

GREAT LAKES WATER LEVELS AND ICE MONITORING

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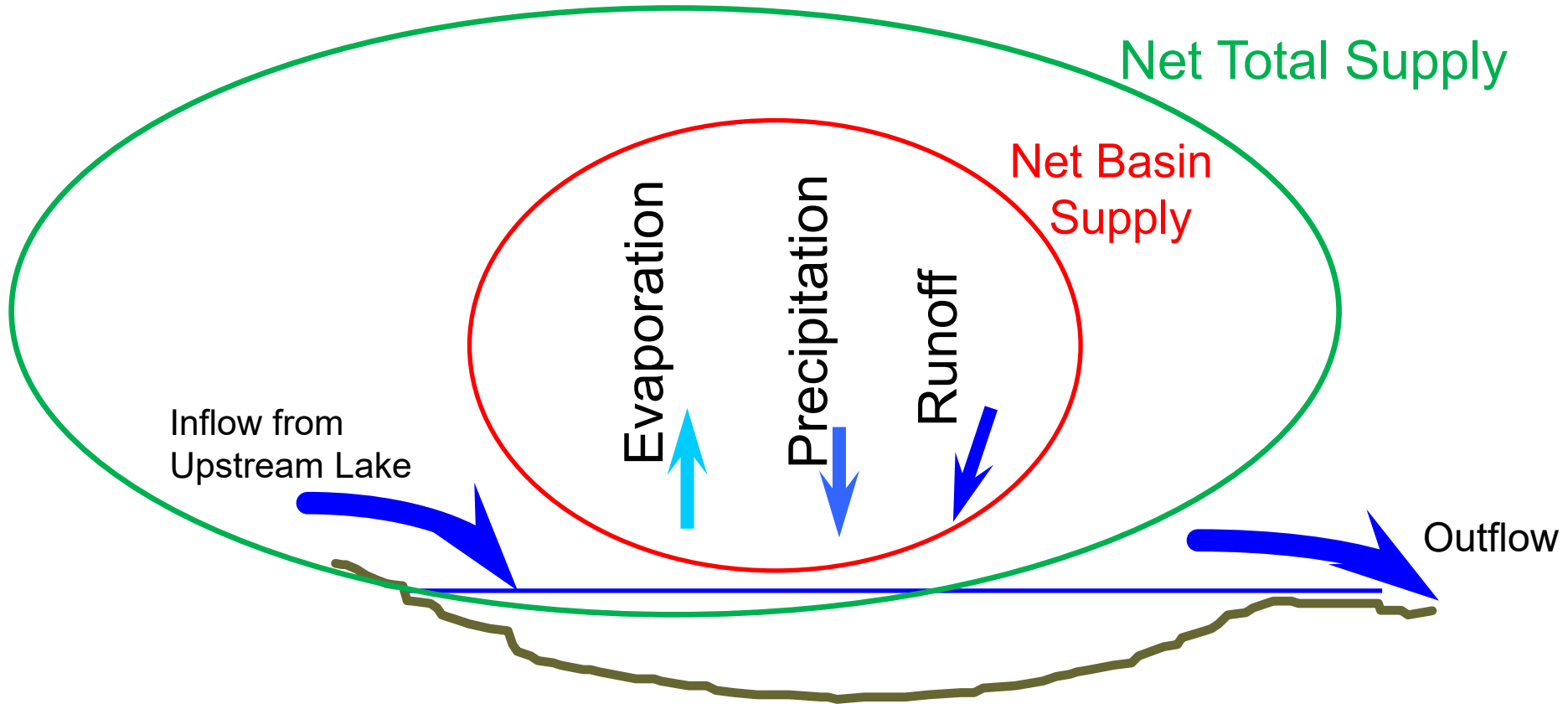
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AGENDA

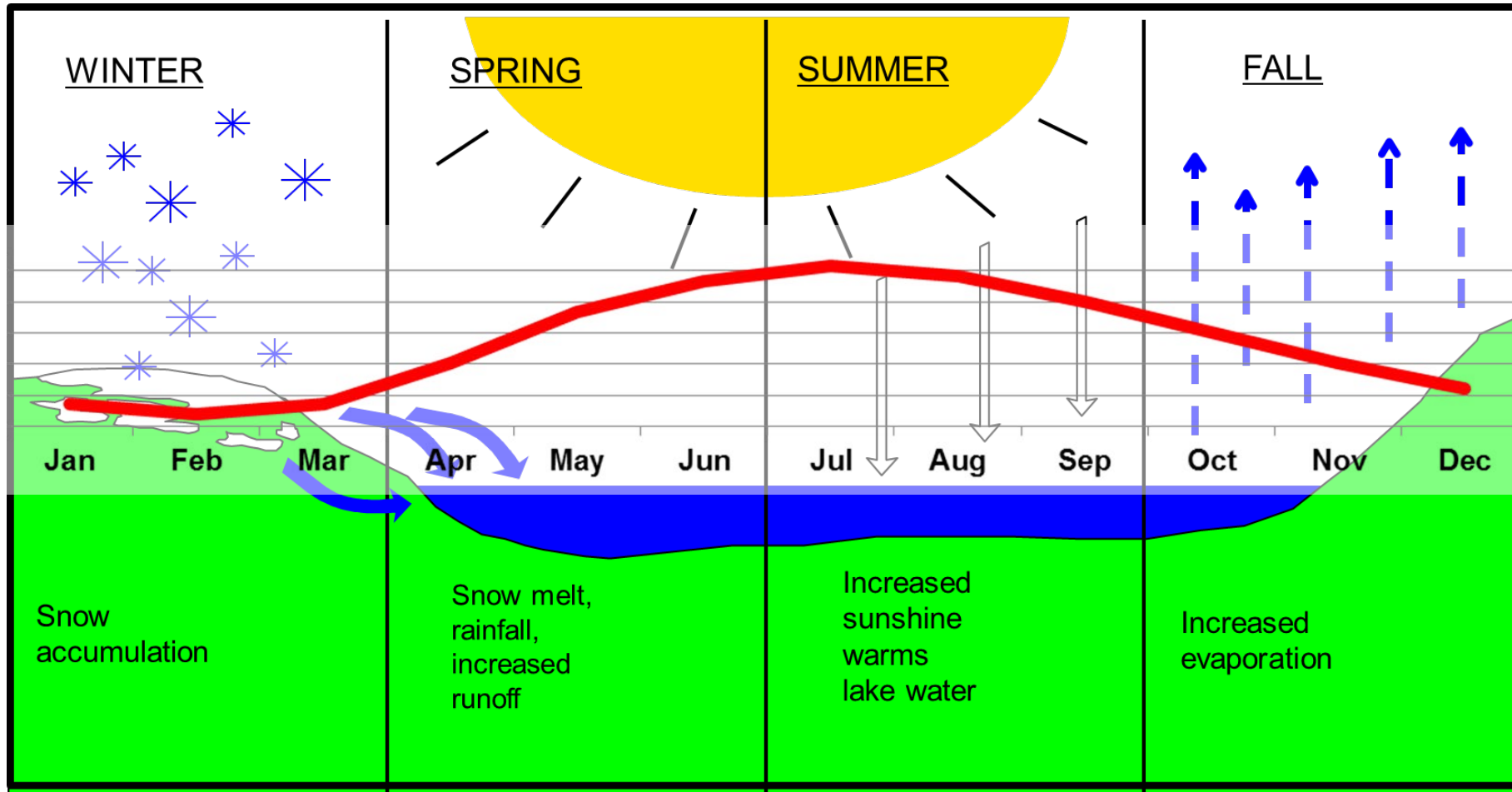
- Some water levels 101
- Current hydrologic conditions in the Great Lakes basin
- Current and forecasted Great Lakes water levels
- Ice monitoring



