

A Holiday Period for the History Books: Part Two

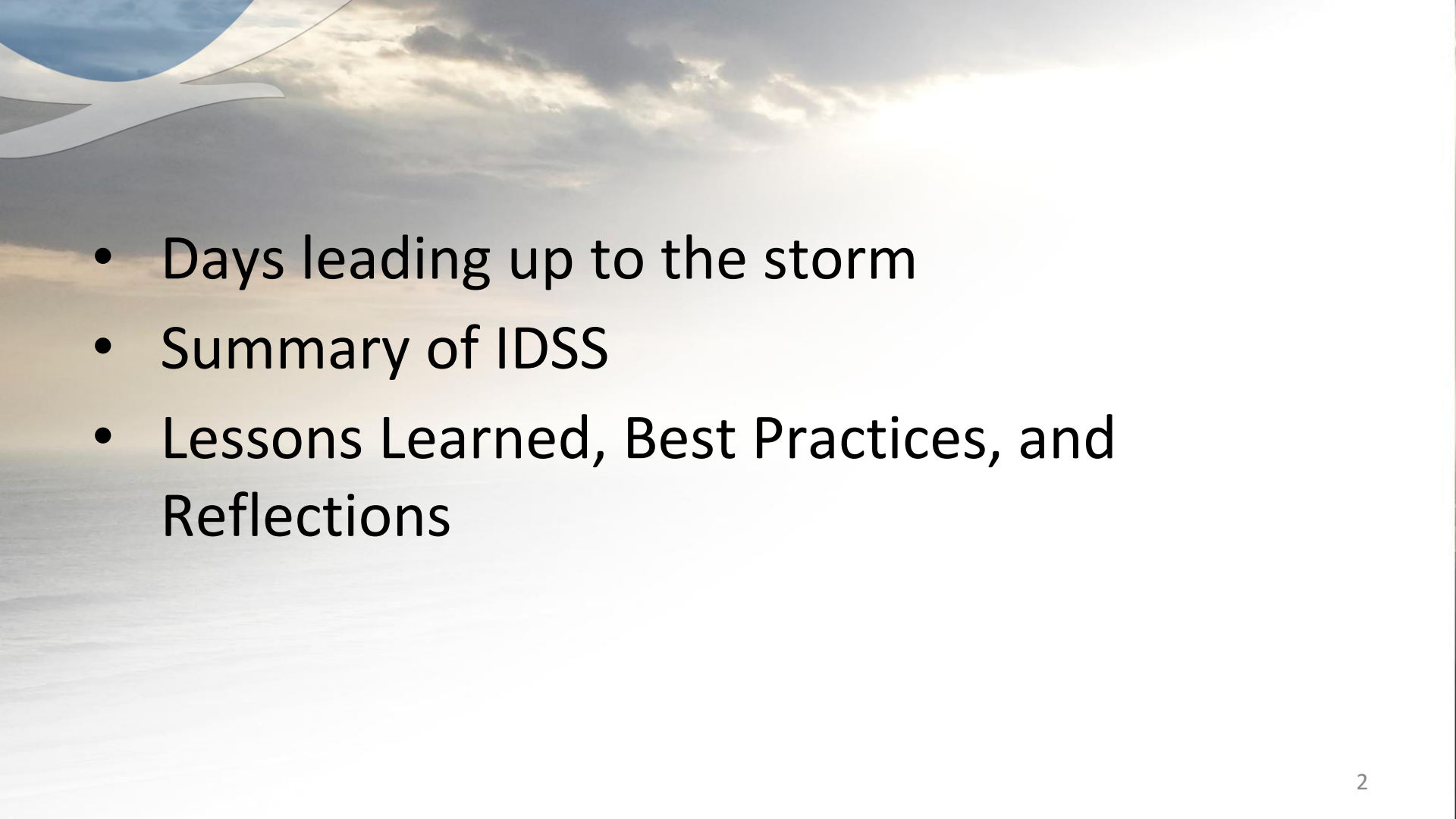
An Inside View of Operations to Support the
Mission and Community

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Meteorologist In Charge

NOAA/NWS Buffalo, NY



- 
- Days leading up to the storm
 - Summary of IDSS
 - Lessons Learned, Best Practices, and Reflections

Sunday – 12/18/2022

5 days before the storm

FLUS41 KBUF 180938
HWOBUF

Hazardous Weather Outlook
National Weather Service Buffalo NY
438 AM EST Sun Dec 18 2022

NYZ001-002-010-011-191000-
Niagara-Orleans-Northern Erie-Genesee-
438 AM EST Sun Dec 18 2022

This Hazardous Weather Outlook is for portions of western New York.

.DAY ONE...Today and tonight.

