAL WATER LEVELS AND THE HYDROLOGIC CYCLE





NEW RECORDS IN 2019 - 2020



LAKE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SUP	1986	1986	1986	1986	2019	2019	2019	2019	2019	1985	1985	1985
M-H	1987	1986	1986	1986	1986	1986	1986	1986	1986	1986	1986	1986
STC	1986	1986	1986	1986	2019	2019	2019	2019	2019	1986	1986	1986
ERI	1987	1987	1986	1985	2019	2019	2019	2019	2019	1986	1986	1986
ONT	1946	1952	1952	1973	2017	2019	2019	1947	1947	1945	1945	1945

LAKE	Peak Level (ft)	Ranking
Superior	603.28	3rd highest
Mich-Huron	581.92	6th highest
St. Clair	577.56	Highest
Erie	574.61	Highest
Ontario	249.05	Highest

New monthly record high reached in Jan on Superior and Michigan-Huron.

January record high tied on Lake St. Clair

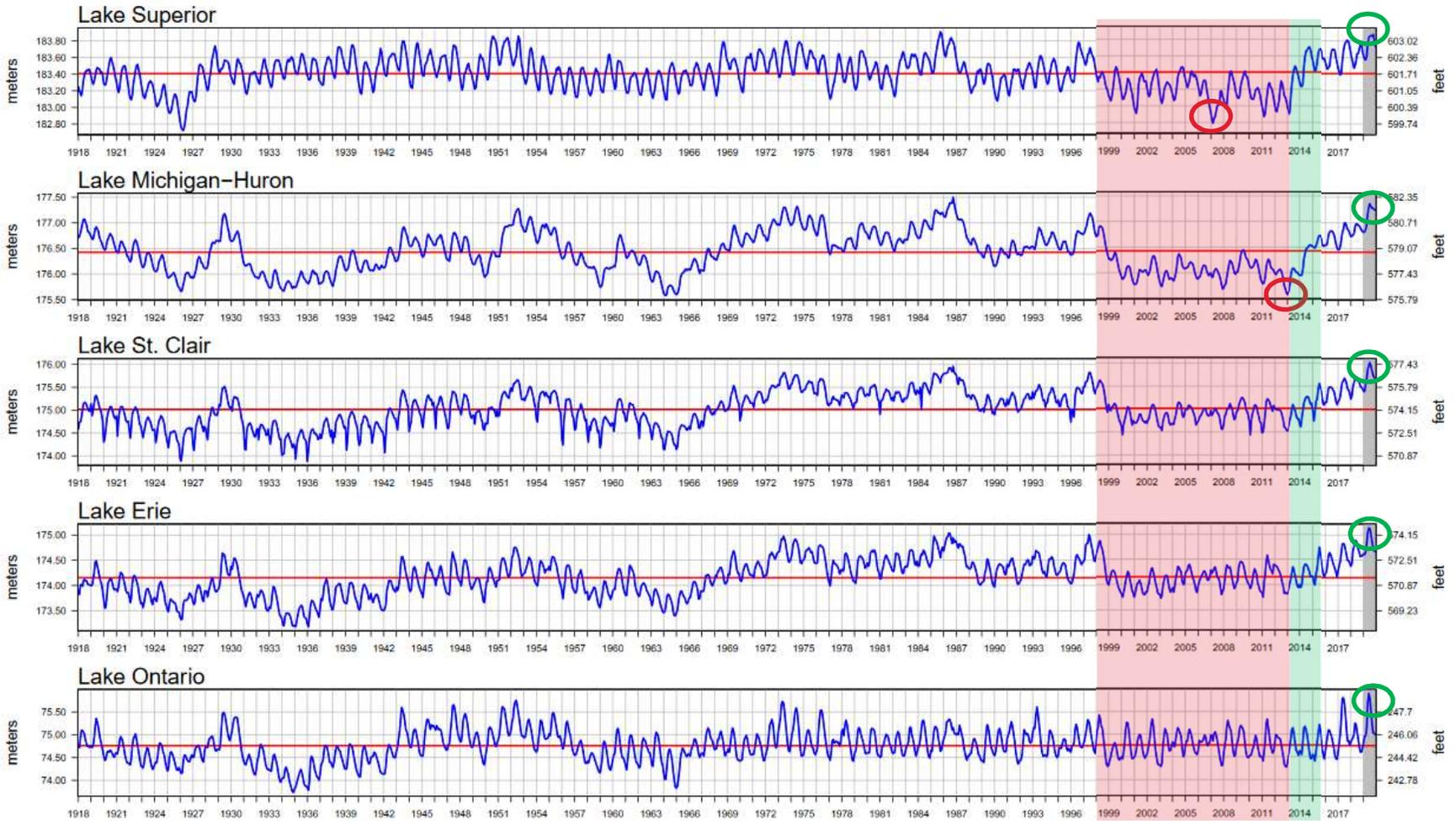


Great Lakes Water Levels (1918–2020)

