

# A Holiday Period for the History Books: Part One

An Overview and Historical Perspective of  
the Crippling Buffalo Blizzard of 23-27 December 2022

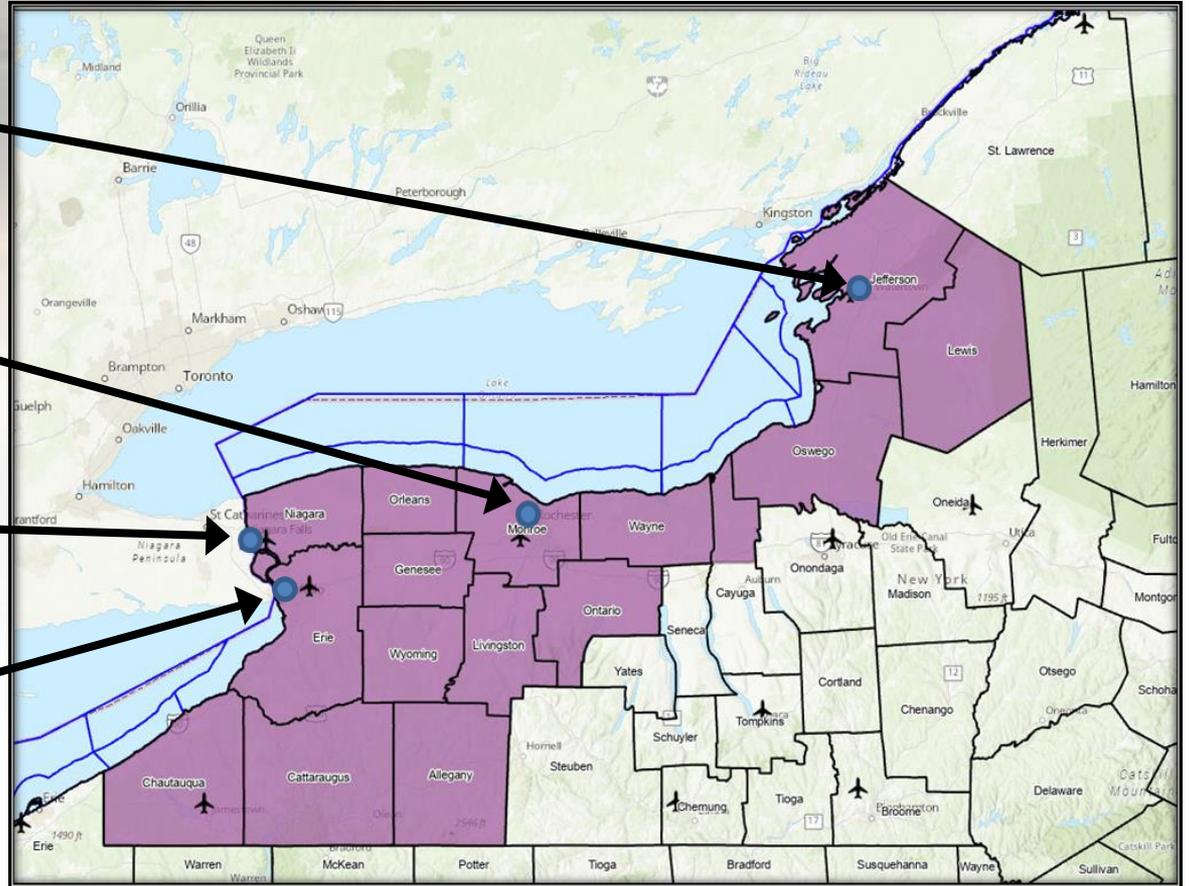
**Mike Fries**

Warning Coordination Meteorologist  
NOAA/NWS Buffalo, NY



# Buffalo CWA Orientation

- Watertown
- Rochester
- Niagara Falls
- Buffalo





# A Look Back...

- The Great Christmas Storm of December 20-25, 1878
- The Blizzard of 1977
- Snowvember of 2014
- The Previous Month – Snowvember #2 in 2022

# The Great Christmas Storm of 1878

- *“We challenge the oldest inhabitant, be his imagination as large as his years are many, to produce the equal of yesterday’s hurricane. For utter abandonment of all known rules of decorum which should govern storms, for the wild vagary and strange variety of mischievousness, for the sum total of everything bad and utter absence of all that is good, the Christmas week storm of 1878 deserves the gold medal of dishonor. It seems that this city alone has been the recipient of the abundant gifts of present snowfall. A few miles on either side of us, and the snow can only be measured in inches, instead of feet.”*

– Daily Courier, December 25, 1878

# The Great Christmas Storm of 1878

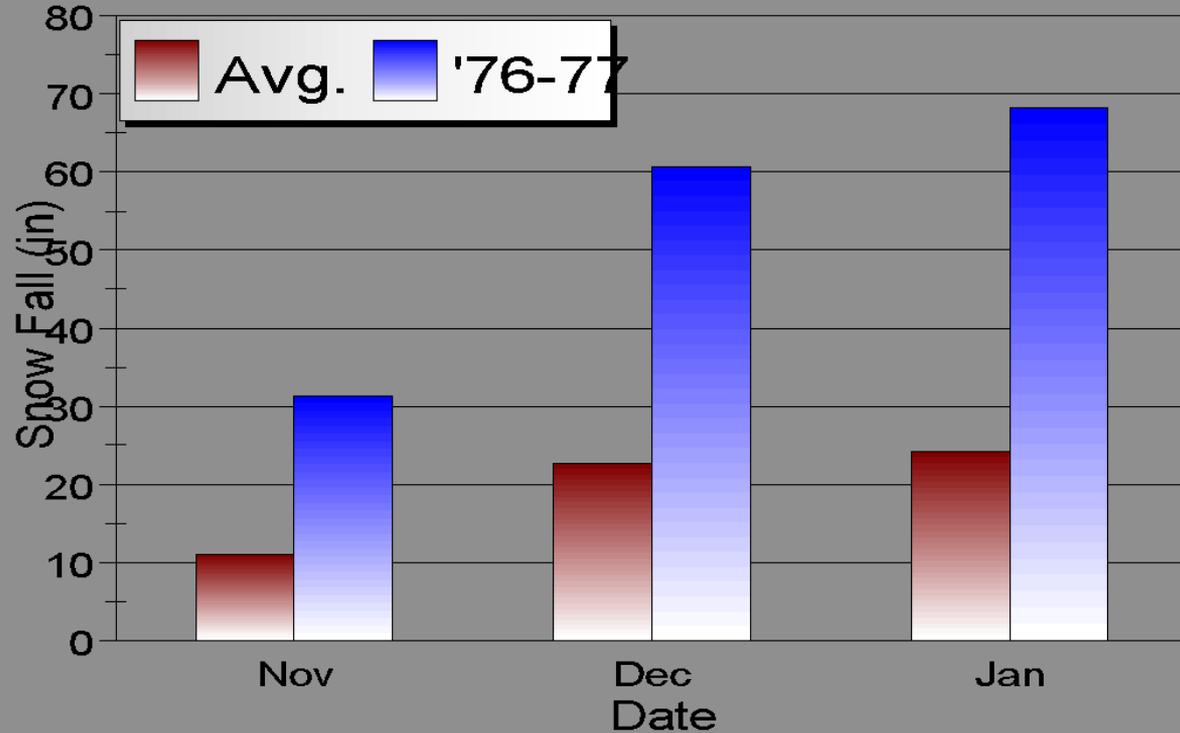
- Lasted five days: December 20-25, 1878
- Wind gusted up to 72 mph on December 24
- Started as a synoptic snow of 8"
- 39" of snow in total was observed in the city
- Drifts over 7 feet recorded
- Blocked all railroad traffic
- Sleighs were the only mode of transportation possible
- Large fire burned the Black Rock neighborhood
  - Immense amount of snow before the fire controlled it, as fire crews were unable to get to the fire
- Many records set by this storm were broken in 2022
- Followed by another major snow storm on January 2, 1879

# The Blizzard of 1977

- January 28-February 1, 1977
- November, December, and January were well below normal
  - October – 8<sup>th</sup> coldest on record
  - November – 4<sup>th</sup> coldest on record
  - December – 6<sup>th</sup> coldest on record
  - January – coldest on record
  - Lake Erie froze over December 14, 1976, earliest on record