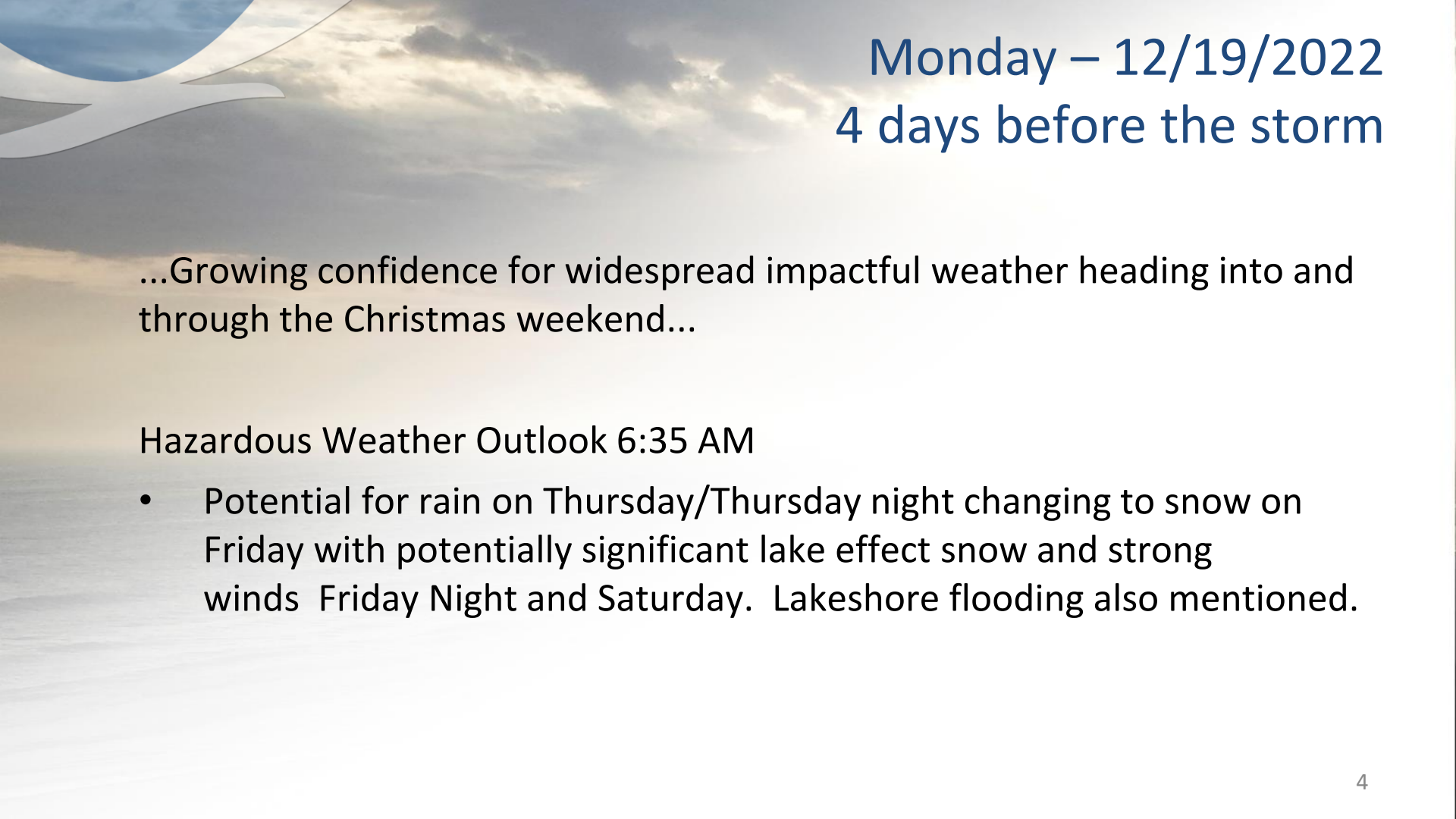
Hazardous weather is not expected at this time.

.DAYS TWO THROUGH SEVEN...Monday through Saturday.

A significant winter storm appears likely to develop and track northeastward across the eastern third of the country Thursday and Friday. While its exact track and resultant impacts on our region remain uncertain this far in advance...this system will likely pose a risk for widespread snow or mixed precipitation Thursday into Friday...followed by much colder conditions and the potential for significant lake effect snow from Friday into Christmas weekend. There is also a chance that the precipitation could be accompanied by strong winds Friday into Saturday.

Hazardous Weather Outlook 4:38 AM

Potential for significant winter storm then significant lake effect snow Thursday through the weekend



Monday – 12/19/2022
4 days before the storm

...Growing confidence for widespread impactful weather heading into and through the Christmas weekend...

Hazardous Weather Outlook 6:35 AM

- Potential for rain on Thursday/Thursday night changing to snow on Friday with potentially significant lake effect snow and strong winds Friday Night and Saturday. Lakeshore flooding also mentioned.

Monday – 12/19/2022

4 days before the storm

A Powerful Storm Will Impact the Holiday Weekend

Thursday

- **Rain**
- May start as a brief rain/snow mix
- *Impact: Low*

Friday

- **Flash Freeze** – temperatures rapidly dropping to the teens, freezing water/slush
- Rain to snow; windy
- *Impact: High*

Friday night – Saturday night

- **Lake effect snow** east/northeast of the lakes
- Very windy with areas of blowing snow
- Temps: teens/single digits
- *Impact: High*

- **Be prepared** for a storm to impact travel heading into the holiday weekend, with power outages also possible
- Exact snow amounts and location are still *uncertain*
- Details will come into better focus during the next couple days



1st Social Media Post - 5:15 PM

“A powerful storm will impact the region heading into the holiday weekend. Here's an overview of the potential weather hazards Thursday through Saturday night.”

Tuesday – 12/20/2022

3 days before the storm

.LONG TERM /THURSDAY NIGHT THROUGH MONDAY/...
...Incredibly Powerful Storm To Impact our Region Heading Into and
THROUGH the Christmas Weekend...