— Monthly Mean Level — Long Term Average Annual

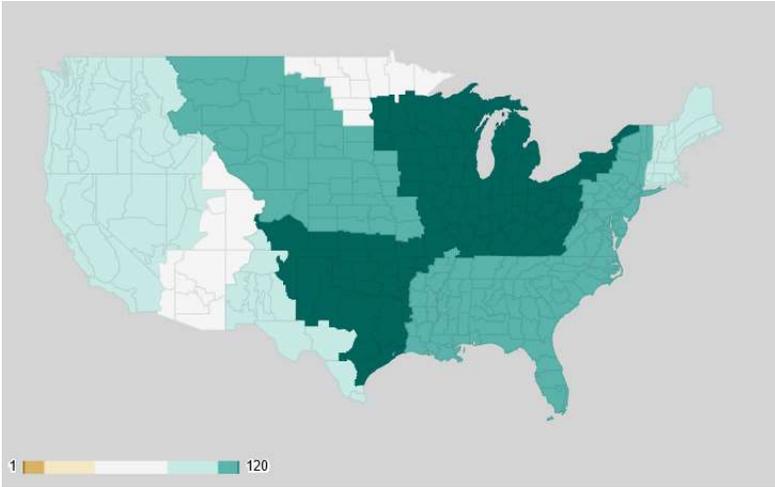
Decade plus of
low water with
record lows

Record rise and
record highs





5 YEAR PRECIP – WHY ARE LEVELS SO HIGH?



Wettest 12 – 60 month periods in 120 plus years for the Great Lakes

NOAA National Centers for Environmental information, Climate at a Glance

PERIOD	VALUE	1901-2000 MEAN	ANOMALY	RANK (1895-2020)	WETTEST/DRIEST SINCE	RECORD
Feb 2019–Jan 2020 12-Month	42.75" (1,085.85mm)	32.77" (832.36mm)	9.98" (253.49mm)	125th Driest	Driest since: 2019	1931
					1st Wettest	Wettest to Date
Aug 2018–Jan 2020 18-Month	63.66" (1,616.96mm)	48.89" (1,241.81mm)	14.77" (375.15mm)	124th Driest	Driest since: 2019	1931
					1st Wettest	Wettest to Date
Feb 2018–Jan 2020 24-Month	81.78" (2,077.21mm)	65.53" (1,664.46mm)	16.25" (412.75mm)	124th Driest	Driest since: 2019	1964
					1st Wettest	Wettest to Date
Feb 2017–Jan 2020 36-Month	121.84" (3,094.74mm)	98.30" (2,496.82mm)	23.54" (597.92mm)	123rd Driest	Driest since: 2019	1965
					1st Wettest	Wettest to Date
Feb 2016–Jan 2020 48-Month	159.08" (4,040.63mm)	131.07" (3,329.18mm)	28.01" (711.45mm)	122nd Driest	Driest since: 2019	1964
					1st Wettest	Wettest to Date
Feb 2015–Jan 2020 60-Month	193.85" (4,923.79mm)	163.82" (4,161.03mm)	30.03" (762.76mm)	121st Driest	Driest since: 2019	1935
					1st Wettest	Wettest to Date