# Nov-Jan Monthly Snowfall

Average vs. '76-77



# The Blizzard of 1977

- Snow occurred every day in January
  - Snowed every day after December 19
- Snow depth before the blizzard was 33”
  - Snow was touching power lines in places
  - City had abandoned cars blocking most residential streets
    - 20% of all cars
- Storm total snow was *only* 12.3”

Date	Temperature				HDD	CDD	Precipitation	New Snow	Snow Depth
	Maximum	Minimum	Average	Departure					
1977-01-01	23	12	17.5	-10.1	47	0	0.11	2.2	16
1977-01-02	23	19	21.0	-6.4	44	0	0.12	3.3	16
1977-01-03	24	18	21.0	-6.3	44	0	0.02	0.6	19
1977-01-04	27	12	19.5	-7.6	45	0	0.02	0.4	19
1977-01-05	26	7	16.5	-10.4	48	0	T	0.1	17
1977-01-06	29	13	21.0	-5.7	44	0	0.02	0.4	16
1977-01-07	27	11	19.0	-7.5	46	0	0.16	4.5	16
1977-01-08	19	7	13.0	-13.4	52	0	0.03	1.0	18
1977-01-09	16	7	11.5	-14.7	53	0	0.08	1.6	17
1977-01-10	22	7	14.5	-11.6	50	0	0.74	13.2	20
1977-01-11	14	5	9.5	-16.4	55	0	0.10	2.1	27
1977-01-12	9	4	6.5	-19.3	58	0	0.06	1.4	27
1977-01-13	16	5	10.5	-15.1	54	0	0.04	1.0	24
1977-01-14	26	16	21.0	-4.5	44	0	0.08	1.8	25
1977-01-15	23	13	18.0	-7.4	47	0	0.18	3.8	24
1977-01-16	13	-1	6.0	-19.3	59	0	0.07	1.8	26
1977-01-17	4	-4	0.0	-25.1	65	0	0.37	7.3	29
1977-01-18	5	-6	-0.5	-25.5	65	0	0.04	1.1	33
1977-01-19	24	5	14.5	-10.4	50	0	0.06	1.5	33
1977-01-20	23	13	18.0	-6.9	47	0	0.05	1.1	32
1977-01-21	22	14	18.0	-6.8	47	0	0.07	1.4	33
1977-01-22	14	7	10.5	-14.2	54	0	0.02	0.5	34
1977-01-23	22	3	12.5	-12.2	52	0	T	T	33
1977-01-24	30	22	26.0	1.4	39	0	0.10	1.3	29
1977-01-25	29	19	24.0	-0.6	41	0	0.11	1.4	28
1977-01-26	26	15	20.5	-4.0	44	0	0.06	1.3	29
1977-01-27	20	5	12.5	-12.0	52	0	0.15	3.0	32
1977-01-28	26	-4	11.0	-13.5	54	0	0.28	4.4	33
1977-01-29	5	-7	-1.0	-25.5	66	0	0.05	1.0	38
1977-01-30	10	4	7.0	-17.5	58	0	0.08	1.6	37
1977-01-31	15	4	9.5	-15.0	55	0	0.11	2.2	38
<b>Sum</b>	612	245	-	-	1579	0	3.38	68.3	-
<b>Average</b>	19.7	7.9	13.8	-11.7	-	-	-	-	26.4
<b>Normal</b>	32.1	19.0	25.5	-	1223	0	3.35	26.7	-

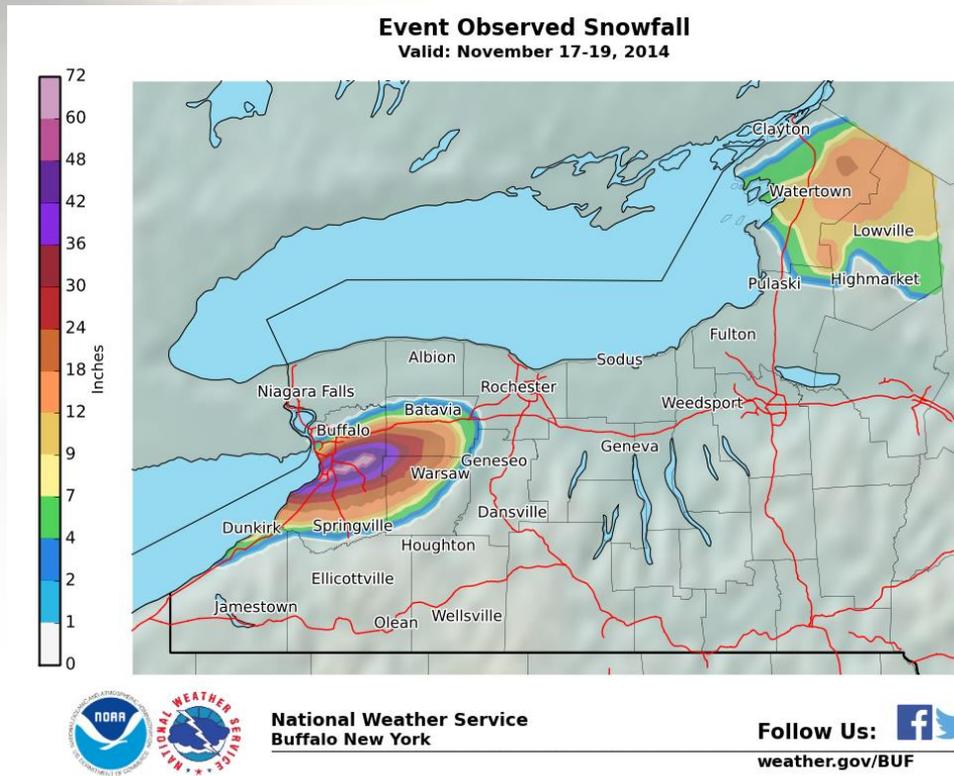
# The Blizzard of 1977

- Maximum of 11 hours of consecutive blizzard conditions on January 28
- Blizzard conditions occurred on 5 consecutive days
  - Wind speeds
    - 1/28 – 69 mph
    - 1/29 – 51 mph
    - 1/30 – 52 mph
    - 1/31 – 58 mph
    - 2/1 – 46 mph



# Snowvember of 2014

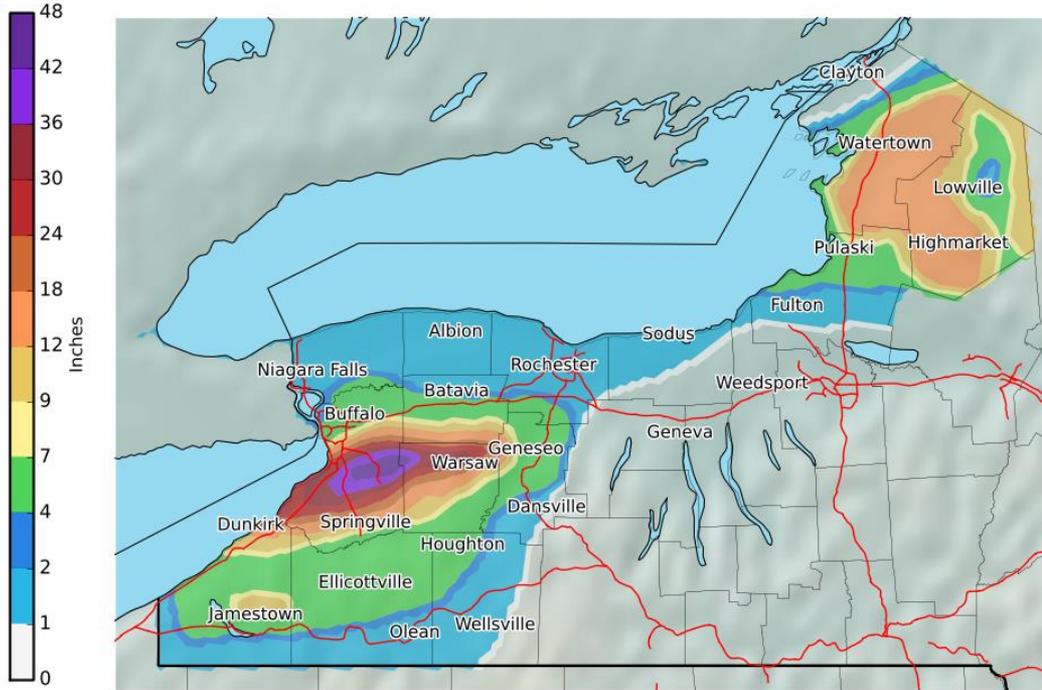
- Two parts with a short gap between
- November 17-19



