

# 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 1918-2019
- Coordination occurs with Environment and Climate Change Canada
- **Primary drivers of water level fluctuations are changing weather patterns and resulting fluctuations in water supply**

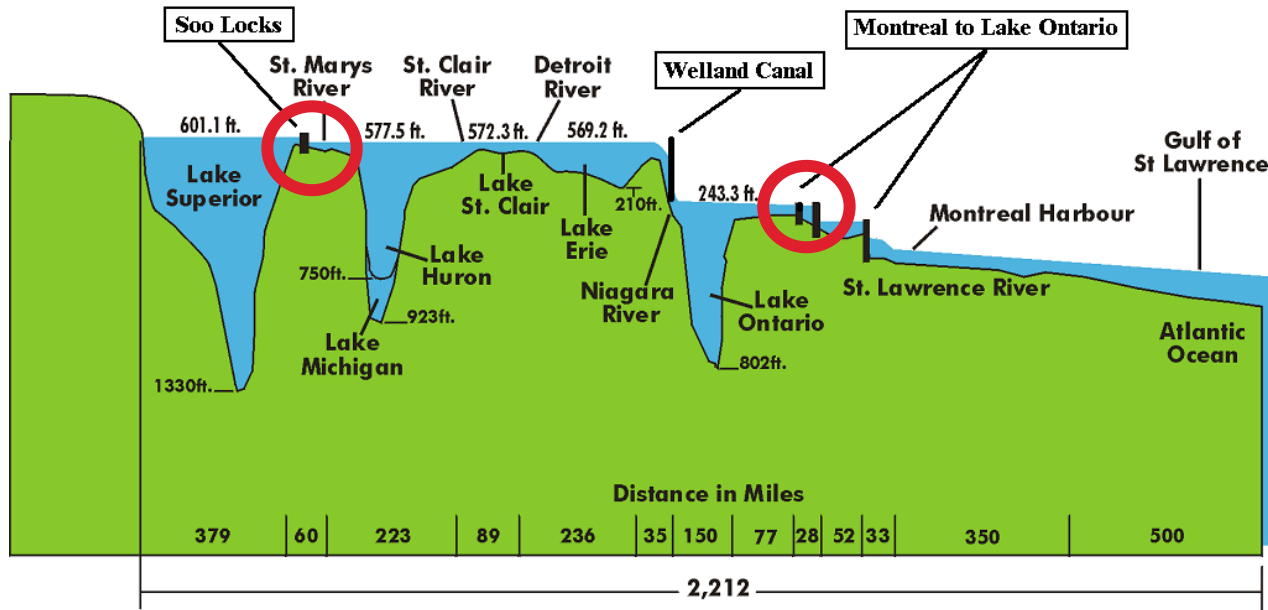


# MONITORING GREAT LAKES WATER LEVELS



## 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



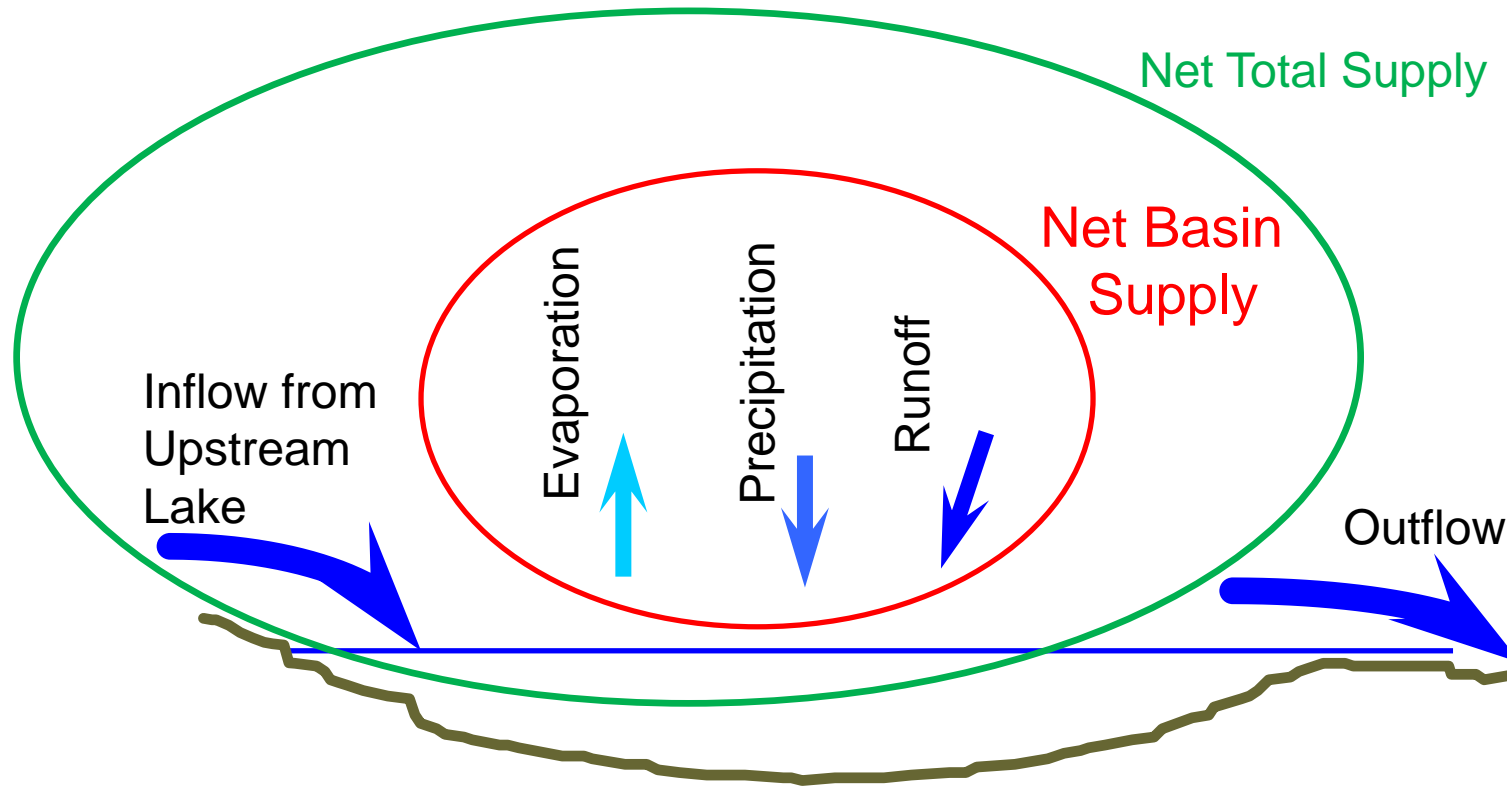
Outflow regulation

Diversions



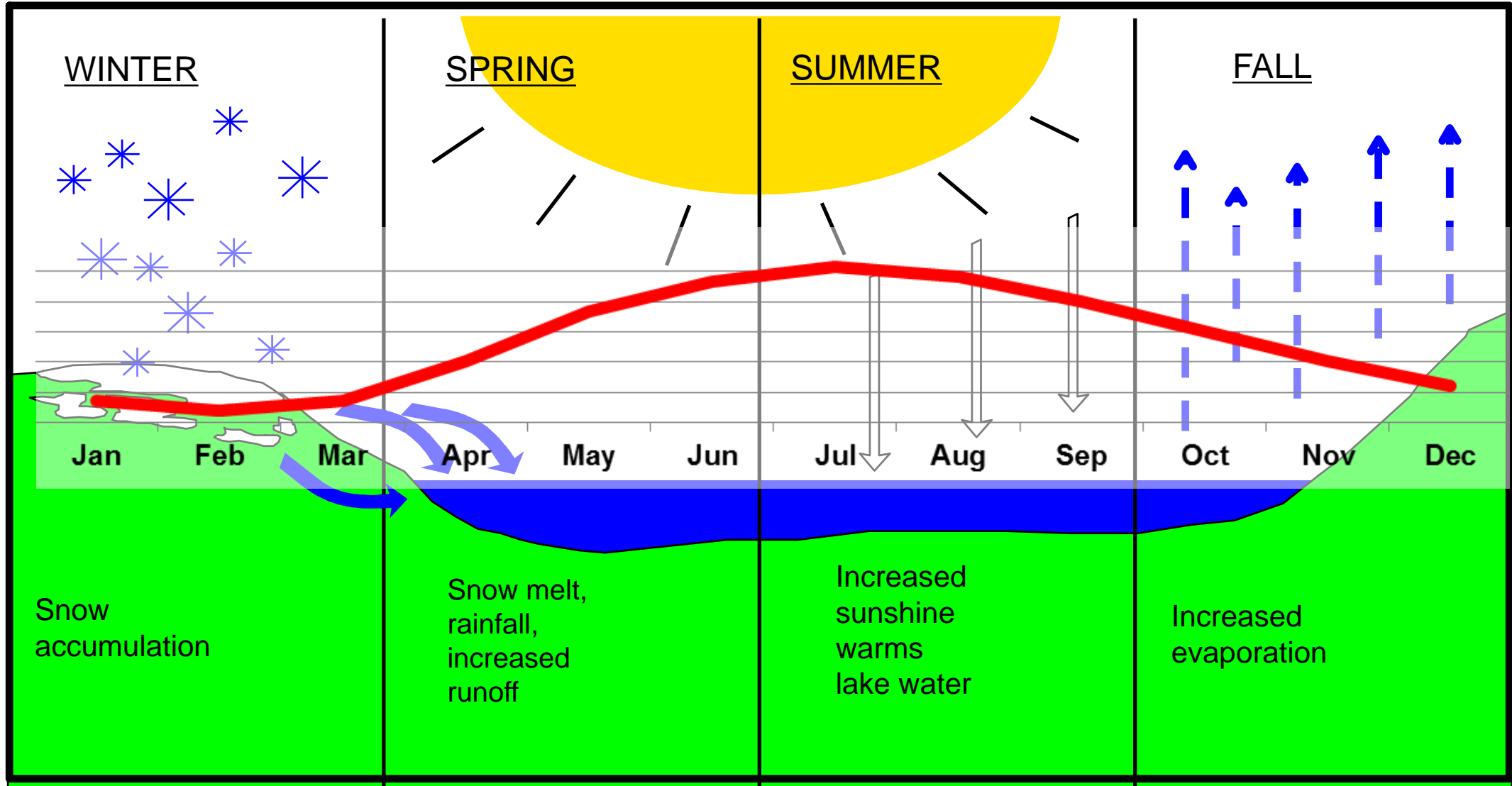


# FACTORS IMPACTING WATER LEVELS





# ANNUAL WATER LEVELS AND THE HYDROLOGIC CYCLE



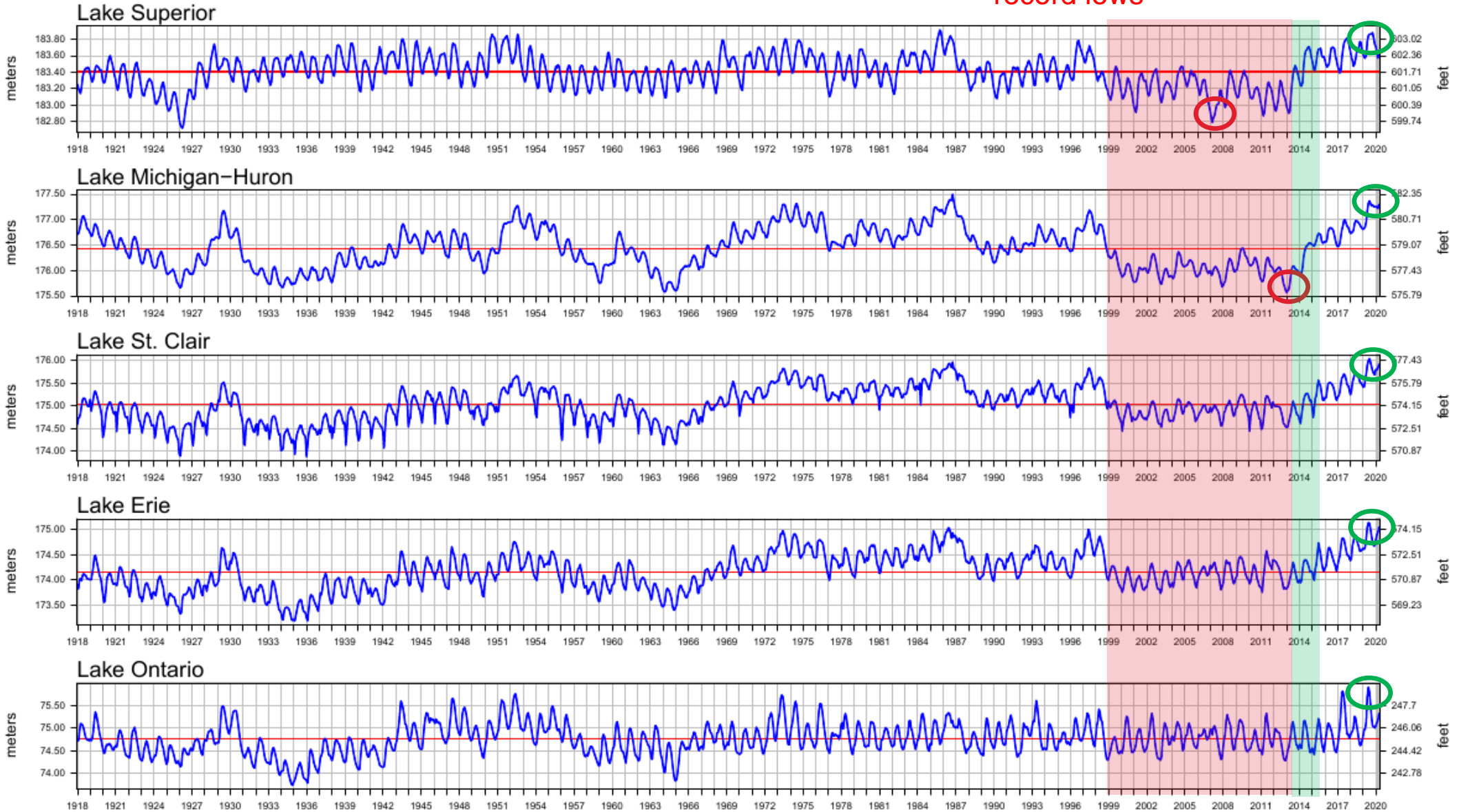


# Great Lakes Water Levels (1918–2020)

— Monthly Mean Level    — Long Term Average Annual

Decade plus of low water with record lows

Record rise and record highs