DRIVERS OF WATER LEVEL FLUCTUATION

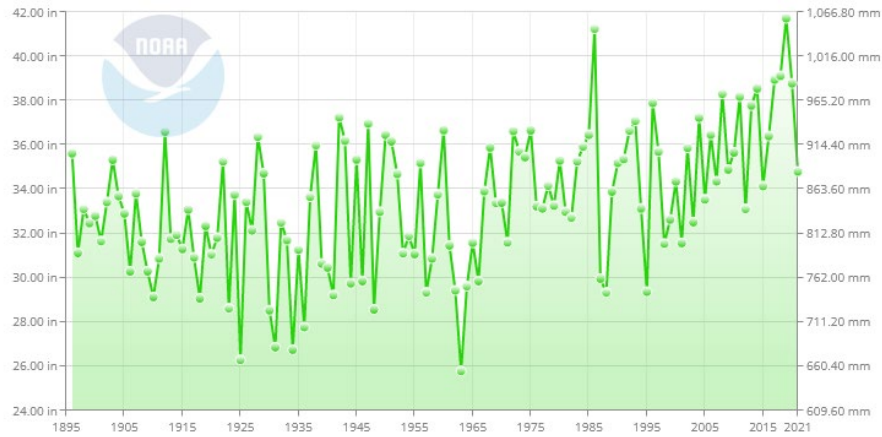


ANNUAL WATER LEVEL FLUCTUATION



PRECIPITATION RANKS ENDING SEP 2021

Great Lakes Basin Precipitation
October–September



45th wettest out of 120 plus years for the Great Lakes

NOAA National Centers for Environmental information,
Climate at a Glance

Oct 2020–Sep 2021 12-Month	34.80" (883.92mm)	32.79" (832.87mm)	2.01" (51.05mm)	82nd Driest 45th Wettest	Driest since: 2015 Wettest since: 2020	1963 2019
Apr 2020–Sep 2021 18-Month	55.22" (1,402.59mm)	52.09" (1,323.09mm)	3.13" (79.50mm)	89th Driest 38th Wettest	Driest since: 2013 Wettest since: 2020	1931 2019
Oct 2019–Sep 2021 24-Month	73.58" (1,868.93mm)	65.57" (1,665.48mm)	8.01" (203.45mm)	116th Driest 10th Wettest	Driest since: 2016 Wettest since: 2020	1963 2019
Oct 2018–Sep 2021 36-Month	115.30" (2,928.62mm)	98.34" (2,497.84mm)	16.96" (430.78mm)	122nd Driest 3rd Wettest	Driest since: 2018 Wettest since: 2020	1964 2019
Oct 2017–Sep 2021 48-Month	154.42" (3,922.27mm)	131.13" (3,330.70mm)	23.29" (591.57mm)	121st Driest 3rd Wettest	Driest since: 2018 Wettest since: 2020	1964 2020
Oct 2016–Sep 2021 60-Month	193.37" (4,911.60mm)	163.87" (4,162.30mm)	29.50" (749.30mm)	121st Driest 2nd Wettest	Driest since: 2019 Wettest since: 2020	1966 2020