# Snowvember Part 2: November 19-21

## Event Observed Snowfall

Valid: November 19-21, 2014



National Weather Service  
Buffalo New York

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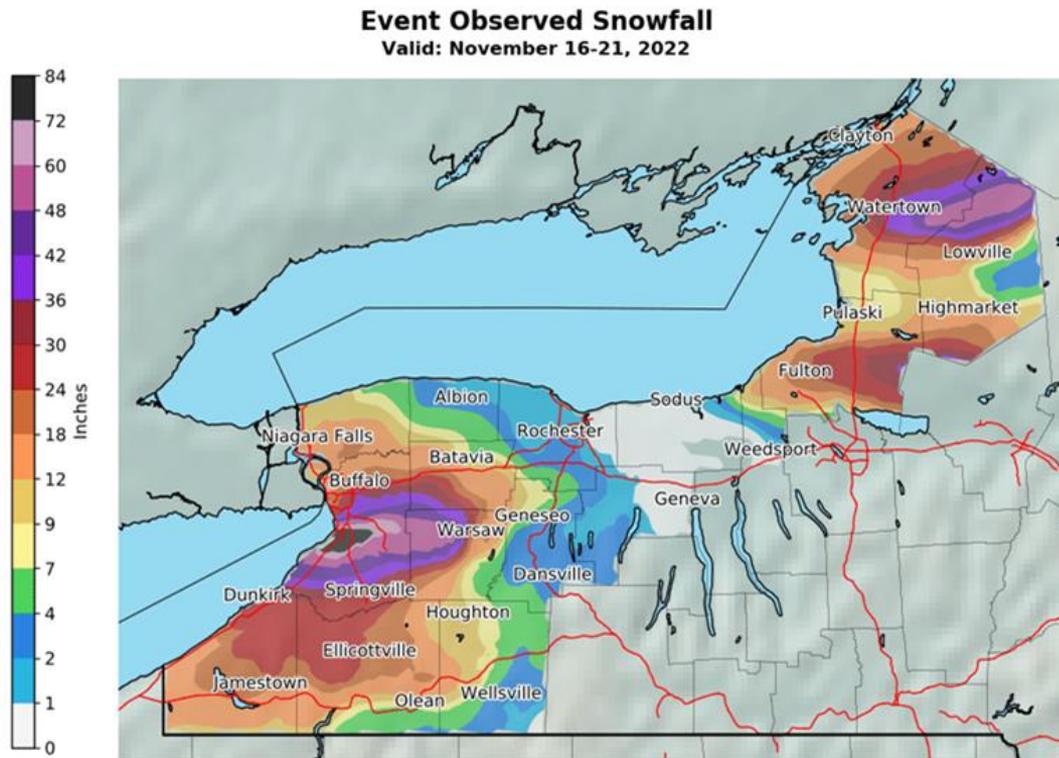
# Snowvember 2014

- Dual event totals generally of 5-7 feet
- Hundreds stranded on the NYS Thruway (I-90)
- Bills game relocated to Ford Field in Detroit
- Named “Winter Storm Knife” by Erie County Executive due to sharp cutoff on northern accumulations
  - Affected primarily the Southtowns
  - Buffalo total was on 6.2 inches
- Not a blizzard



# Snowvember #2 in 2022

- November 16-21
- Up to 5.7" of snow per hour at Buffalo Airport
  - 36.7" total at BUF
  - Unofficial measurements in excess of 80" in Southtowns
- Widespread, continuous thundersnow
- Lake Erie was 52 degrees
- Bills game again moved to Ford Field in Detroit
- Not a blizzard



National Weather Service  
Buffalo New York  
11/27/2022 05:02 AM EST

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# Christmas Blizzard

## December 23-27, 2022

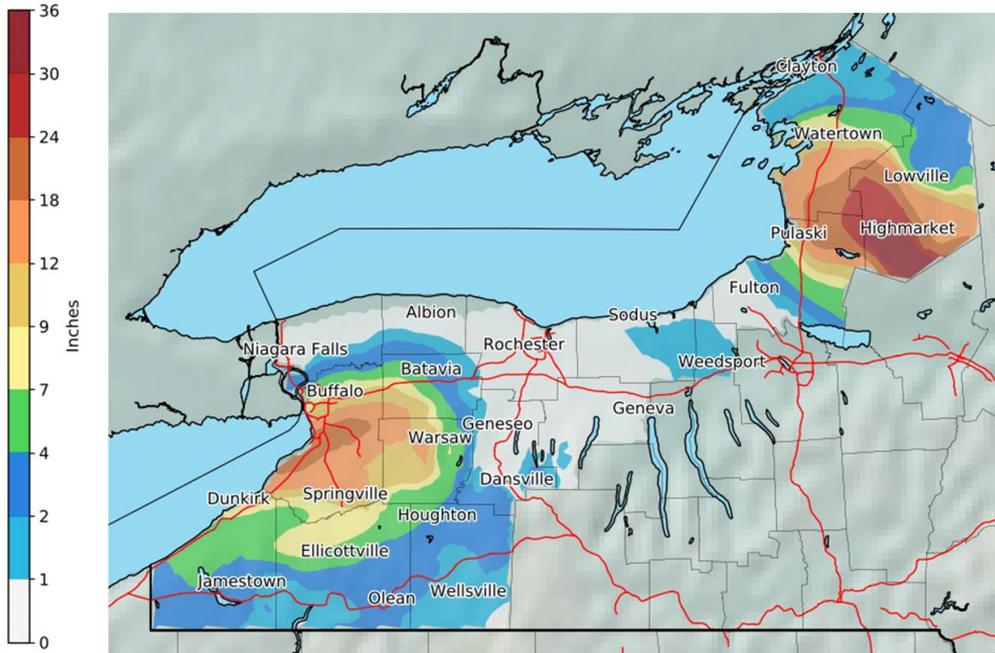


# Dates of the Last Blizzard in WNY

County	Last Verified Blizzard
Niagara	March 12, 2014
Orleans	March 12, 2014
N. Erie	Jan 30, 2019
S. Erie	Feb 27-28, 2020
Genesee	Jan 30, 2019
Wyoming	Feb 27-28, 2020
Chautauqua	Feb 27-28, 2020
Cattaraugus	Feb 27-28, 2020
Allegany	Feb 27-28, 2020
Monroe	March 12, 2014
Livingston	March 12, 2014
Ontario	March 12, 2014
Wayne	March 12, 2014
N. Cayuga	March 12, 2014
Oswego	Feb 27-28, 2020
Jefferson	Feb 27-28, 2020
Lewis	Feb 27-28, 2020

# Days Leading Up to the Blizzard

**Event Observed Snowfall**  
Valid: December 17-20, 2022



**National Weather Service**  
Buffalo New York  
01/09/2023 01:37 PM EST

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- A “forgotten” snow between two massive snow storms
- A “modest” lake effect event ongoing December 17-20
- Up to 23” in the Buffalo Southtowns
- 7-11” in and around the city proper
- Lake effect snow warnings were in effect for this snow through December 20