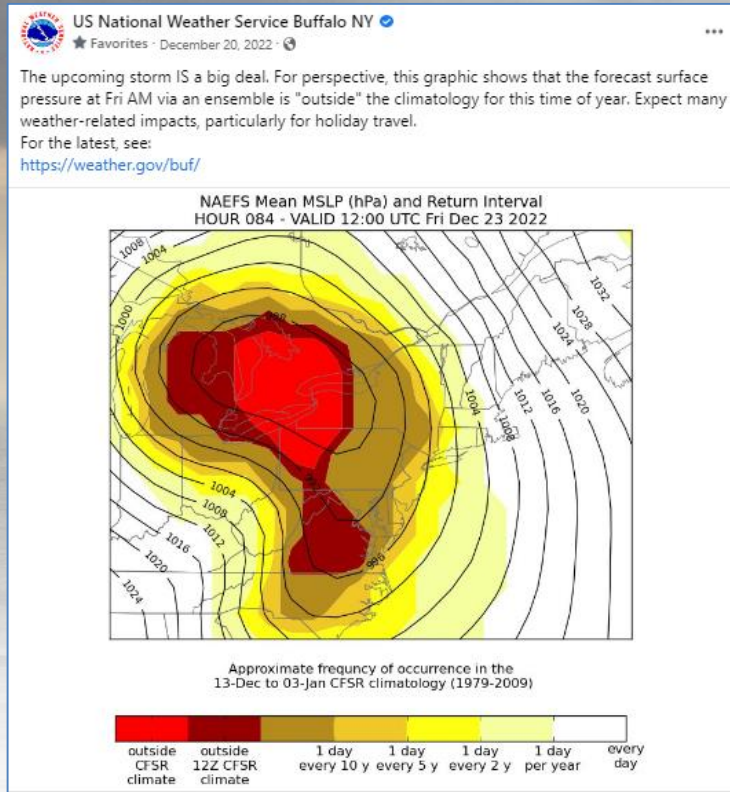
Some of the parameters of this intense storm are forecast to be climatologically 'off the charts'...such as MSLP and strength of both the low level and upper level jets. One could certainly describe this storm system as a once in a generation type of event. Its worth noting that the guidance continues to come into better agreement with the strengthening and track of this system with most of the packages coming into line with the consistent ECMWF solution of a few days ago. This agreement is allowing for increased confidence in the overall solution.

Area Forecast Discussion 4:51 AM

“Some of the parameters of this intense storm are forecast to be climatologically ‘off the charts’...such as MSLP and strength of both the low level and upper level jets. One could certainly describe this storm system as **a once in a generational type of event.**”

Tuesday – 12/20/2022

3 days before the storm



Social Media Post – 11:21 AM

“The upcoming storm IS a big deal. For perspective, this graphic shows that the forecast surface pressure at Fri AM via an ensemble is "outside" the climatology for this time of year. Expect many weather-related impacts, particularly for holiday travel.”

Tuesday – 12/20/2022

3 days before the storm

WINTER STORM WATCH ISSUED 2:22 PM

FORECAST:

- Flash Freeze
- High winds >65 mph
- Heavy Lake Effect Snow
- Blizzard Conditions
- Wind Chills 10 to 20 below zero
- Power Outages
- Tree Damage
- Dangerous to impossible travel

URGENT - WINTER WEATHER MESSAGE
National Weather Service Buffalo NY
222 PM EST Tue Dec 20 2022

NYZ001-002-010>012-019-020-085-210330-
/O.NEW.KBUF.WS.A.0016.221223T1200Z-221226T1200Z/
Niagara-Orleans-Northern Erie-Genesee-Wyoming-Chautauqua-
Cattaraugus-Southern Erie-
Including the cities of Niagara Falls, Medina, Buffalo, Batavia,
Warsaw, Jamestown, Olean, Orchard Park, and Springville
222 PM EST Tue Dec 20 2022

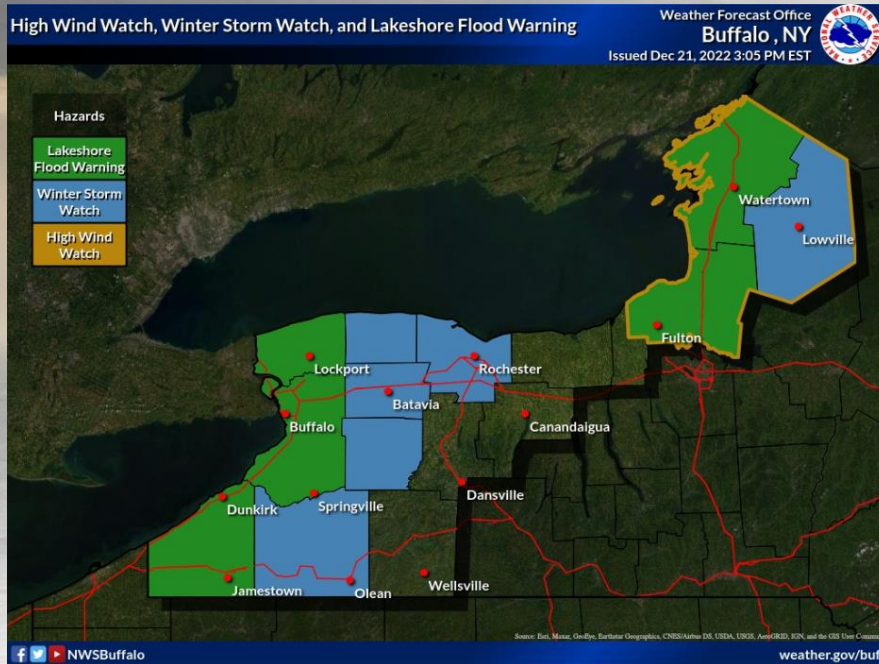
...WINTER STORM WATCH IN EFFECT FROM FRIDAY MORNING THROUGH
MONDAY MORNING...