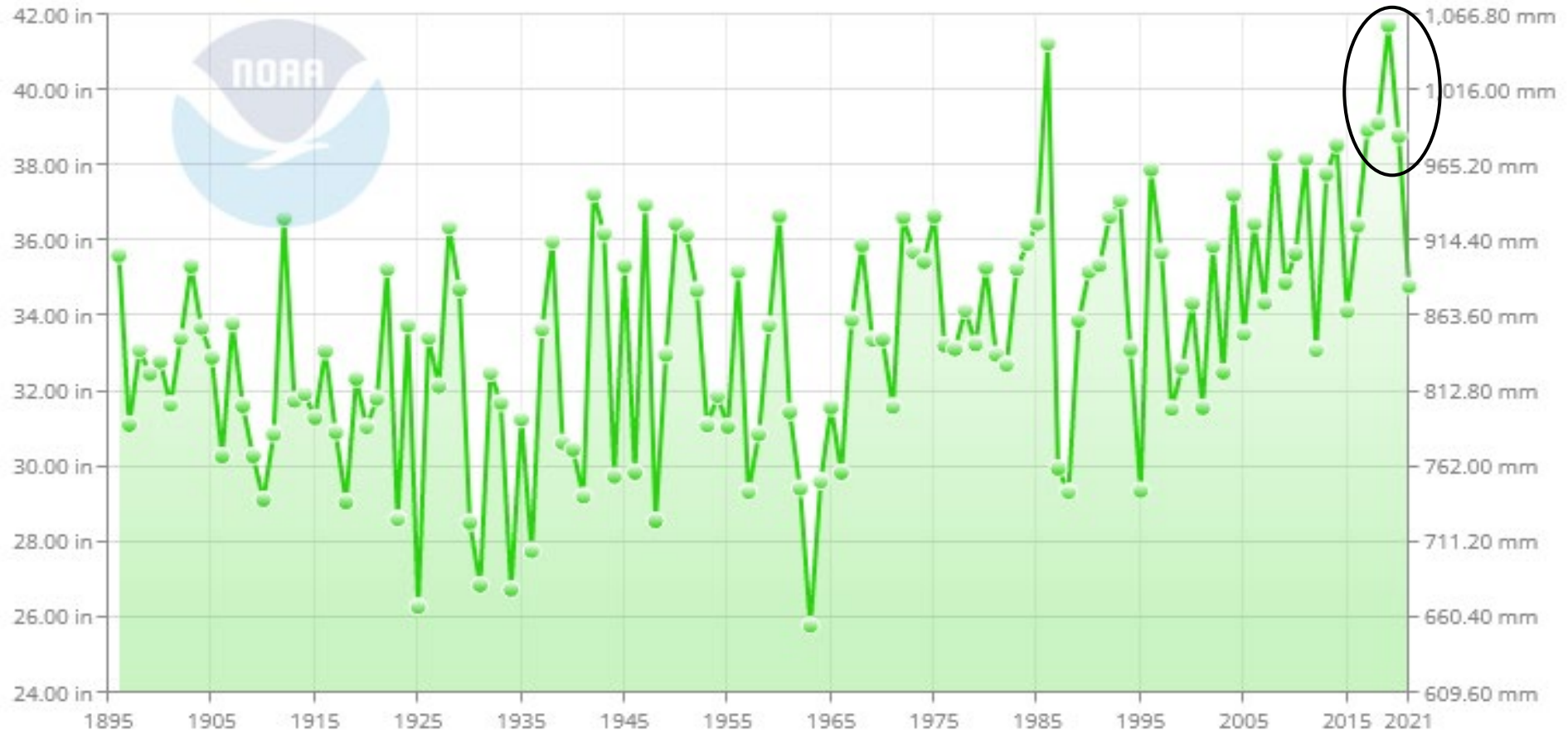
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PRECIPITATION RANKS ENDING SEP 2021

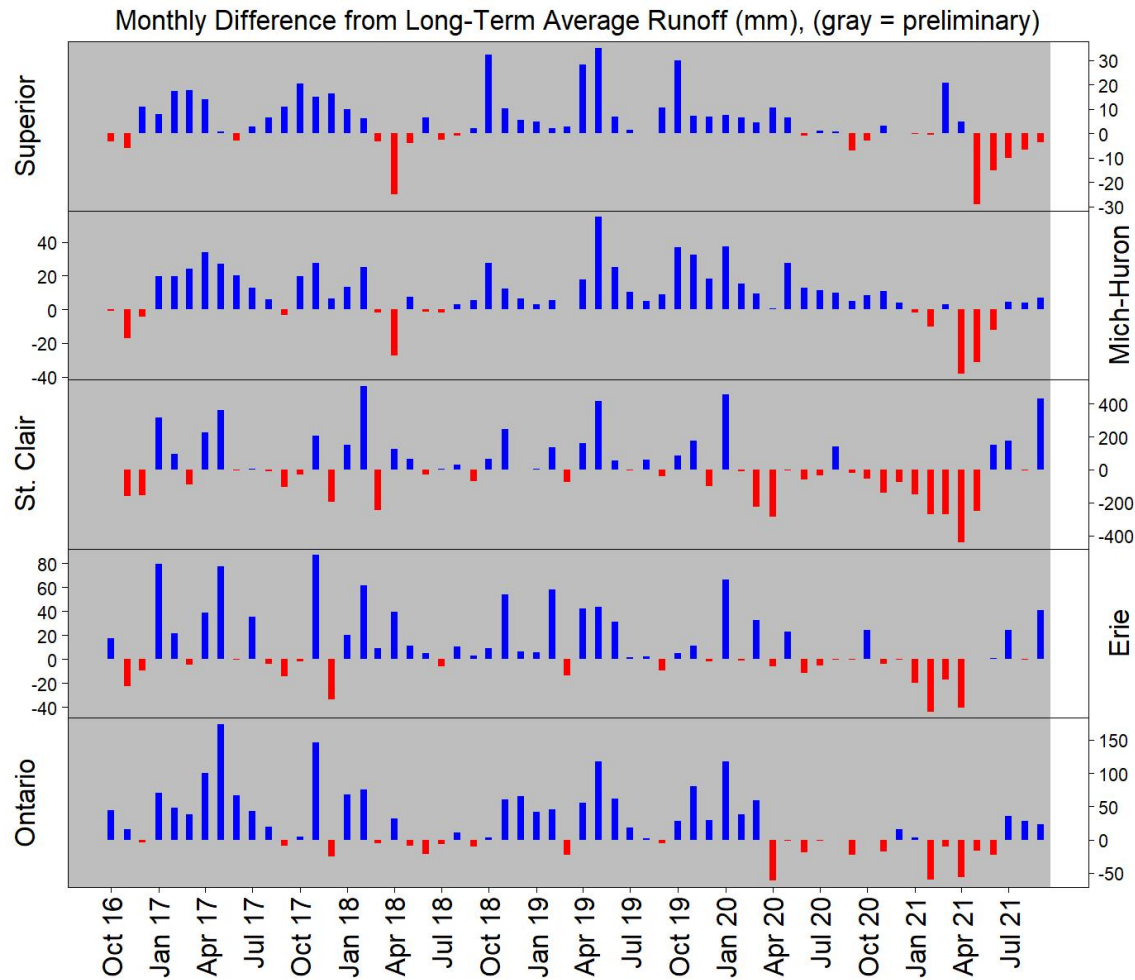
Great Lakes Basin Precipitation
October–September



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WET WEATHER AND INCREASED RUNOFF



Prolonged period of wet weather led to much increased runoff, noted by the blue bars. Drier conditions last winter and into the spring of 2021 led to lower runoff noted by the red bars.