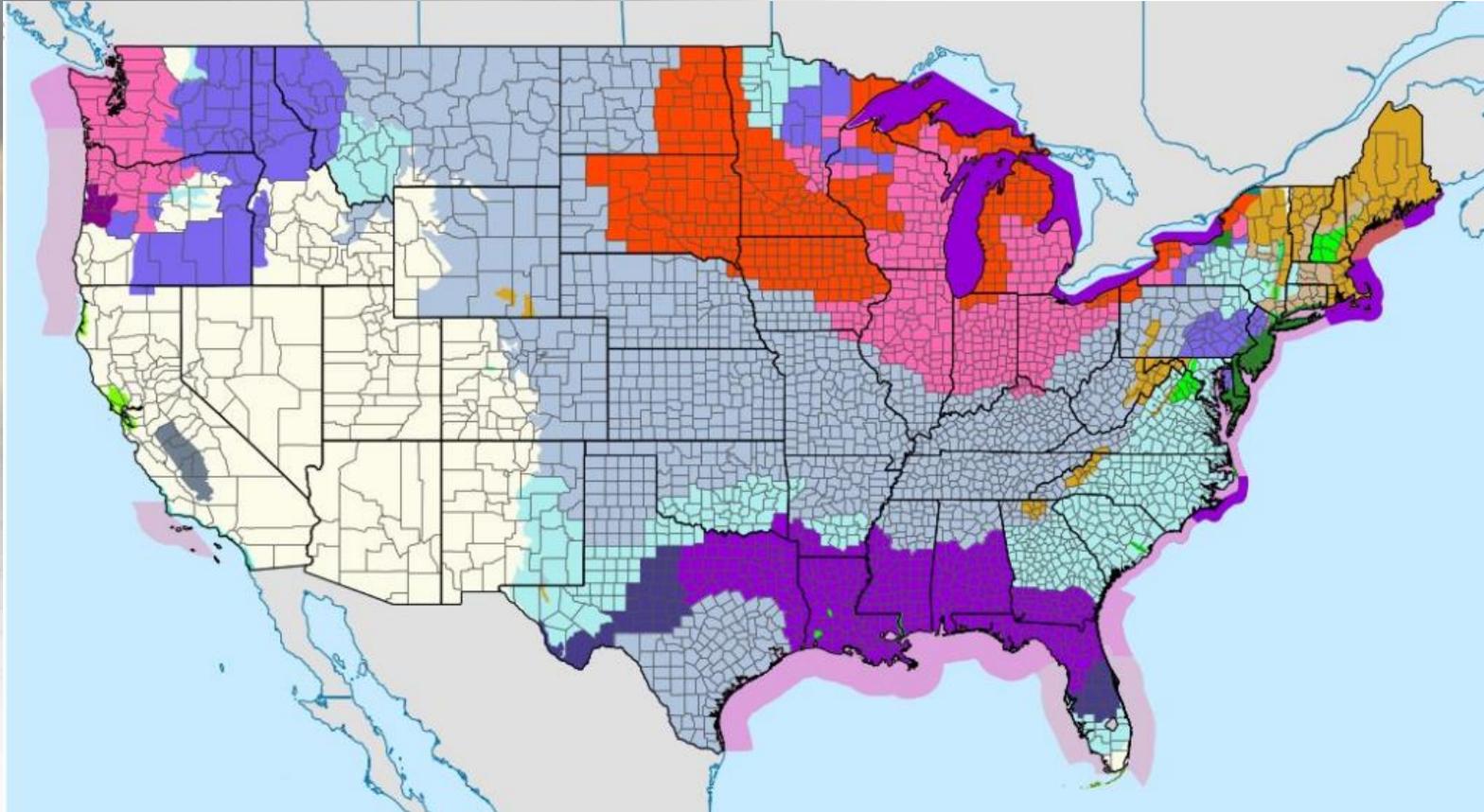
# Days Leading Up to the Blizzard

- 12/18, 4:10 AM – significant impacts from LES to the region for Christmas
- 12/18, 3:53 PM – heavy LES, blowing snow, impacts especially Christmas Eve with lesser wind after
- 12/20, 4:51 AM – Strong mentions in products
  - An extremely amplified longwave pattern during this period will spawn one of the most intense storm systems in decades to impact the Midwest and Great Lakes region.
  - Some of the parameters of this intense storm are forecast to be climatologically 'off the charts'.
  - As if the very real threat for damage producing winds were not enough...there will also be the risk for a prolonged...paralyzing heavy lake effect snow event.
- 12/20, 2:22 PM – Winter Storm/High Wind/Lakeshore Flood/Storm Watches Issued.
  - A rapid switch from rain to snow with sharply falling temperatures into the teens will result in a flash freeze on Friday. From Friday afternoon through most of the weekend, very strong winds, heavy lake effect snow and significant blowing and drifting snow will be possible. Winds could gust as high as 65 mph Friday into Friday night. Localized blizzard conditions are possible.
- 12/21, 4:45 AM – Lakeshore Flood/Storm Warnings Issued.
  - Once in a **Generation** Winter Storm to Slam the Region Heading into and THROUGH the Christmas Weekend

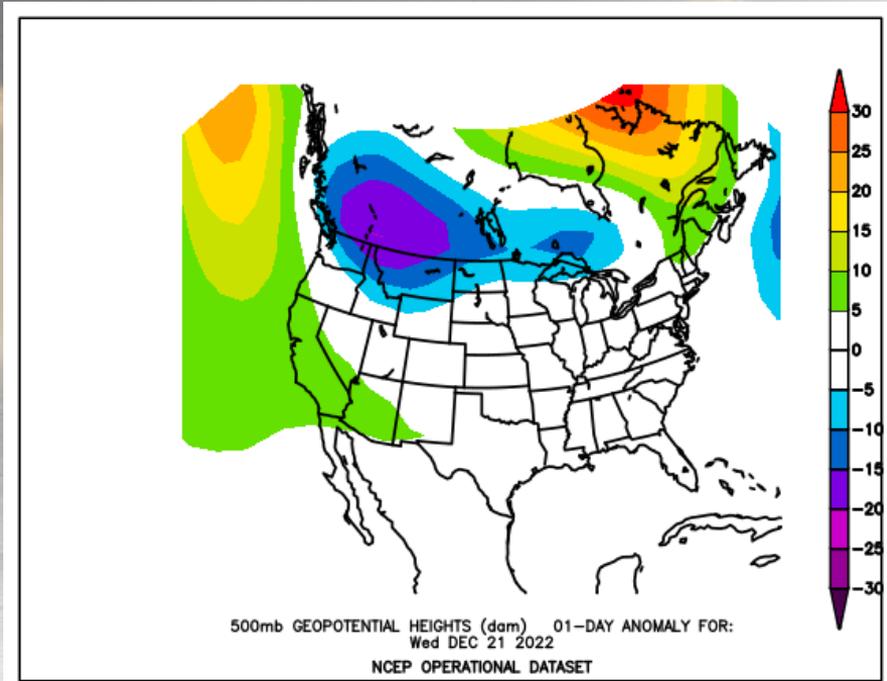
# Days Leading Up to the Blizzard

- 12/22, 3:54 AM – Blizzard Warning Issued
  - True blizzard conditions are rare in Western NY, and it's unusual to even consider blizzard headlines this far in advance of a storm. However, the magnitude of this storm justifies this consideration.
  - 1 to 3 feet, 70 mph winds carried in Blizzard Warning
  - Timing of 7-9 AM on 12/23
- 12/22, 6:48 PM – Blizzard Warning Updated
  - 2 to 3 feet, gusts up to 70 mph, flash freeze, WCI to -20
- 12/23, 8:39 AM
  - Blizzard begins