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

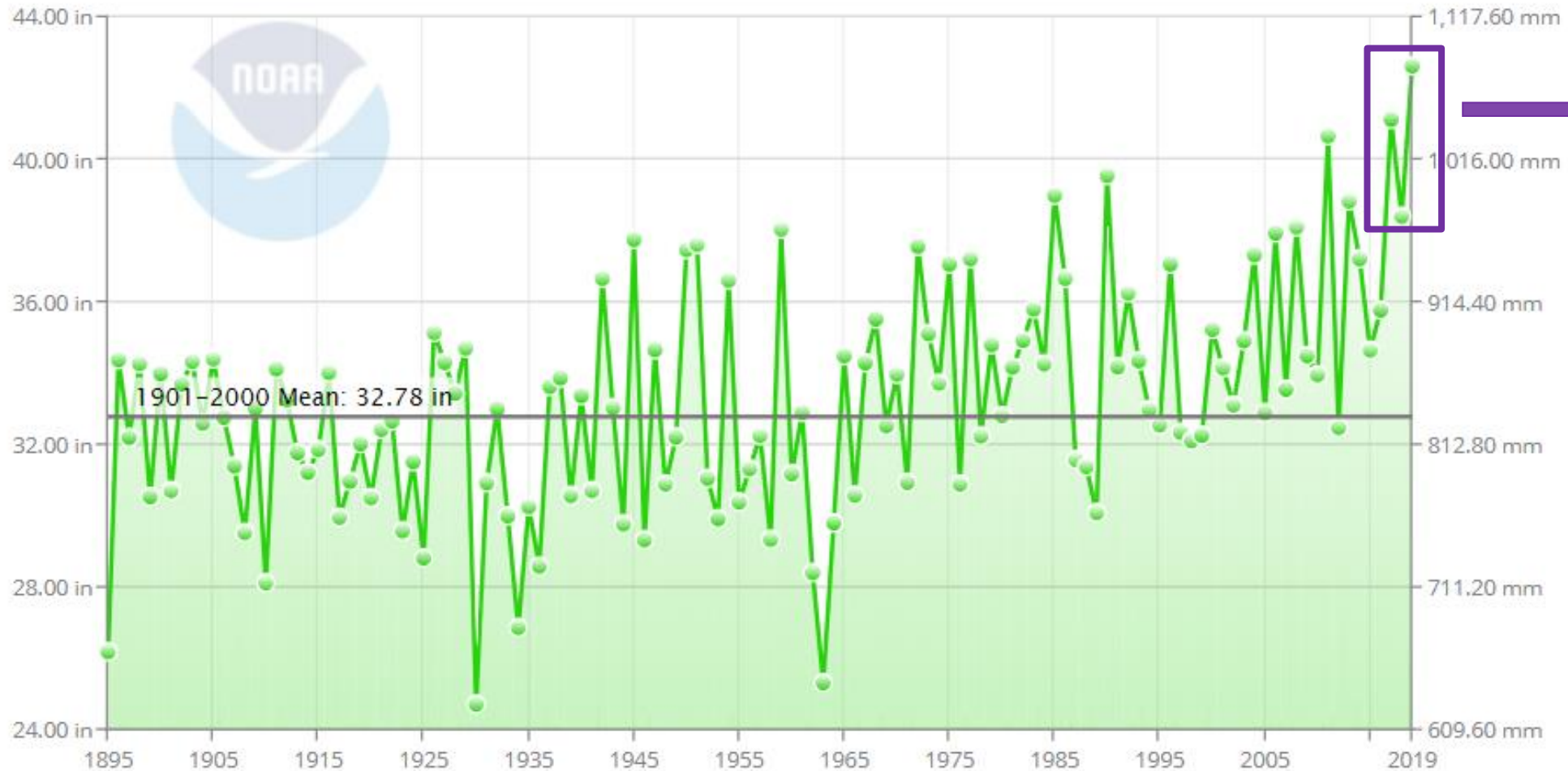
- Jan: Superior, Michigan-Huron, St. Clair (tied)
- Feb: Superior, Michigan-Huron, Erie
- Mar: Michigan-Huron, St. Clair, Erie
- Apr: Michigan-Huron, St. Clair, Erie
- May: Michigan-Huron, St. Clair, Erie



# WHY ARE LEVELS SO HIGH? – WET PATTERN



Great Lakes Basin Precipitation  
January–December



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





# CURRENT WATER LEVELS



Date	Superior*	Michigan Huron*	St. Clair*	Erie*	Ontario*
	Daily Mean	Daily Mean	Daily Mean	Daily Mean	Adj. Daily Mean
01-MAY-2020	602.44	581.89	577.18	574.35	247.31
02-MAY-2020	602.42	581.88	577.16	574.33	247.32
03-MAY-2020	602.49	581.88	577.20	574.33	247.34
04-MAY-2020	602.52	581.87	577.24	574.34	247.34
05-MAY-2020	602.48	581.86	577.28	574.38	247.36