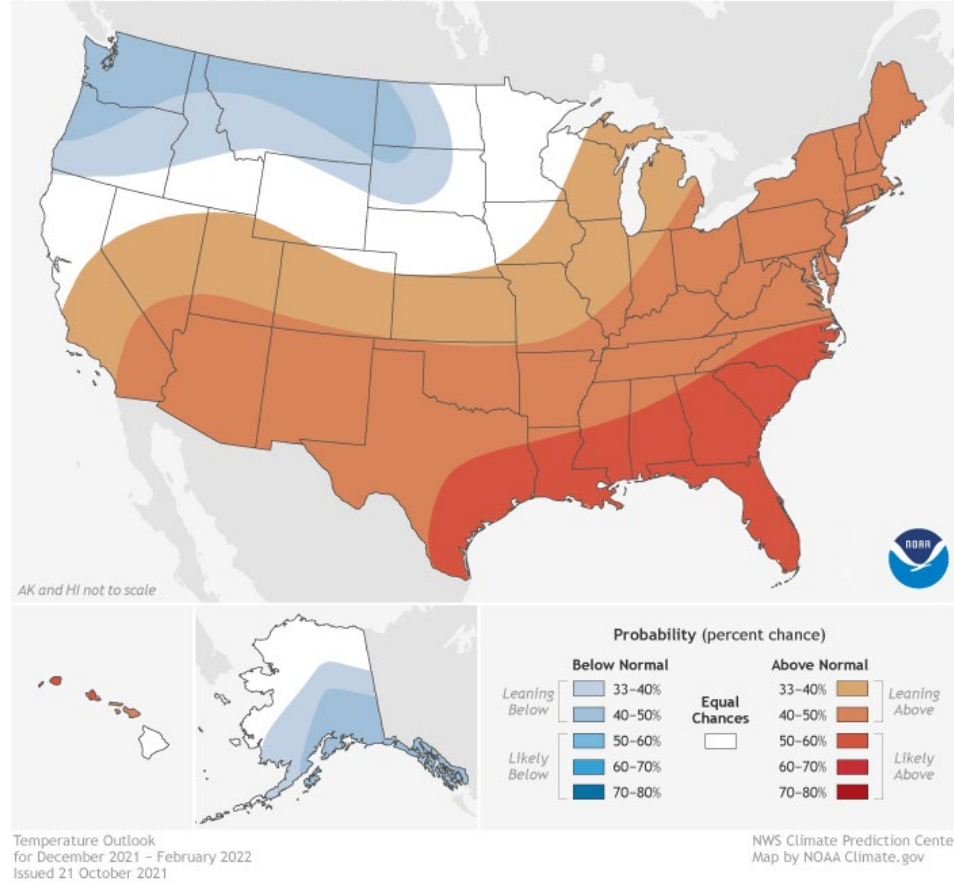


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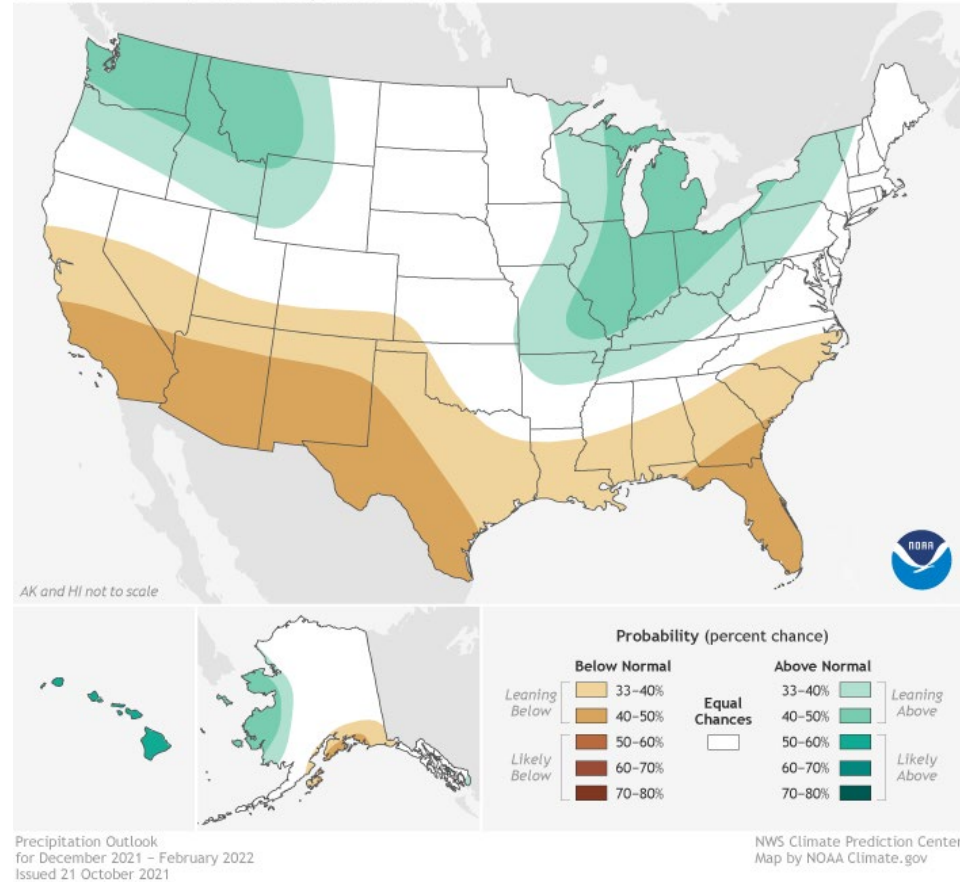


WINTER OUTLOOK

Winter 2021: U.S. Temperature Outlook



Winter 2021: U.S. Precipitation Outlook



How will a 2nd La Nina winter in a row impact things?