- * WHAT...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.
- * WHERE...Niagara, Orleans, Erie, Genesee, Wyoming, Chautauqua, and Cattaraugus counties.
- * WHEN...From Friday morning through Monday morning.
- * IMPACTS...Travel for the holiday weekend, including Friday, could be very difficult to impossible at times. Areas of blowing snow could significantly reduce visibility with whiteouts and localized blizzard conditions possible. The most persistent and worst conditions will be where lake effect snow is most widespread, which is still uncertain at this time. Winds this strong could cause tree damage and power outages. Cold wind chills as low as 10 to 20 below zero this weekend could cause frostbite on exposed skin in as little as 30 minutes.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

Begin needed preparations at home or with your vehicle. Travel may become difficult or impossible at times this holiday weekend, so plan accordingly.

Wednesday – 12/21/2022
2 days before the storm



WINTER STORM WATCH EXTENDED

Area expanded...

...further inland off Lake Erie

...counties east of Lake Ontario

Hello Monroe County!

Wednesday – 12/21/2022

2 days before the storm

Social Media 9:02 PM

“With the upcoming storm for the holiday weekend that has multiple headlines in effect already, let’s talk timeline...”

Thursday and Thursday Night

Hazards:
 Wind

Travel Impacts:
 Normal

- Rain to spread from SOUTH to NORTH across the area Thursday afternoon
- Rainfall amounts:
 - Far WNY: QUARTER to HALF of an inch
 - Elsewhere: HALF to ONE inch
- STRONG to DAMAGING downslope Winds Thursday night for parts of the Tug Hill Plateau and Chautauqua Ridge (to a lesser extent)
- Temperatures warm overnight

Rainfall Amounts Thursday and Thursday Night

Maximum Wind Gusts Thursday Night

Friday

Hazards:
 Rain to Snow
 Wind
 Blowing Snow
 Power Outages
 Wind Chill
 Lakeshore Flooding

Travel Impacts:
 Caution

- Rain across the area Friday morning
- Arrival of cold air from SW to NE
- Rain quickly switches to snow with arrival of cold air
- Winds will shift from SE to SW and continue to strengthen
- Lake effect snow to set up Friday afternoon across the Niagara Frontier

Temperatures 3 AM

Temperatures 3 PM

Maximum Wind Gusts

Cold Air Arrives

FLASH FREEZE TO OCCUR

Friday Night

Hazards:
 Lake Effect Snow
 Wind
 Blowing Snow
 Power Outages
 Wind Chill
 Lakeshore Flooding

Travel Impacts:
 Caution

- Heavy lake effect snow
- Plume of snow will NOT be narrow but have a wider footprint
- Time frame for strongest wind gusts

Maximum Wind Gusts

Saturday and Saturday Night

Hazards:
 Lake Effect Snow
 Wind
 Blowing Snow
 Power Outages
 Wind Chill
 Lakeshore Flooding

Travel Impacts:
 Caution

- Lake effect snow band to shift SOUTH Saturday into Saturday night
- Winds will diminish some later Saturday but will still be strong

Maximum Wind Gusts

Confidence in Lake Effect Band Placement

Sunday and Sunday Night

Hazards:
 Lake Effect Snow
 Wind
 Blowing Snow
 Wind Chill

Travel Impacts:
 Caution

- Lake effect snow band to shift further SOUTH
- Winds will continue to diminish but will remain blustery

Maximum Wind Gusts

Confidence in Lake Effect Band Placement

Monday

Hazards:
 Lake Effect Snow

Travel Impacts:
 Caution

- Lake effect snow will be ongoing off of both Lakes Erie and Ontario
- Intensity of lake bands uncertain
- Lake bands should drift south throughout the day

Confidence in Lake Effect Band Placement



Thursday – 12/22/2022 1 day before the storm

WARNINGS ISSUED 3:54 AM BLIZZARD AND WINTER STORM

- Rapidly falling temperatures Friday morning
- Lake effect snow beginning Friday afternoon, continuing through the weekend
- Winds gusting to 50-70 mph Friday through Saturday
- Blowing snow/near zero visibility
- Wind chills 10 to 25 below zero
- Lakeshore Flooding

Thursday – 12/22/2022
1 day before the storm

The message was getting out!

COUNTY OF ERIE COUNTY OF ERIE

NATIONAL WEATHER SERVICE WFN
Blizzard Warning, High Wind Warning, Winter Storm Warning, Lakeshore Flood Warning, Storm Warning, Gale Warning, and Heavy Freezing Spray Warning

Decision Support Briefing #4
As of: 7:00 AM December 22, 2022

What's New?