06-MAY-2020	602.49	581.86	577.26	574.26	247.34
07-MAY-2020	602.51	581.85	577.22	574.22	247.33
08-MAY-2020	602.51	581.83	577.32	574.30	247.32
09-MAY-2020	602.50	581.84	577.18	574.17	247.30
10-MAY-2020	602.50	581.84	577.12	574.17	247.28
11-MAY-2020	602.48	581.81	577.22	574.19	247.27
12-MAY-2020	602.48	581.82	577.16	574.21	247.27
13-MAY-2020	602.45	581.82	577.18	574.25	247.26
14-MAY-2020	602.45	581.80	577.18	574.22	247.24
15-MAY-2020	602.51	581.85	577.21	574.27	247.25
16-MAY-2020	602.51	581.86	577.29	574.33	247.24
17-MAY-2020	602.51	581.87	577.35	574.40	247.23
18-MAY-2020	602.52	581.94	577.55	574.52	247.24
19-MAY-2020	602.51	581.99	577.69	574.53	247.22
20-MAY-2020	602.49	582.02	577.68	574.48	247.21
21-MAY-2020	602.49	582.02	577.64	574.50	247.20
22-MAY-2020	602.50	582.04	577.58	574.52	247.19
23-MAY-2020	602.49	582.05	577.54	574.57	247.18
24-MAY-2020	602.49	582.03	577.48	574.56	247.18
25-MAY-2020	602.49	582.06	577.46	574.56	247.19
26-MAY-2020	602.50	582.06	577.44	574.56	247.20
27-MAY-2020	602.55	582.08	577.42	574.56	247.18
28-MAY-2020	602.57	582.09	577.40	574.54	247.17
29-MAY-2020	602.60	582.12	577.42	574.57	247.19
30-MAY-2020	602.62	582.13	577.44	574.59	247.20
31-MAY-2020	602.59	582.14	577.46	574.59	247.18
Mean:	602.51	581.94	577.35	574.40	247.25
May Historic Water Levels					
June Statistics	Superior	Michigan Huron	St. Clair	Erie	Ontario
Avg Last Month	602.41	581.68	577.14	574.33	247.10
Avg Last Year	602.90	581.28	577.07	574.30	248.35
Minimum	599.61 (1926)	576.57 (1964)	572.24 (1934)	569.03 (1934)	243.14 (1935)
Maximum	602.92 (2019)	581.63 (1986)	577.07 (2019)	574.31 (2019)	248.69 (2017)
Long Term Avg**	601.61	579.04	574.61	571.92	246.16