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CURRENT LAKE LEVELS

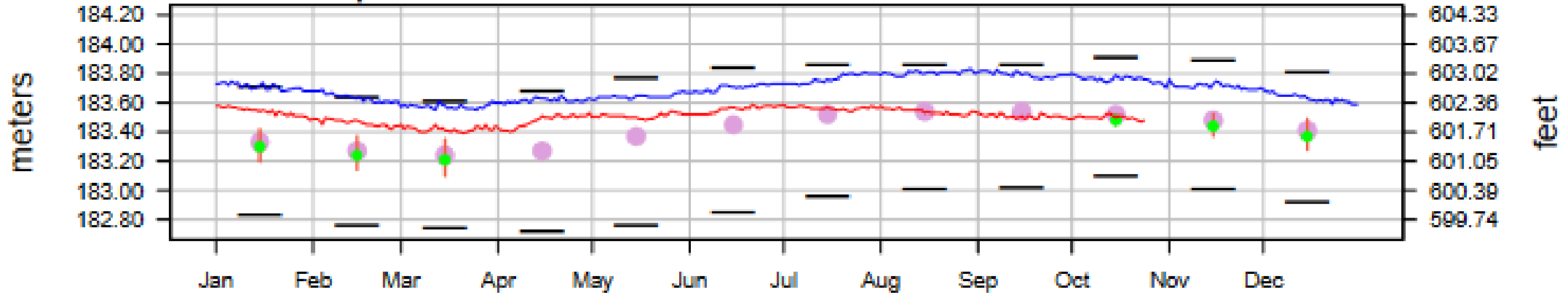
	Superior*	Michigan Huron*	St. Clair*	Erie*	Ontario*
Mean:	602.03	580.35	576.10	573.03	245.31

October Statistics	<i>Historic Water Levels</i>				
	Superior	Michigan Huron	St. Clair	Erie	Ontario
Avg Last Month	602.06	580.48	576.25	573.05	245.36
Avg Last Year	602.89	581.54	576.57	573.22	245.09
Minimum	600.72 (1925)	576.44 (1964)	571.75 (1934)	568.57 (1934)	242.19 (1934)
Maximum	603.38 (1985)	582.35 (1986)	577.30 (1986)	573.95 (1986)	246.78 (1945)
Long Term Avg**	602.10	578.94	574.21	571.16	244.82