- ✓ **Blizzard Warning** in effect for Niagara, Erie, Orleans, and Genesee counties
- ✓ **Winter Storm Warning** in effect for Chautauqua, Cattaraugus, Wyoming, Monroe, Jefferson, and Lewis counties
- ✓ **Winter Weather Advisory** in effect for Allegany, Livingston, Ontario, Wayne, northern Cayuga, and Oswego counties
- ✓ **High Wind Warning** for Jefferson, Lewis, and Oswego counties
- ✓ **Heavy Freezing Spray Warning** in effect for Lake Ontario

Blizzard Warning
Winter Weather Headlines
Winter Weather Marine Headlines

Erie County
December 22, 2022

Screenshot of Erie County Storm Conference (County Executive upper left)

Thursday – 12/22/2022 1 day before the storm

 US National Weather Service Buffalo NY  December 22, 2022 · 

Perspective: A Blizzard Warning is for 35+ mph winds + 1/4 mi visibilities from snow (or blowing snow), for 3+ hrs.

At Buffalo, we expect blizzard conditions for ~30 hrs, with peak winds ~70 mph.



Don't focus on snow totals. Power outages + stranded cold travelers are higher impacts.





Perspective:

A Blizzard Warning is for 35+ mph winds + 1/4 mi visibilities from snow (or blowing snow), for 3+ hrs.

At Buffalo, we expect blizzard conditions for **~30 hrs**, with peak winds **~70 mph**.

Don't focus on snow totals. Power outages + stranded cold travelers are higher impacts.

  301 67 comments 492 shares

 Like  Comment  Share 

The message was:

“Don’t focus on snow totals”

1:09 PM

Friday – 12/23/2022

1st day of the storm

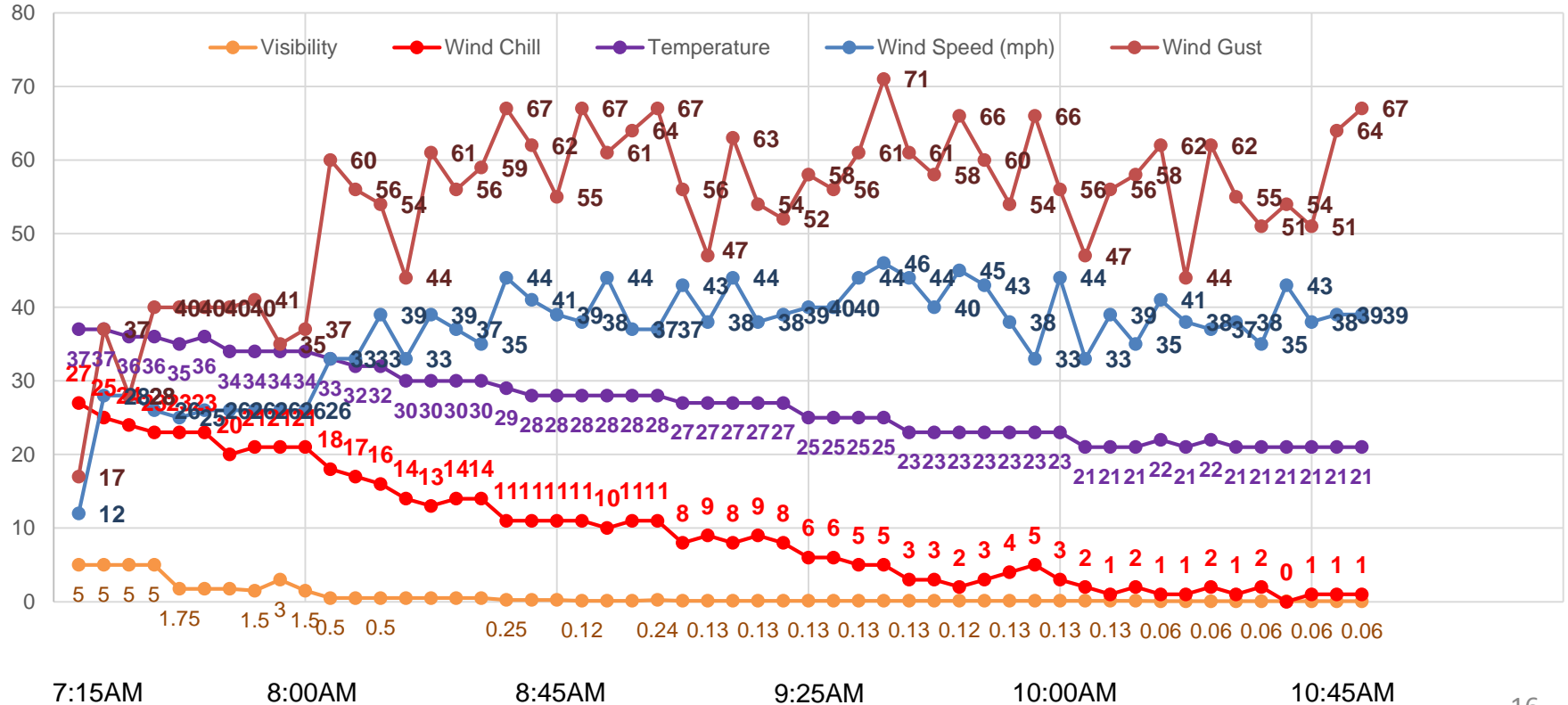
Time	Temperature	Wind Chill	Weather	Visibility	Wind Speed	Wind Gust
6:00AM	38	33	Lt Rain	8	6	
7:00AM	37	32	Lt Rain	3	5	
7:20AM	37	30	Lt Rain/Snow	1.75	12	17
7:40AM	36	23	Lt Rain/Snow	5	26	40
8:00AM	34	21	Lt Snow	1.5	26	41
8:20AM	30	14	Snow	0.5	33	44
8:40AM	28	11	Heavy Snow	0.25	44	67