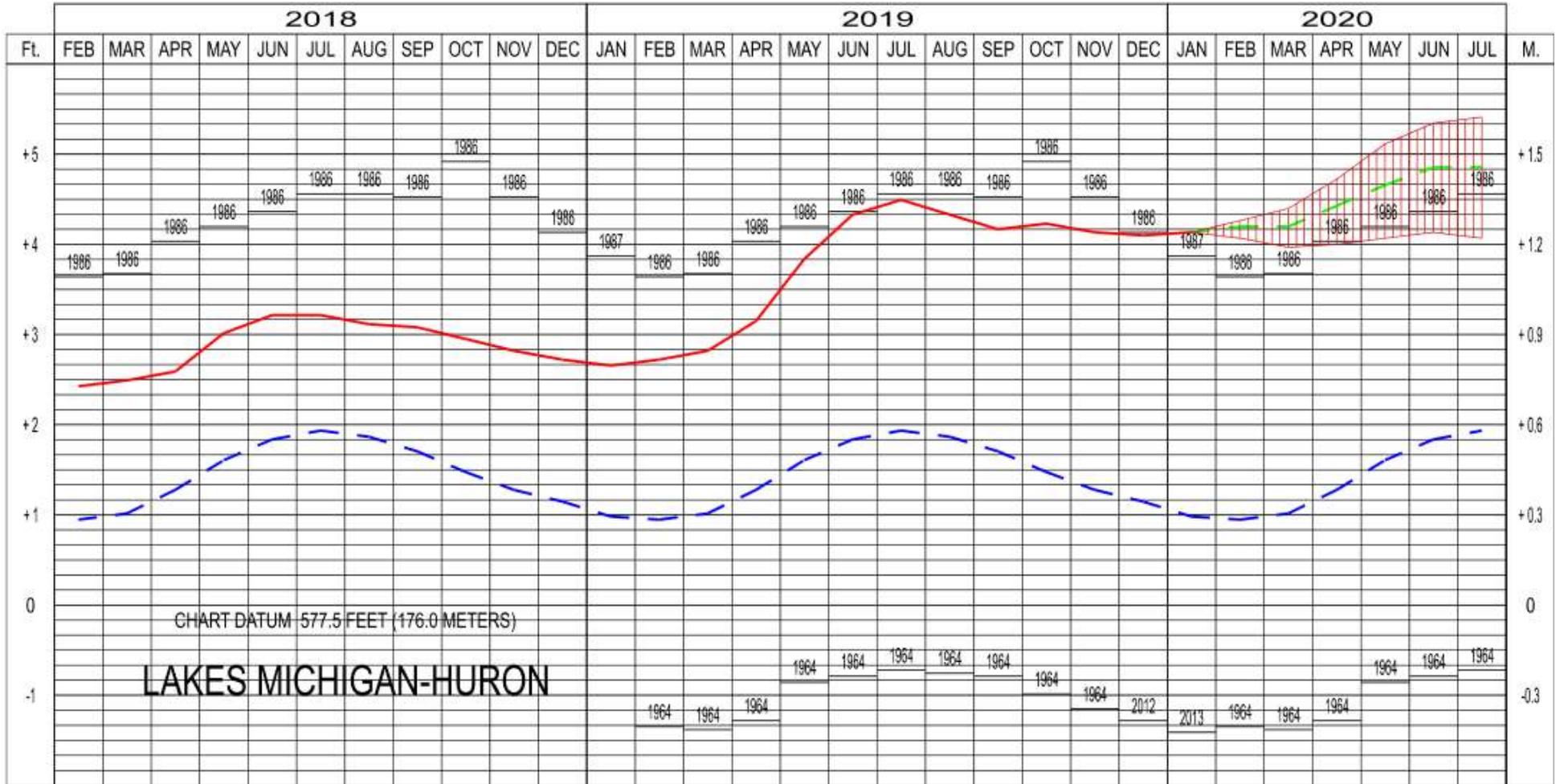
CURRENT WATER LEVELS



	SUPERIOR	MICH-HURON	ST. CLAIR	ERIE	ONTARIO
Forecasted Water Level for Feb 7, 2020 (feet)	602.56	581.59	577.00	573.92	246.49
Chart Datum (feet)	601.10	577.50	572.30	569.20	243.30
Difference from chart datum (inches)	+18	+49	+56	+57	+38
Difference from average water level for Jan 7, 2020 (inches*)	-3	+1	+7	+9	+6
Difference from average water level for Feb 7, 2019 (inches*)	+3	+18	+17	+14	+7
Differences from Long-Term Monthly Averages					
Difference from long-term monthly average of Feb (inches)	+15	+39	+43	+37	+20
Difference from highest monthly average of record for Feb (inches)	+1	+6	+3	+6	-6
Year of highest recorded monthly mean	1986	1986	1986	1987	1952
Difference from lowest monthly average of record for Feb (inches)	+35	+66	+78	+69	+53
Year of lowest recorded monthly mean	1926	1964	1926	1936	1936



LAKES MICHIGAN-HURON WATER LEVELS - FEBRUARY 2020





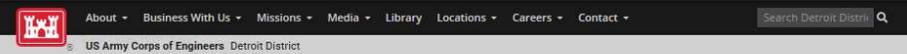
TAKE AWAYS



- Water levels on all the Great Lakes started 2020 higher than 2019.
- Higher peak water levels possible in 2020, especially on Lake Michigan-Huron.
- 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 across well into 2020...this will be a long duration event.



[HTTPS://WWW.LRE.USACE.ARMY.MIL/ABOUT/GREAT-LAKES-HIGH-WATER/](https://www.lre.usace.army.mil/about/great-lakes-high-water/)



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](#)

Water level contacts

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