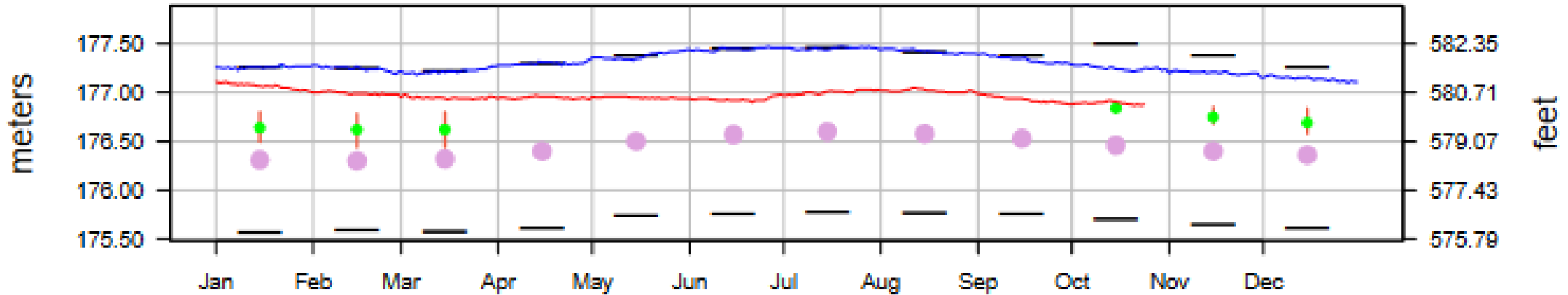


CURRENT AND FORECASTED LAKE LEVELS

Lake Superior

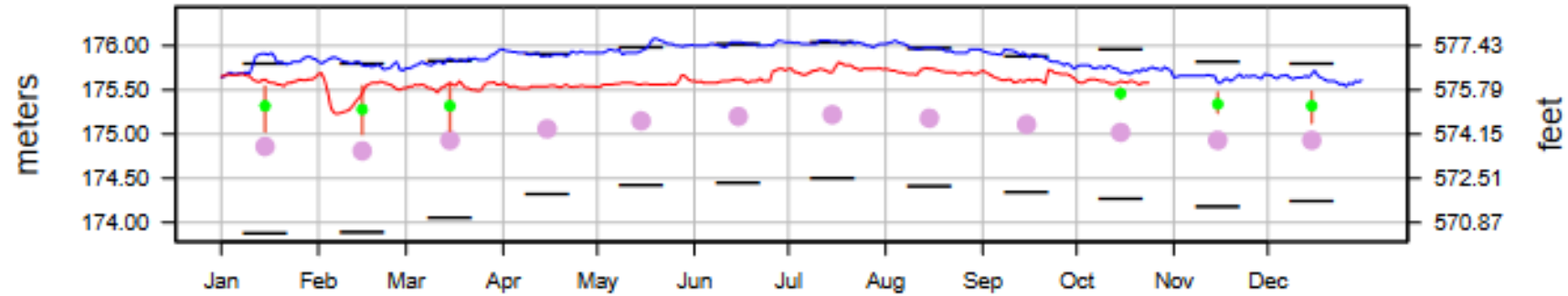


Lake Mich-Huron

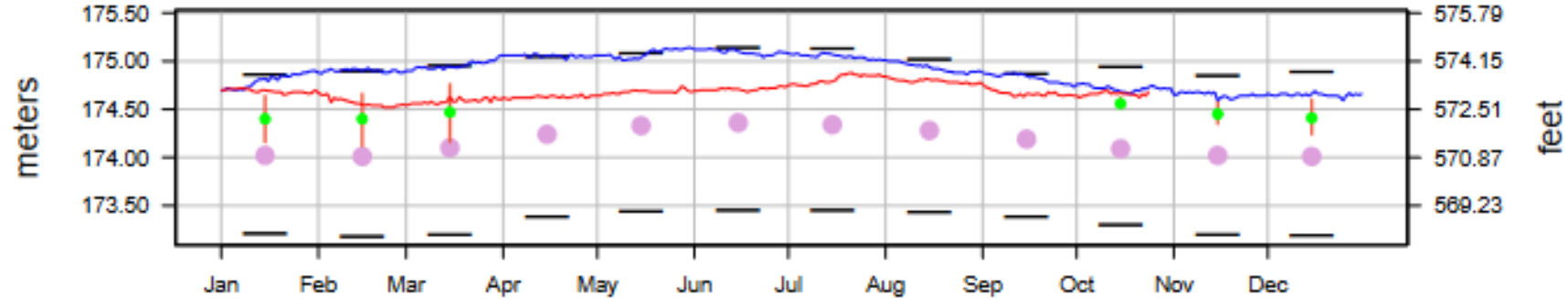


CURRENT AND FORECASTED LAKE LEVELS

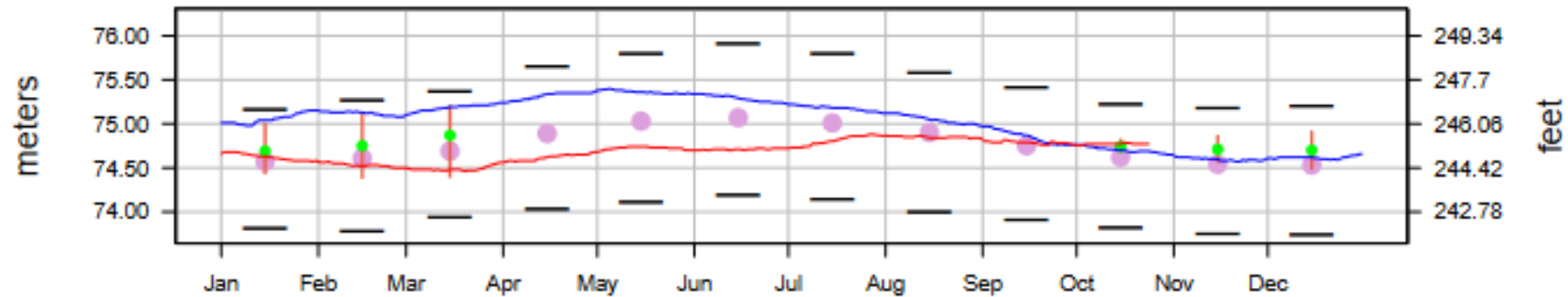
Lake St. Clair



Lake Erie



Lake Ontario

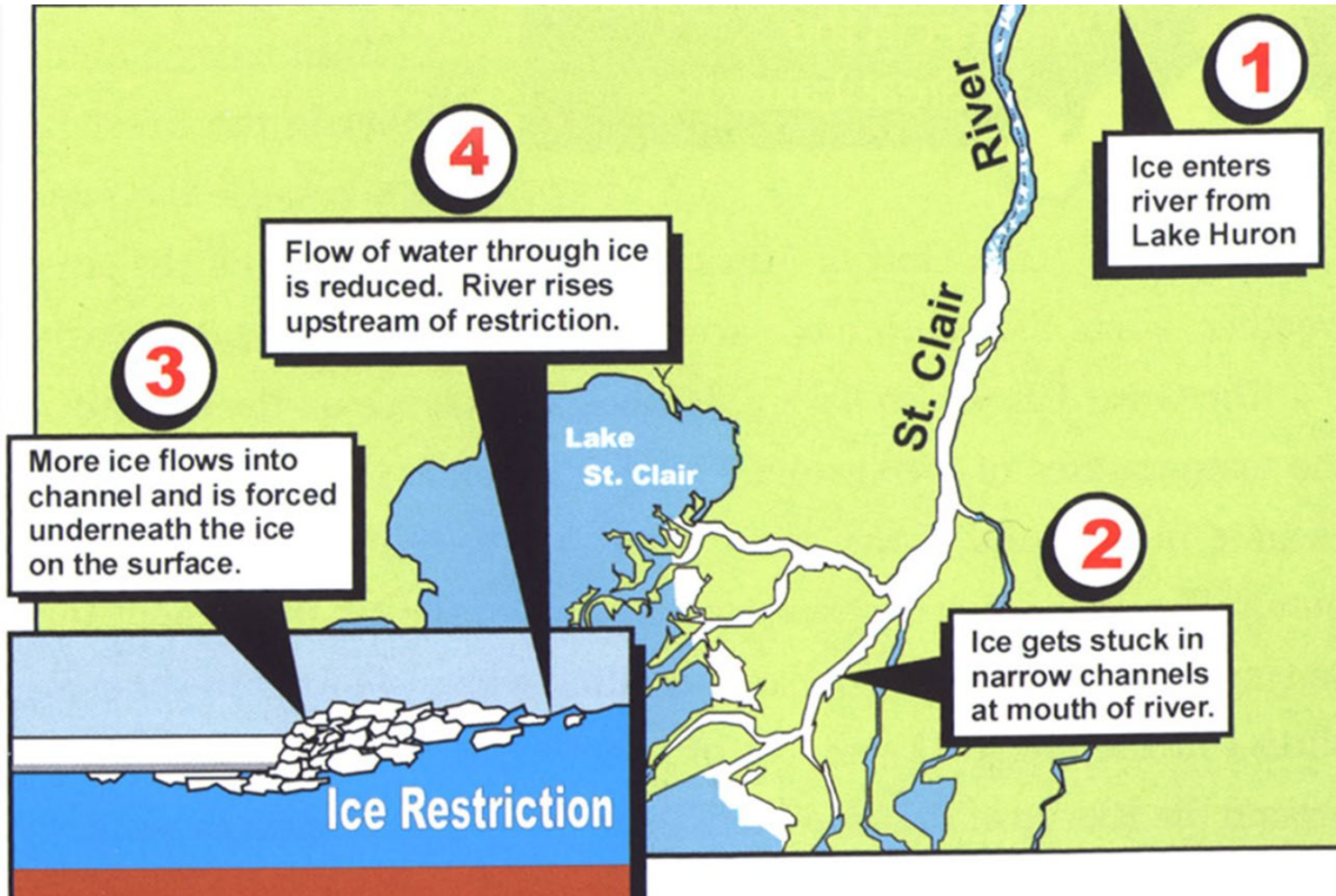


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ICE JAM ORIGINS

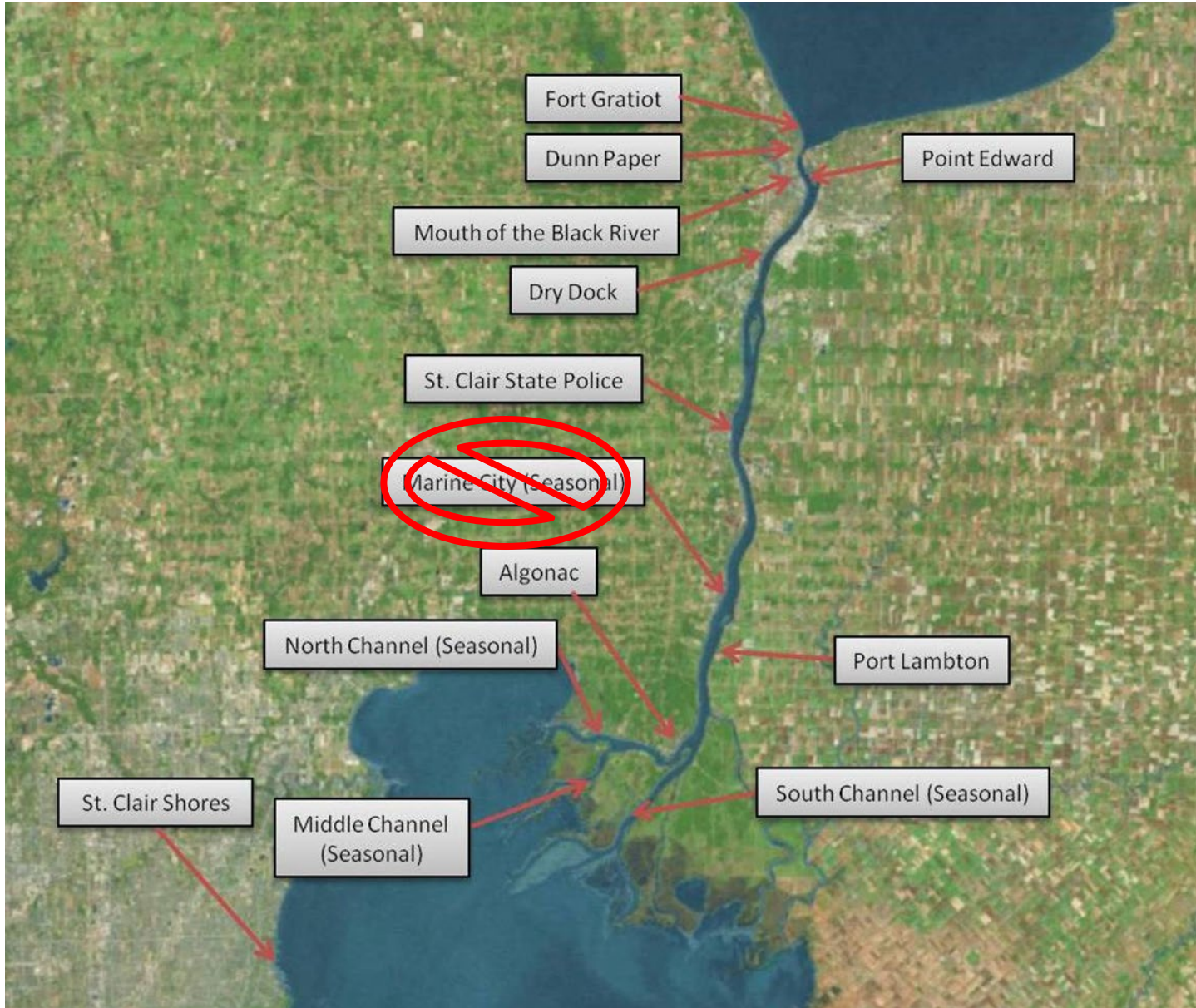


In extremely cold conditions, ice can also grow in the river itself.



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Multi agency gauge network

NOAA: Fort Gratiot, Dunn Paper, Mouth Black River, Dry Dock, St. Clair State Police, Algonac, St. Clair Shores

CHS: Point Edward, Port Lambton

USACE: North, Middle and South Channels.

Marine City gauge is currently offline as property was recently sold. New location being sought.

USACE gauges have trouble in heavy ice conditions or extremely cold temps (seasonal).