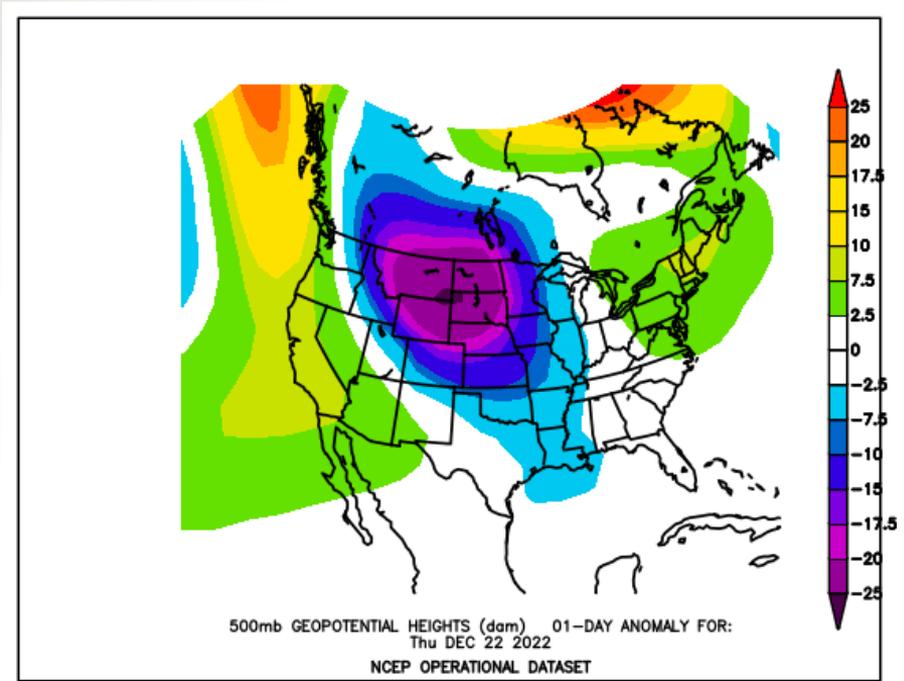
# NWS WWA Map December 23



# 500 hPa Daily Anomalies

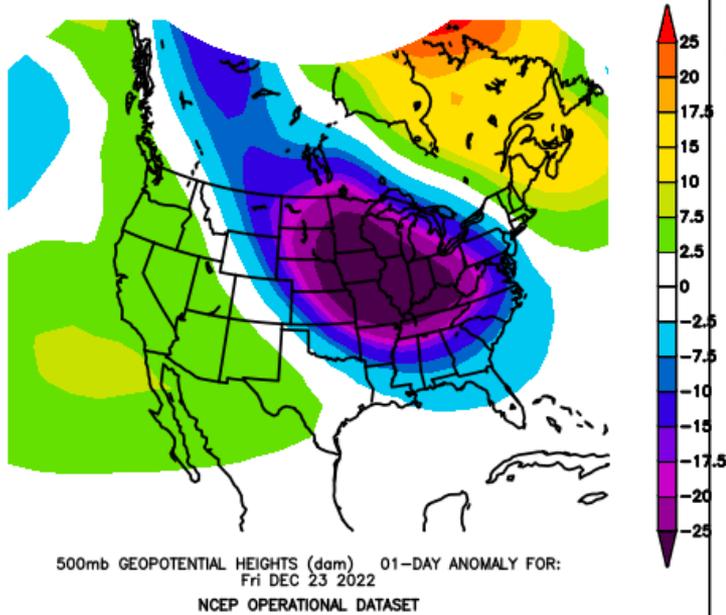


21 December 2022

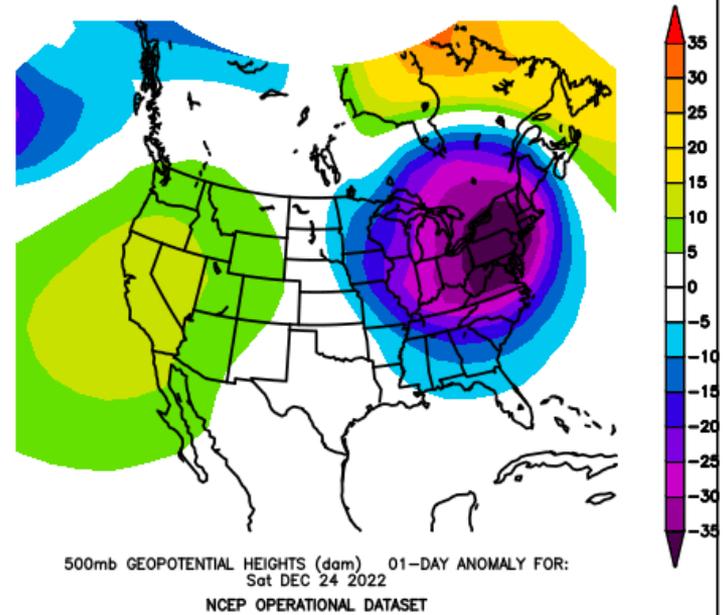


22 December 2022

# 500 hPa Daily Anomalies

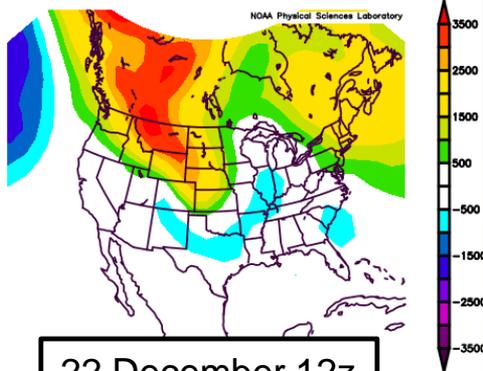


23 December 2022

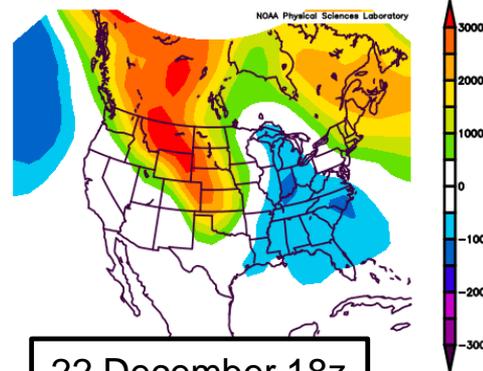


24 December 2022

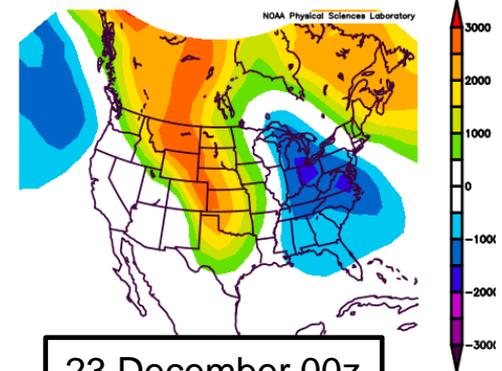
# MSLP Anomalies



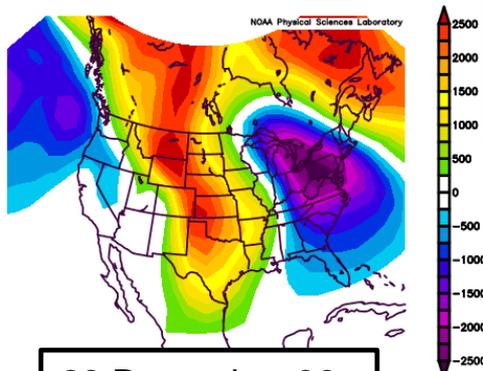
22 December 12z



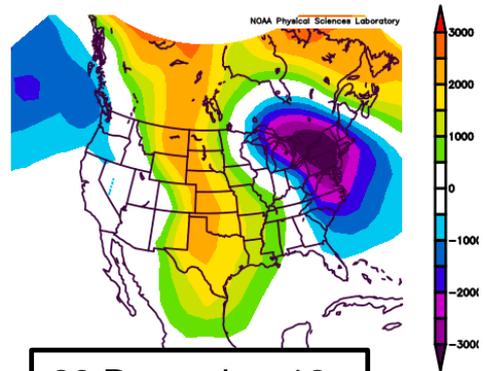
22 December 18z