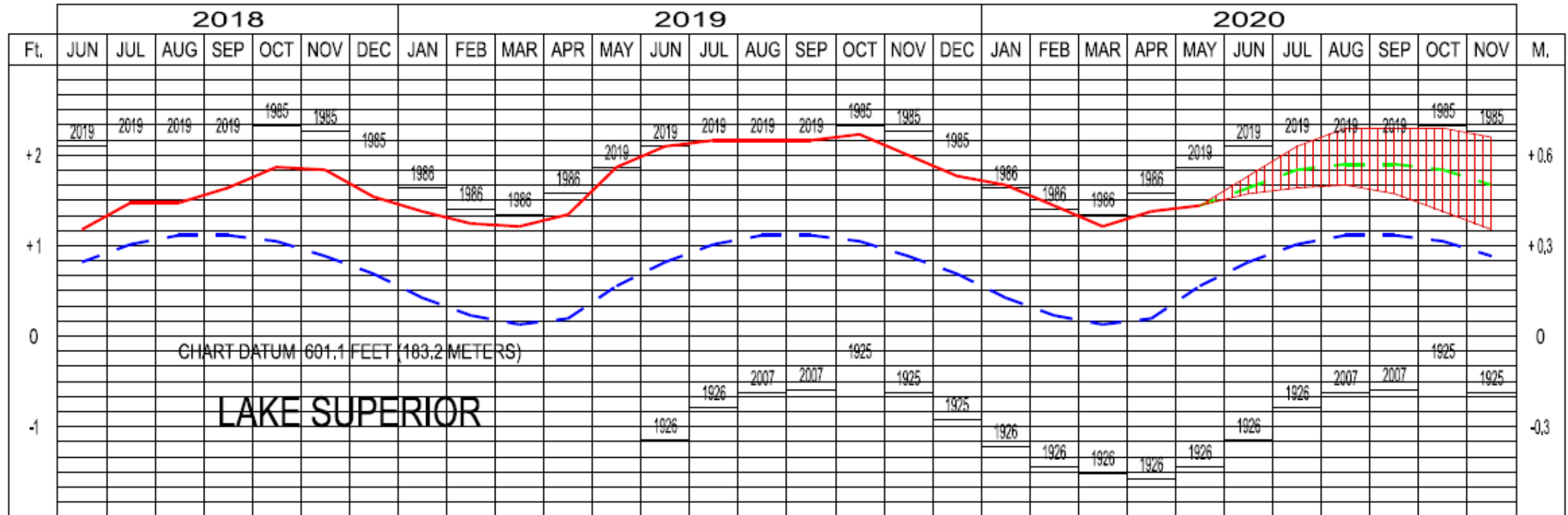
Date	Superior*	Michigan Huron*	St. Clair*	Erie*	Ontario*
	Daily Mean	Daily Mean	Daily Mean	Daily Mean	Adj. Daily Mean
01-JUN-2020	602.58	582.14	577.41	574.54	247.18
02-JUN-2020					
Mean:	602.58	582.14	577.41	574.54	247.18
June Historic Water Levels					
June Statistics	Superior	Michigan Huron	St. Clair	Erie	Ontario
Avg Last Month	602.51	581.94	577.35	574.40	247.25
Avg Last Year	603.16	581.75	577.38	574.62	249.04
Minimum	599.90 (1926)	576.64 (1964)	572.34 (1934)	569.06 (1934)	243.41 (1935)
Maximum	603.15 (2019)	581.79 (1986)	577.40 (2019)	574.61 (2019)	249.05 (2019)
Long Term Avg**	601.87	579.27	574.77	572.01	246.26