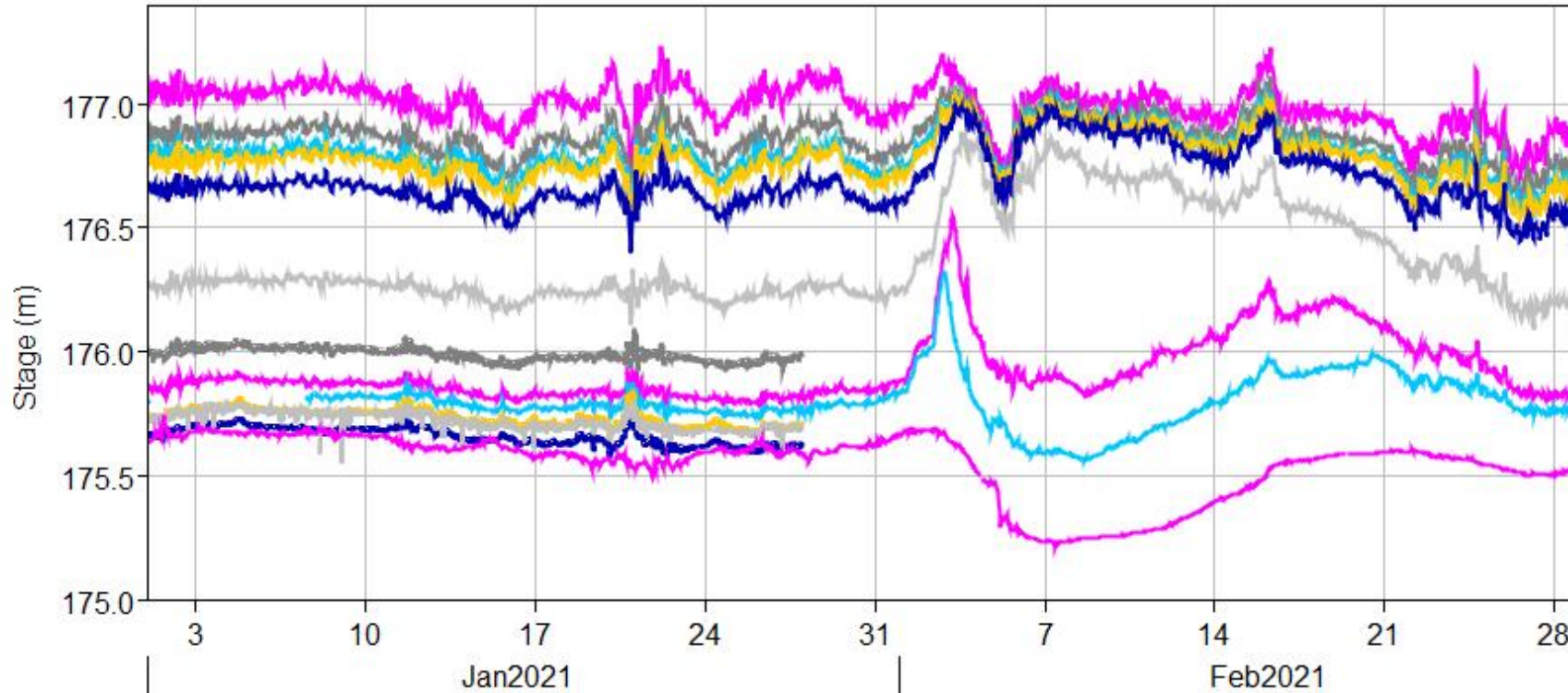


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ICE FREE TRANSITIONING TO AN IMPACTED RIVER

St Clair River Hydrograph



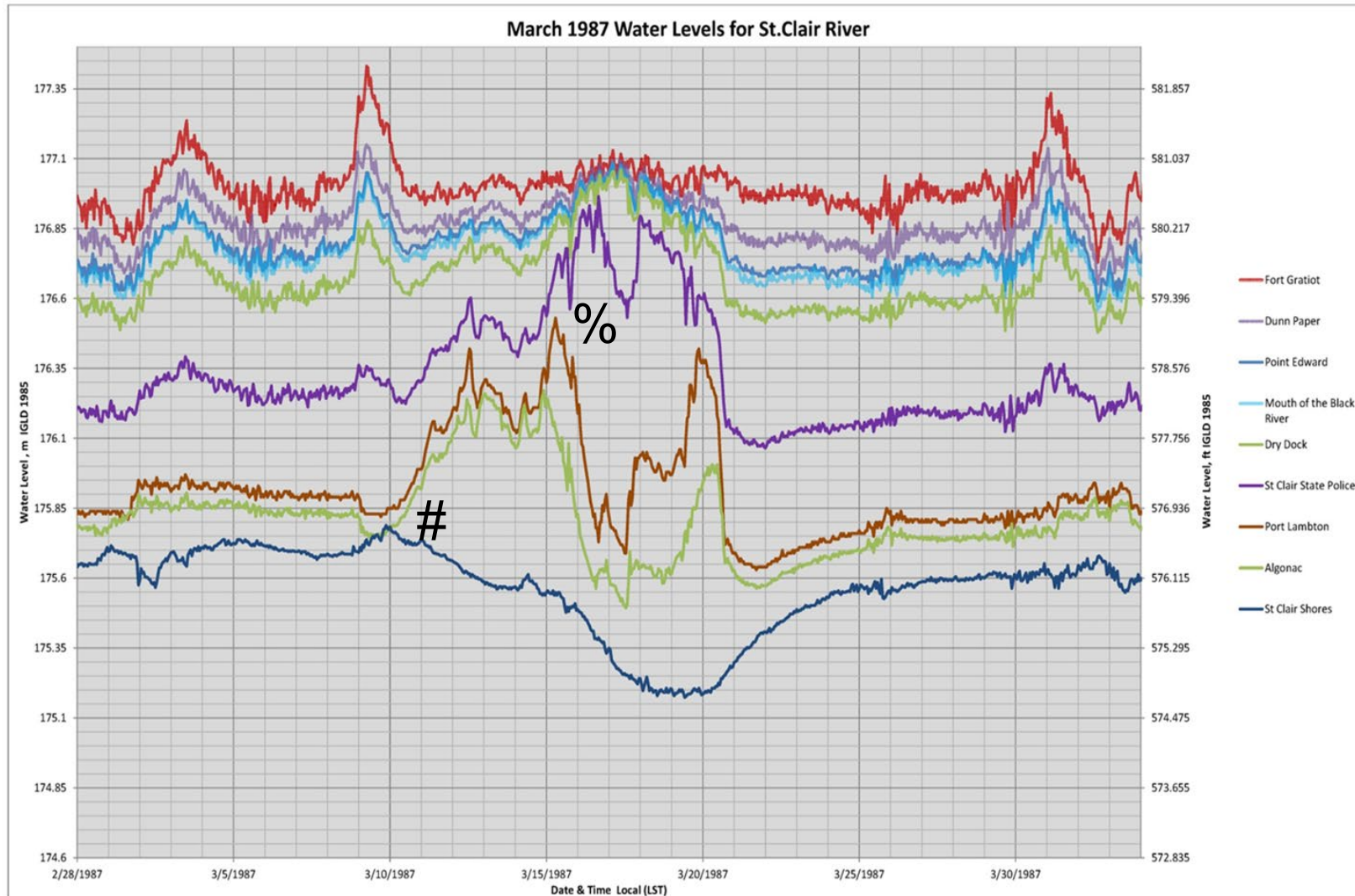
- FortGratiot noaa-rev Stage
- DunnPaper noaa-rev Stage
- PointEdward chs-rev Stage
- MouthBlackRiver noaa-rev Stage
- DryDock noaa-rev Stage
- StClairSP noaa-rev Stage
- PortLambton chs-rev Stage
- MarineCity Irdldm-raw Stage-Encoder
- Algonac noaa-rev Stage
- NorthChannel Irdldm-raw Stage-Encoder
- MiddleChannel Irdldm-raw Stage-Encoder
- SouthChannel Irdldm-raw Stage-Encoder
- StClairShores noaa-rev Stage

Northerly winds can push additional water into the river.

Ice restricts the flow at the outlet causing water to back up.



1987 ICE JAM



Full ice jam.

First between Algonac and St. Clair Shores (#)

Then between St. Clair St. Police and Port Lambton (%)

This scenario from 1987 has water levels similar to current levels.



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