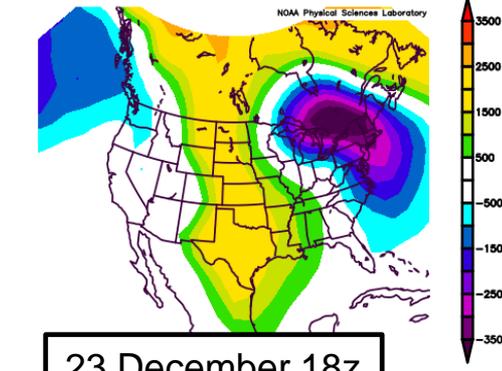
23 December 00z



23 December 06z



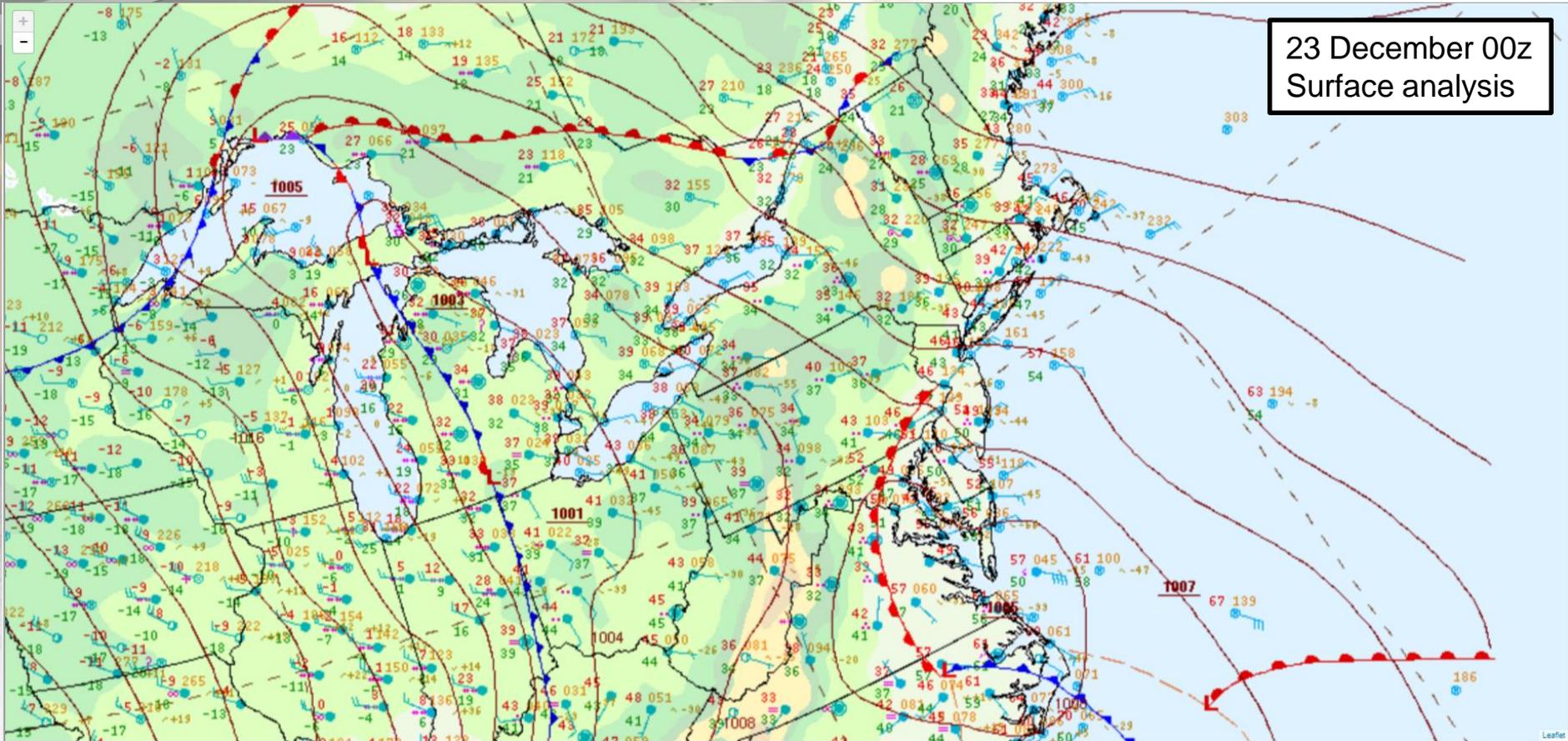
23 December 12z



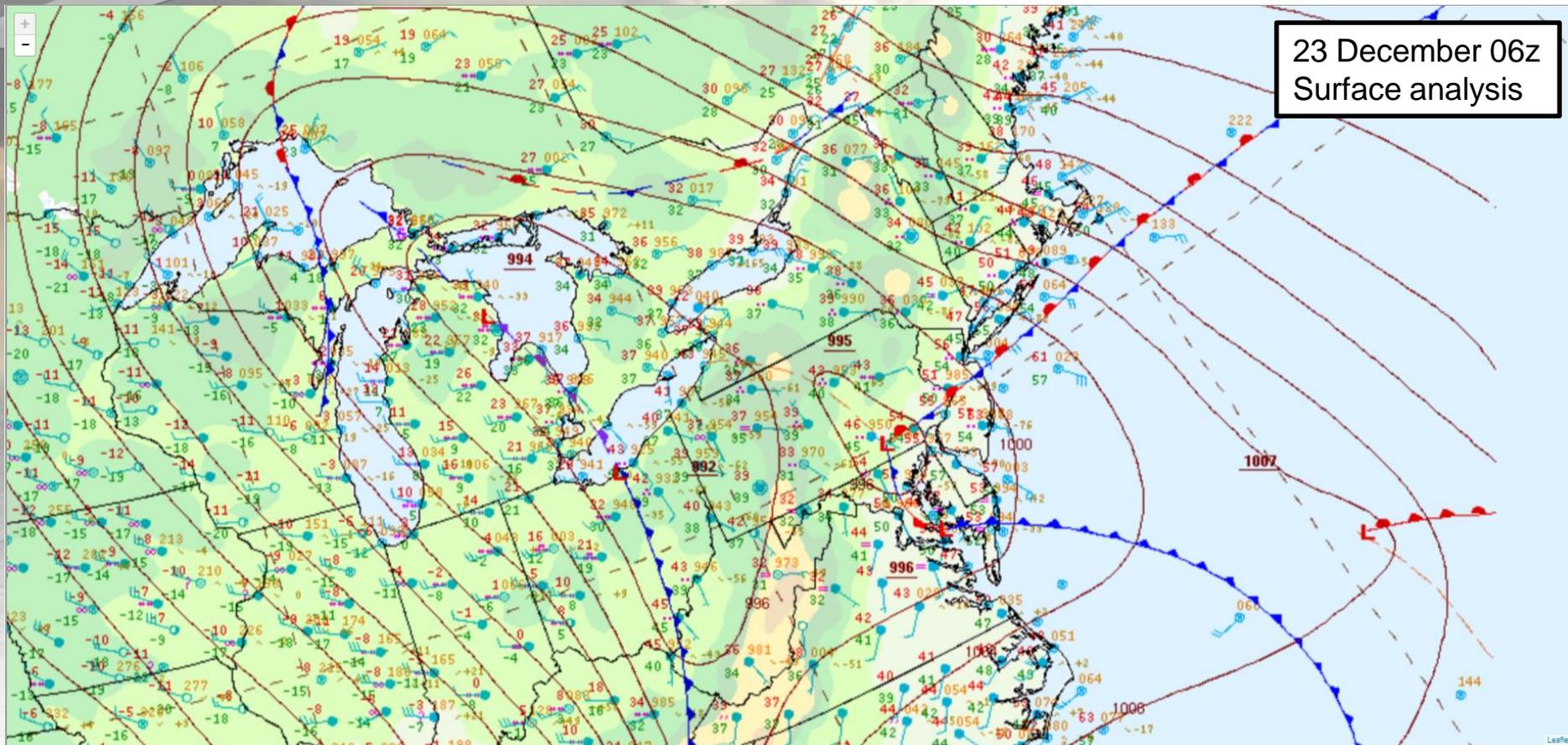
23 December 18z

# Warm and Relative Calm Ahead

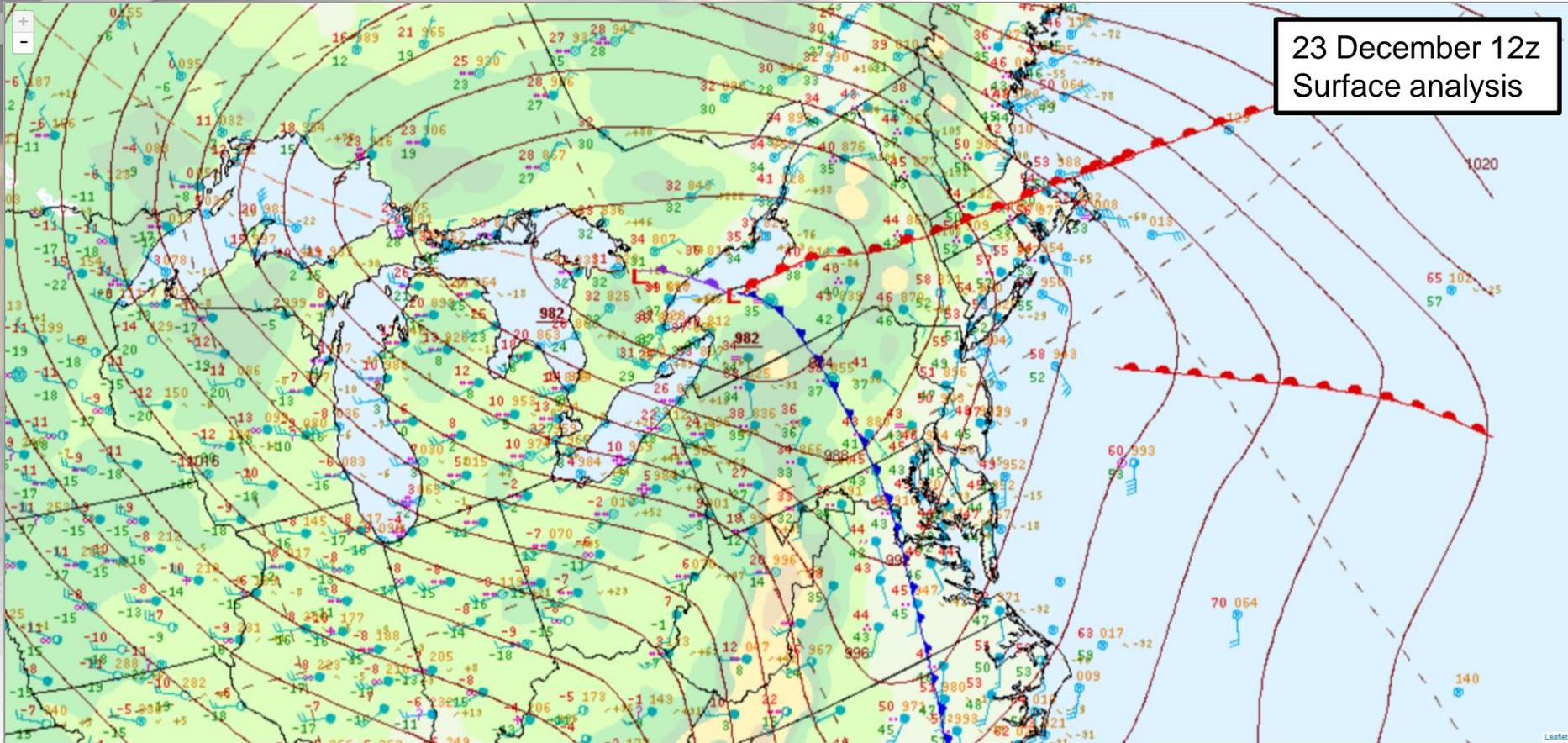
23 December 00z  
Surface analysis



# Warm and Relative Calm Ahead



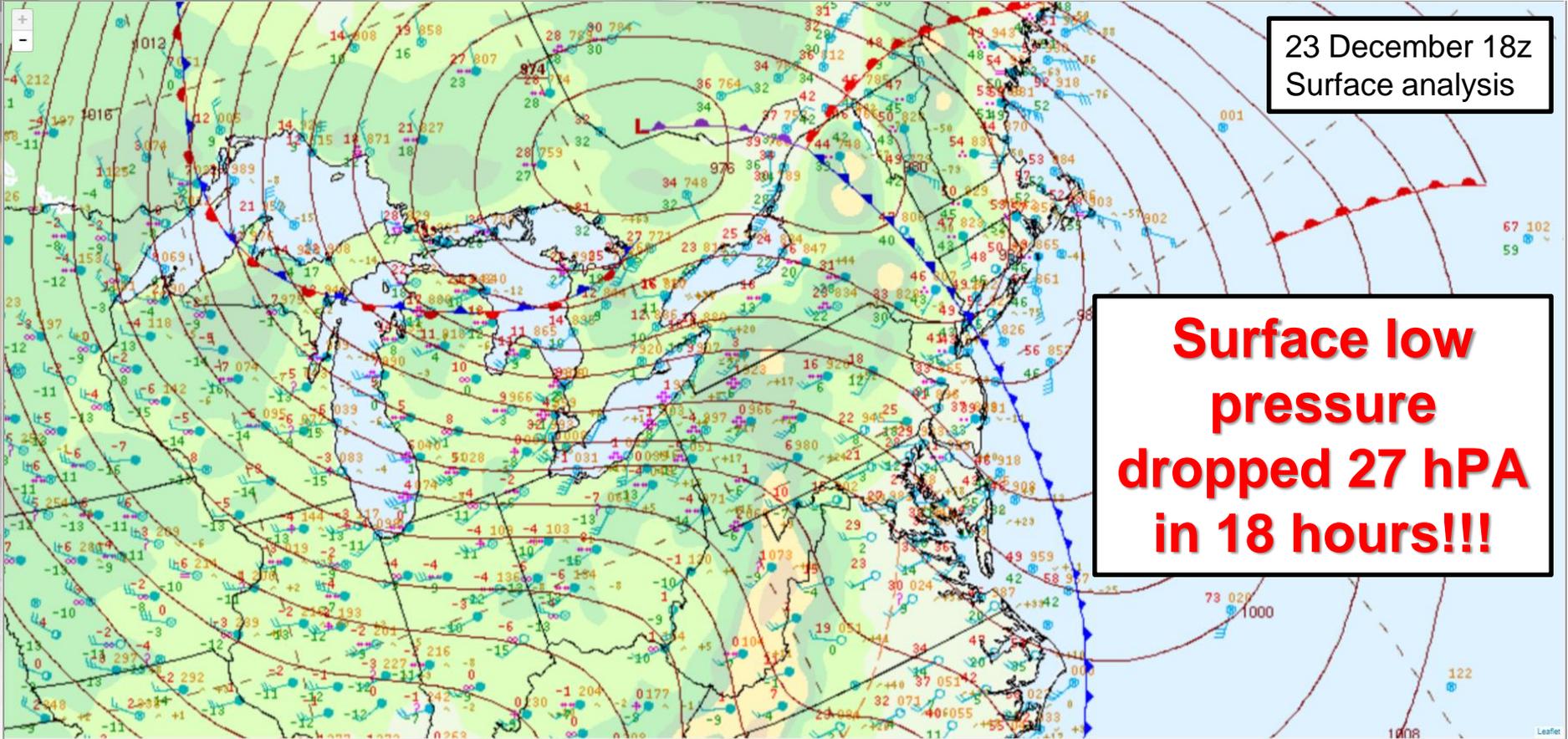
# Everything Changes All at Once



# Blizzard Apex

23 December 18z  
Surface analysis

**Surface low  
pressure  
dropped 27 hPA  
in 18 hours!!!**



# Blizzard Starts

- Buffalo 8:39 AM on 12/23