# 6-MONTH FORECAST (JUNE-NOVEMBER)



## LAKE SUPERIOR WATER LEVELS - JUNE 2020

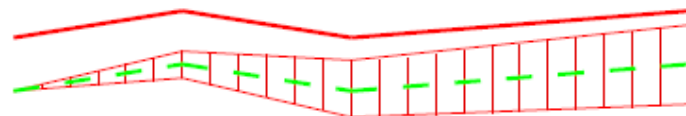


### LEGEND

LAKE LEVELS

RECORDED

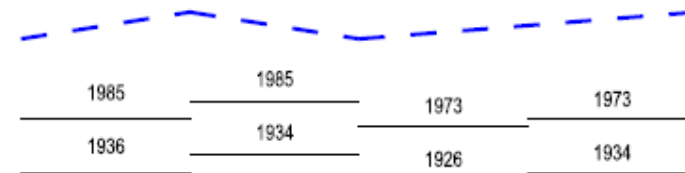
PROJECTED



AVERAGE \*\*

MAXIMUM \*\*

MINIMUM \*\*

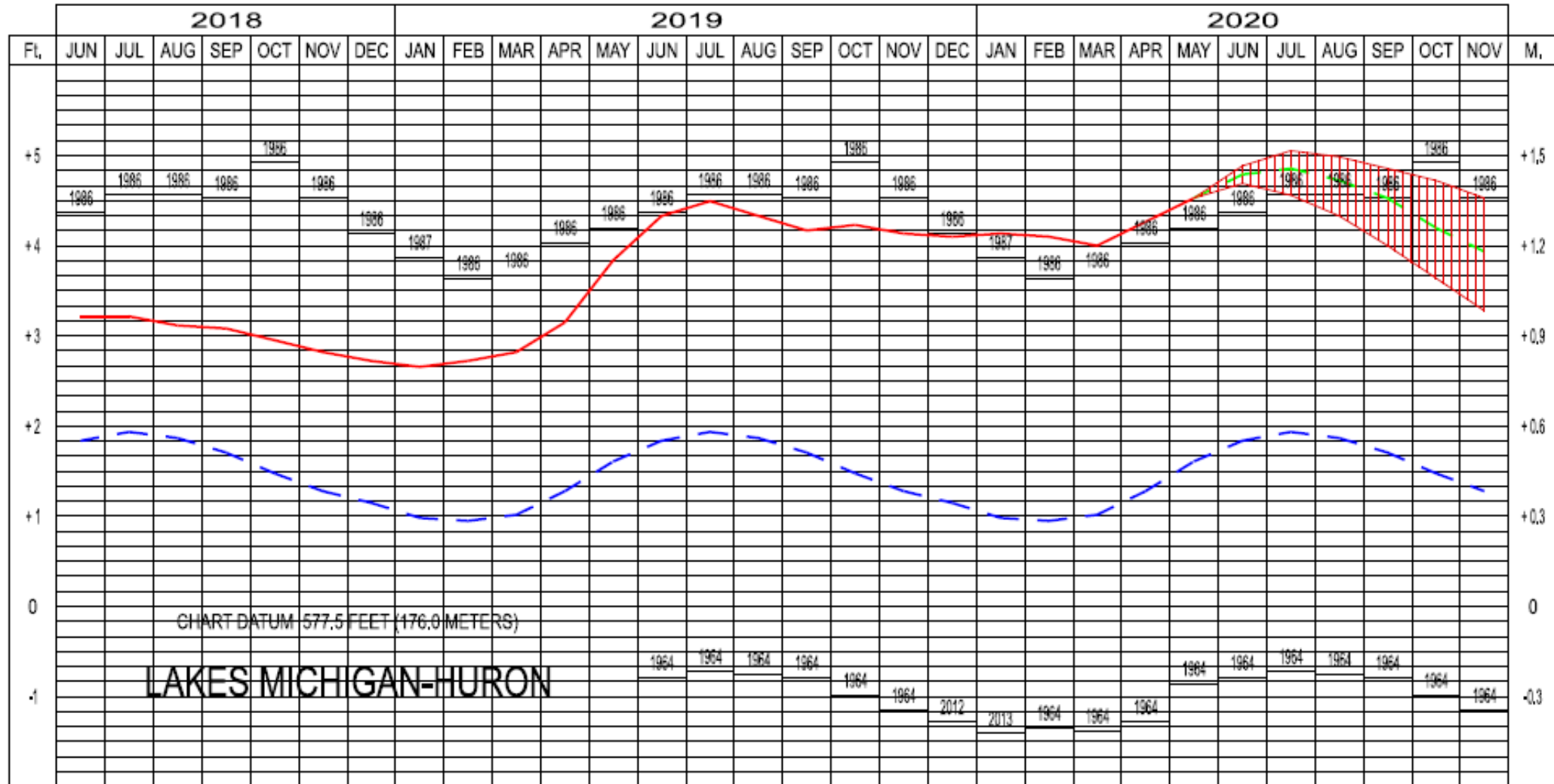