Friday – 12/23/2022
1st day of the storm



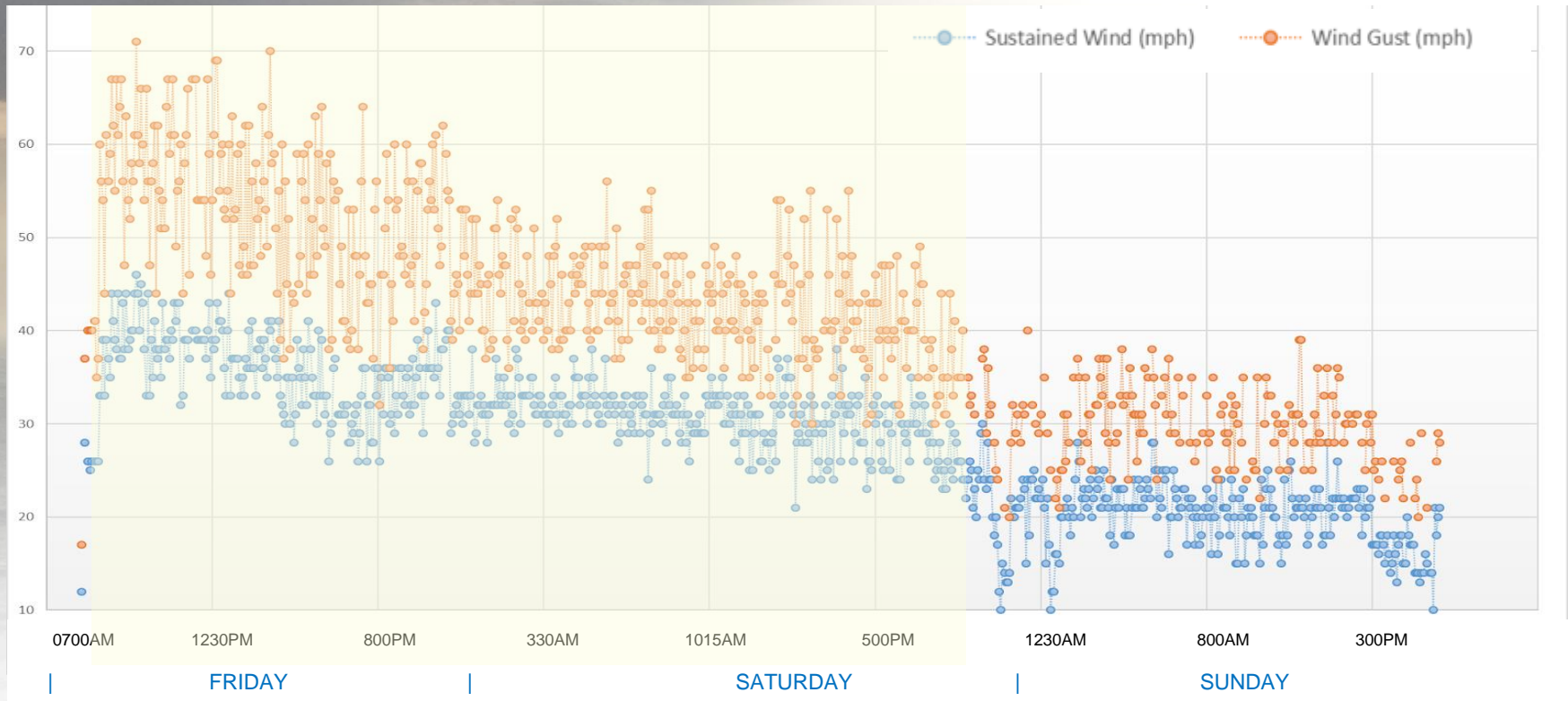
Friday – 12/23/2022

1st day of the storm



Friday – 12/23/2022

1st day of the storm

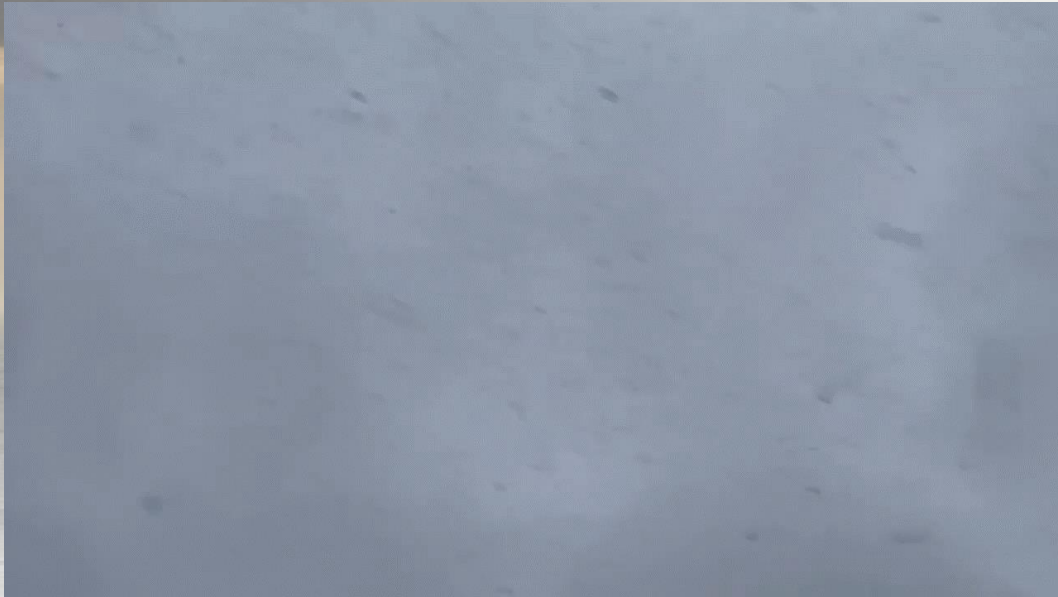


Friday – 12/23/2022
1st day of the storm



Friday – 12/23/2022

1st day of the storm

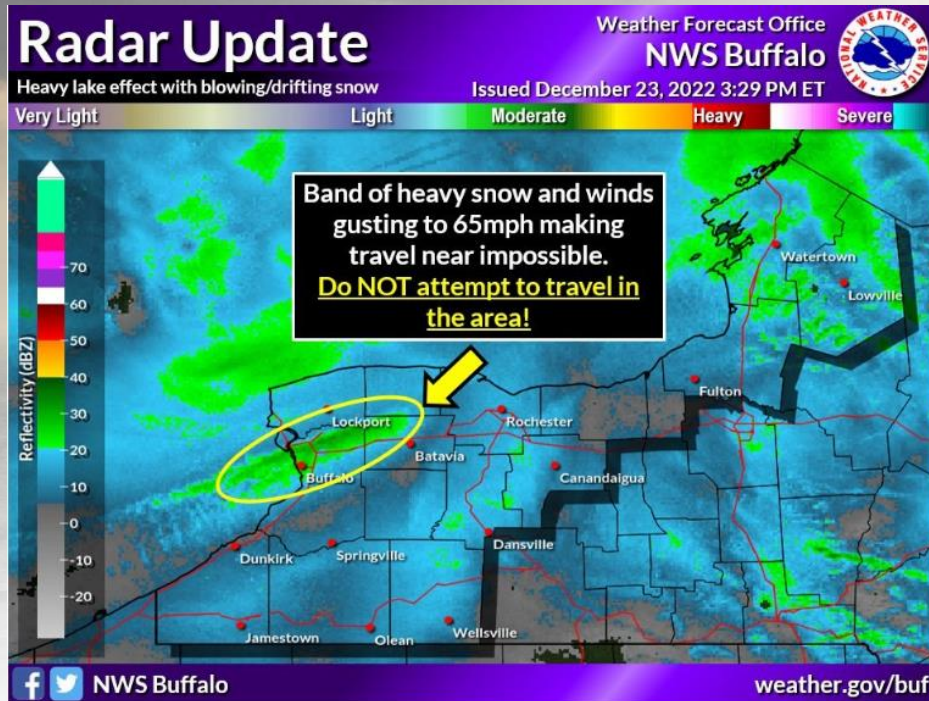


Social Media Post – 3:00 PM

“So what does "zero mile" visibility look like? Well, here's a spectacular view of our parking lot near the airport. Yes, there are cars parked just a few feet away.