- Niagara Falls 9:06 AM on 12/23
- Batavia 10:25 AM on 12/23
- Watertown 1:44 PM on 12/23

## Lead time from warning, Time in *continuous* blizzard

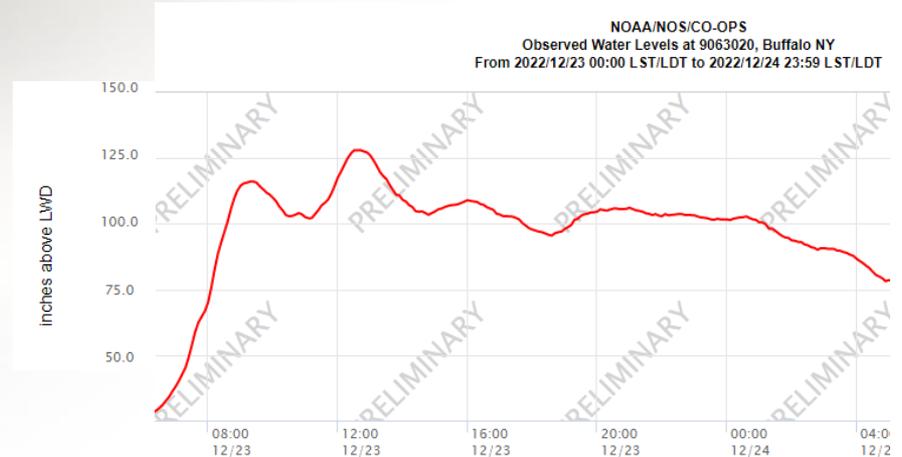
- N Erie 31.75 hours, **over 37 hours in blizzard**
- Niagara 32.2 hours, over 28 hours in blizzard
- Orleans 47.43 hours, over 12 hours in blizzard
- S Erie 67.68 hours, about 3 hours in blizzard
- Genesee 33.52 hours, about 16 hours in blizzard
- Chautauqua 28.9 hours, about 4 hours in blizzard
- Jefferson 36.58 hours, over 25 hours in blizzard