\*\* Average, Maximum and Minimum for period 1918-2019



# 6-MONTH FORECAST (JUNE-NOVEMBER)

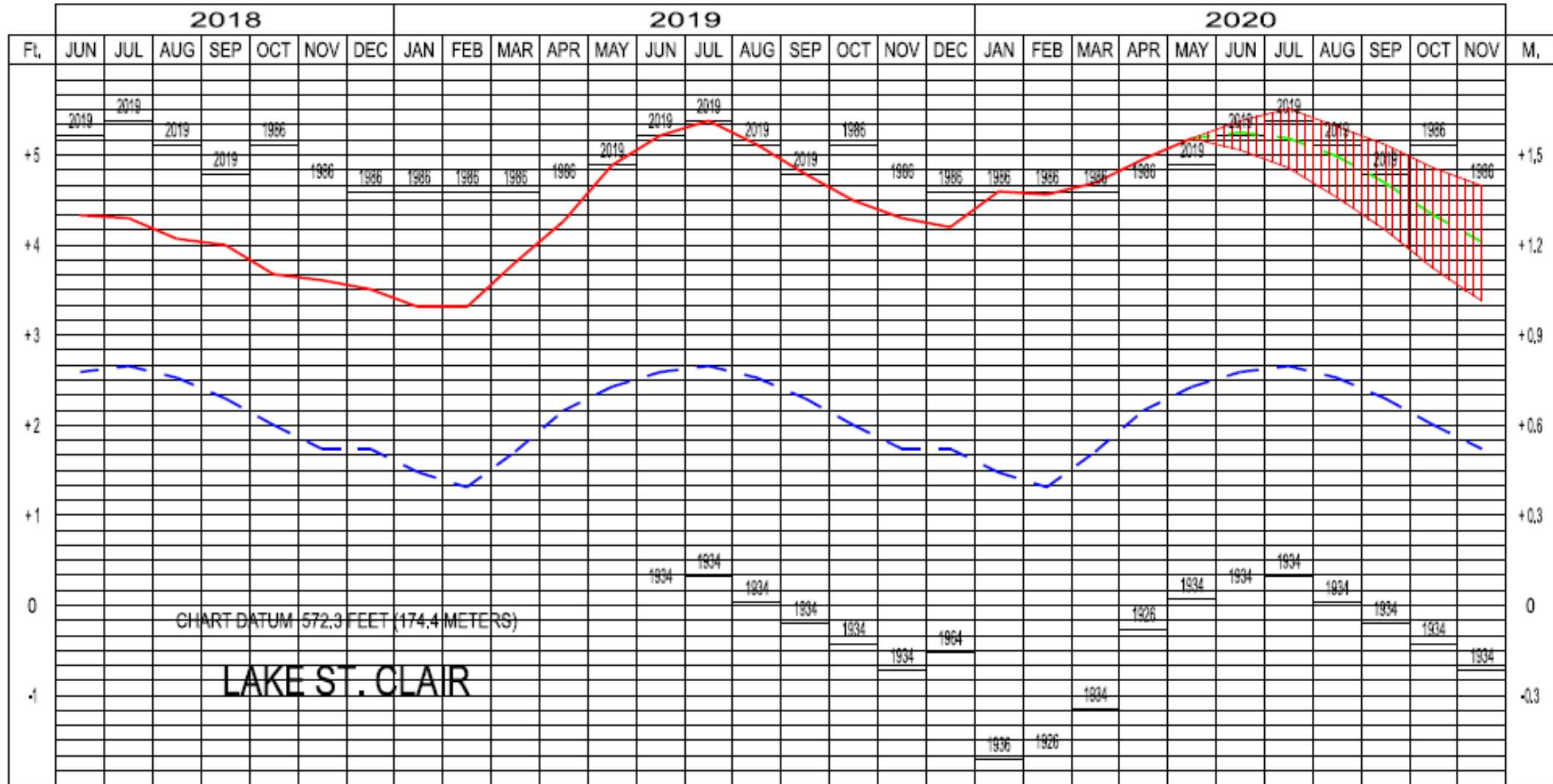
## LAKES MICHIGAN-HURON WATER LEVELS - JUNE 2020





# 6-MONTH FORECAST (JUNE-NOVEMBER)

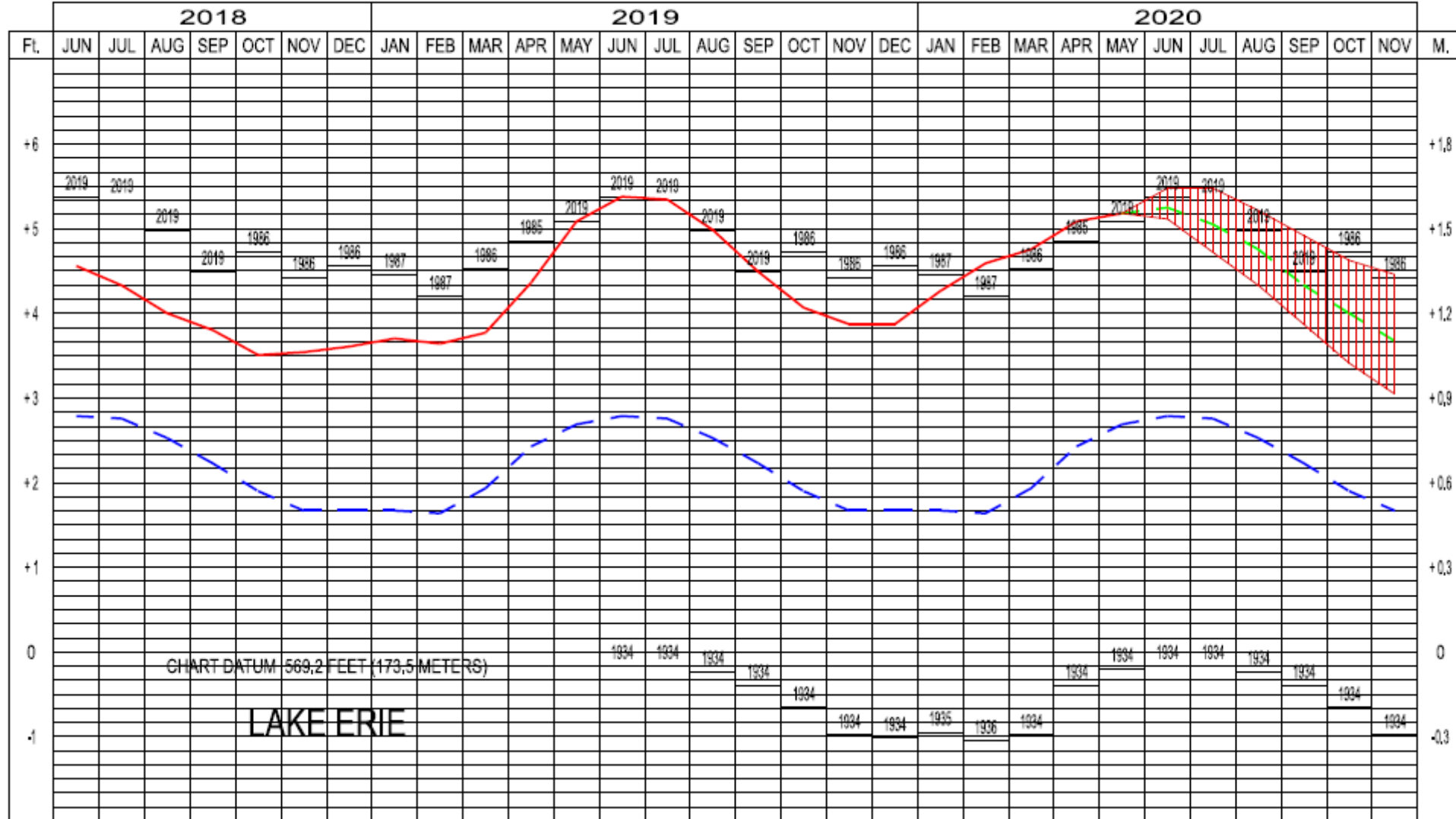
## LAKE ST. CLAIR WATER LEVELS - JUNE 2020