We don't even want to be parked in it, you **definitely** don't want to be driving in it. Seriously.”

Friday – 12/23/2022 1st day of the storm

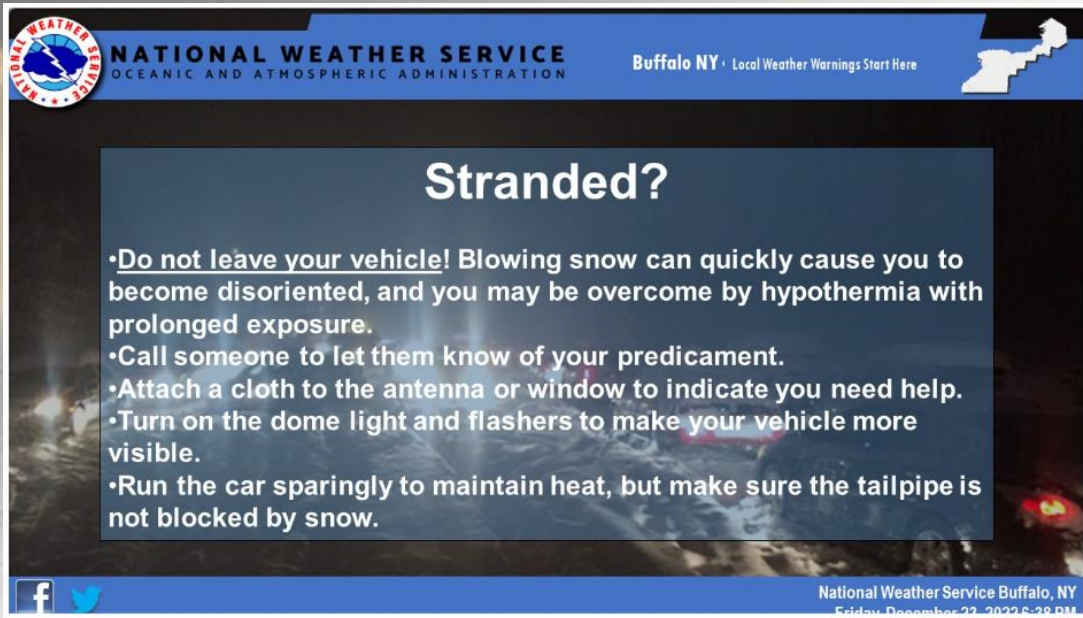


Social Media Post ~ 4:00 PM

“A band of heavy lake effect snow northeast of Lake Erie with very strong winds is creating blizzard conditions with zero or near zero visibilities. Don't focus too much on the snow totals... Significant blowing and drifting will be occurring. Avoid travel in the area!”