Using 5 minute data  
where available

# Winds and the Lakes

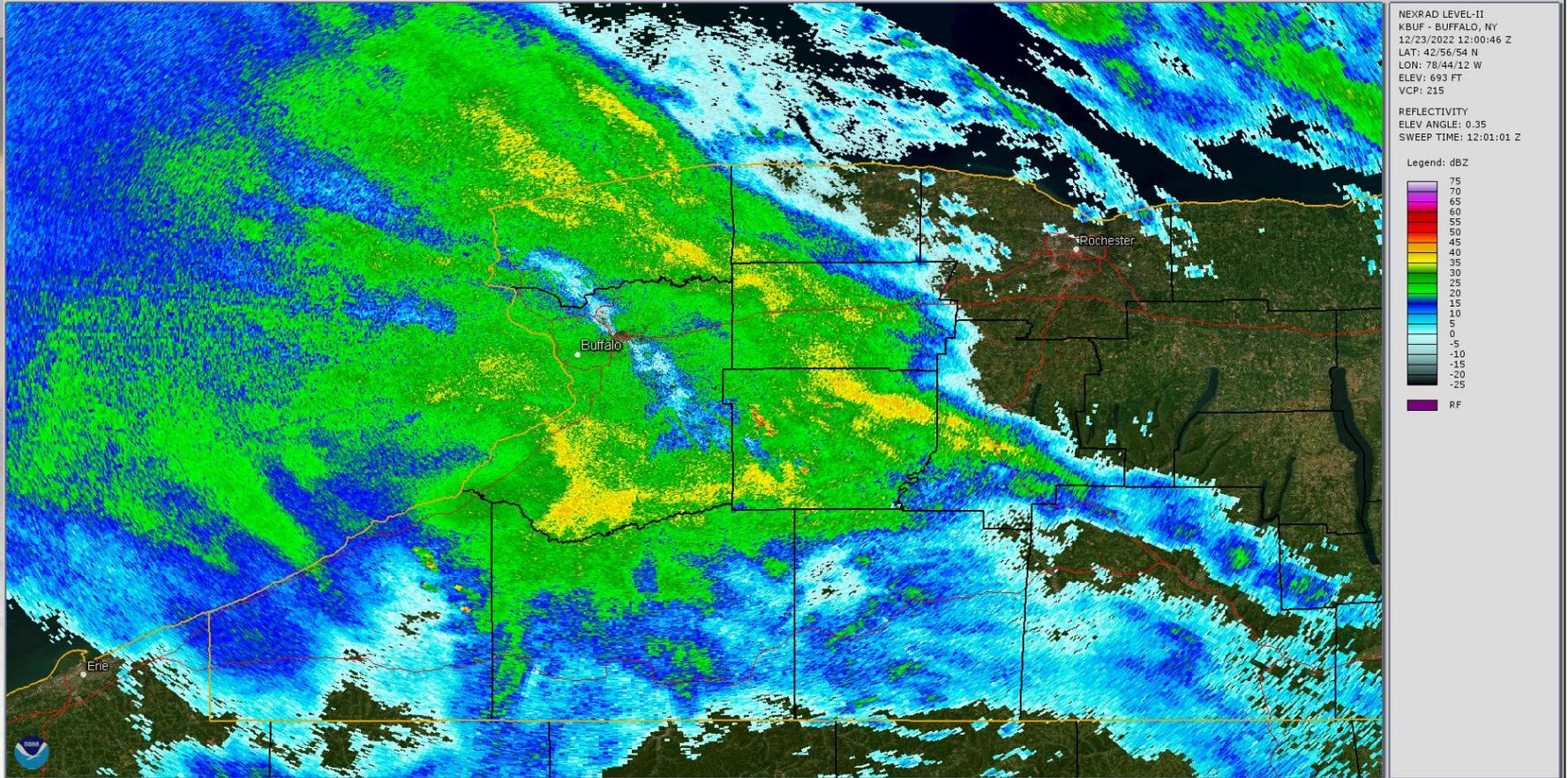
- Peak Gusts
  - Buffalo Downtown 79 mph
  - Buffalo Int'l 72 mph
  - Niagara Falls Int'l 74 mph
  - Warsaw 71 mph
  - Fredonia 70 mph
  - Rochester Int'l 69 mph
  - Watertown 65 mph

- Water levels



- Peak of 10.7 ft
- In flood for 17 hours
- Lake Ontario raised by ~2 ft

# Radar Loop

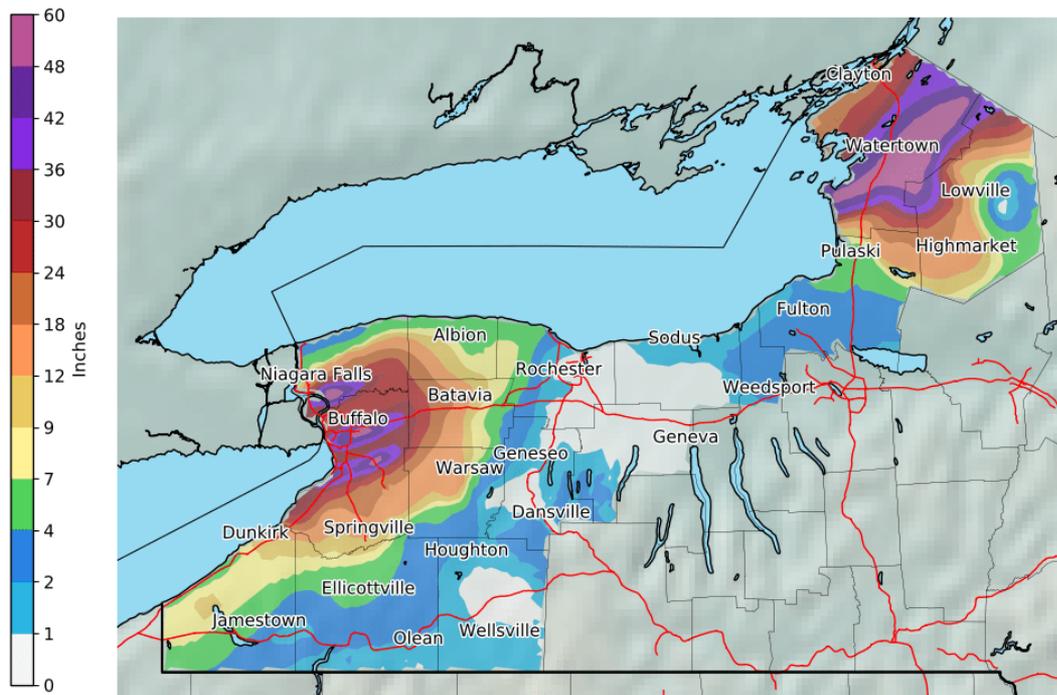


# Snow Totals

- “It never snows in the Northtowns”
- Heaviest snow was in the Northtowns
  - North Tonawanda 59.7”
  - BUF Airport 51.9”

## Event Observed Snowfall

Valid: December 23-27, 2022



National Weather Service  
Buffalo New York  
01/11/2023 02:24 PM EST

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# Comparing Blizzards

- People build mental constructs of what a blizzard is to them
  - These do not align with the criteria for a blizzard
- The Blizzard of 1977 built the mental construct for many in metro Buffalo
- The events were VERY different – different effects on the population
- Preceding events are important
  - 1977 – multiple months of cold, deep continuous snow pack
  - 2022 – Snowvember #2, preceding LES event as warnings were going out; otherwise very warm



Images courtesy of  
WGRZ  
WIVB  
WNED  
Spectrum News  
Buffalo News  
Reuters  
The Weather Channel  
Fox Weather



Questions?