# 6-MONTH FORECAST (JUNE-NOVEMBER)

## LAKE ERIE WATER LEVELS - JUNE 2020

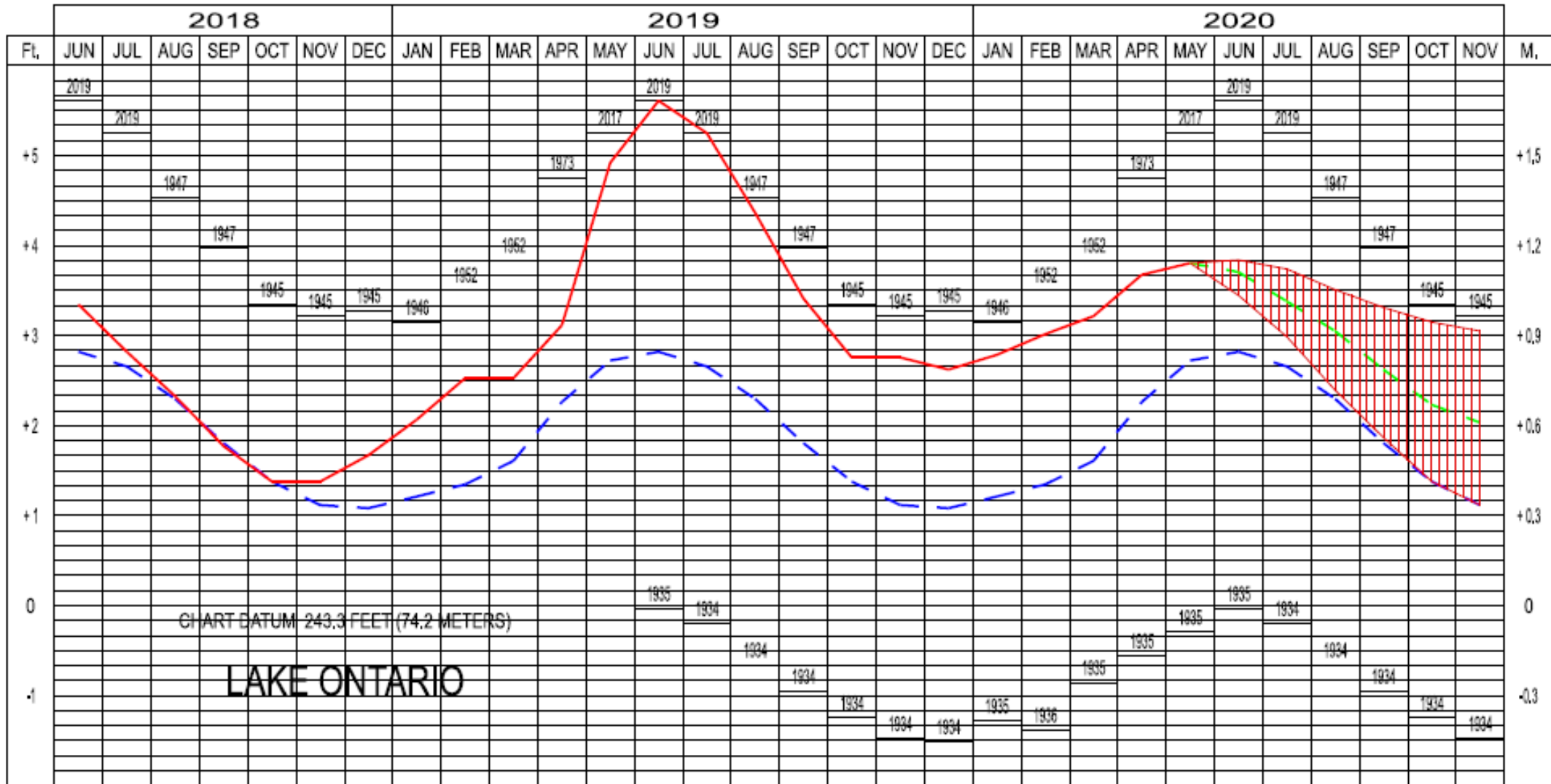




# 6-MONTH FORECAST (JUNE-NOVEMBER)



## LAKE ONTARIO WATER LEVELS - JUNE 2020





# 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. More records expected on 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 throughout 2020



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[HTTPS://WWW.LRE.USACE.ARMY.MIL/ABOUT/GREAT-LAKES-HIGH-WATER/](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](#)

## Water Level Contacts

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