Friday – 12/23/2022
1st day of the storm

Social Media Post ~ 6:45 PM



NATIONAL WEATHER SERVICE
OCEANIC AND ATMOSPHERIC ADMINISTRATION

Buffalo NY · Local Weather Warnings Start Here

Stranded?

- Do not leave your vehicle! Blowing snow can quickly cause you to become disoriented, and you may be overcome by hypothermia with prolonged exposure.
- Call someone to let them know of your predicament.
- Attach a cloth to the antenna or window to indicate you need help.
- Turn on the dome light and flashers to make your vehicle more visible.
- Run the car sparingly to maintain heat, but make sure the tailpipe is not blocked by snow.

National Weather Service Buffalo, NY
Friday, December 23, 2022 6:45 PM

“We are hearing about numerous reports of people being stranded on roadways. (We're stranded here too, but safe inside.) Here are some VERY important safety tips.

“Do not leave your vehicle”!

Wind chills have dropped to near -20 below with ongoing whiteouts.”



Friday – 12/23/2022

1st day of the storm

By Friday evening:

- Driving banned in Erie, Genesee, Niagara and Orleans counties
- Tens of thousands already without power
- Erie County 911 center stressed
 - Averaging 400 calls per hour
- County/Town road crews pulled off the road

Conference calls/Email briefings continue

Saturday – 12/24/2022
2nd day of the storm

No Emergency Services Available

**-Buffalo - Cheektowaga
-Tonawanda -Kenmore
-Amherst -Clarence
-Lancaster -Williamsville**



The City of Buffalo
Common Council

Saturday Morning:

- Blizzard conditions continue
- “A very, very bad night...”
- Hundreds stuck in vehicles
- In hardest hit area, two-thirds of emergency vehicles stuck
- No road crews across the northern sections

Conference calls/Email briefings continue

Saturday – 12/24/2022

2nd day of the storm



Saturday Afternoon:

- Power outages increase
 - “Restoration maybe Monday...”
- City of Buffalo described as “Ground Zero”
- Some County/Town road crews back out as lake effect band shifts slightly north
- Towing of stranded vehicles begins

Conference calls/Email briefings continue

Saturday – 12/24/2022
2nd day of the storm



Saturday – 12/24/2022
2nd day of the storm



Saturday – 12/24/2022

2nd day of the storm



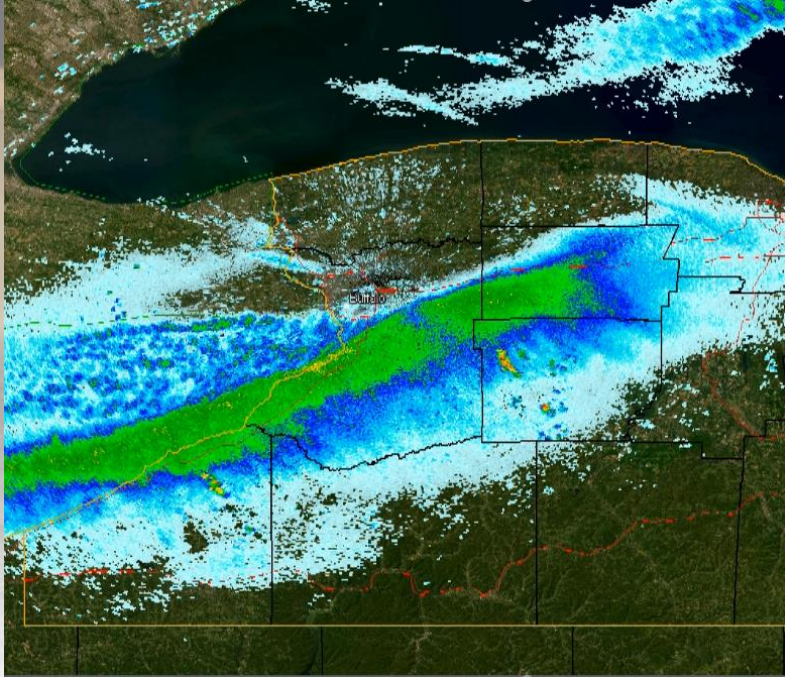
Saturday Evening:

- Blizzard conditions continue
- States of Emergency, Driving Bans remain
- First three confirmed deaths
 - All three found outdoors

Conference calls/Email briefings continue

Sunday – 12/25/2022

3rd day of the storm



Early Sunday morning:

- Lake snow drifted south giving respite to hardest hit areas.
- Power outages continue
 - Substations snowed under and frozen
- Still in “rescue” mode
- Four more people found dead in snowbanks and cars
- Frozen pipes becoming an issue

Sunday – 12/25/2022

3rd day of the storm

Sunday morning:

- Blizzard Warnings cancelled
- Blue skies appearing at the WFO!
- Some driving bans being lifted
- Tens of thousands still without power. About 15% of the City of Buffalo dark
- Twelve confirmed deaths

Conference calls/Email briefings continue

Sunday – 12/25/2022

3rd day of the storm

Sunday evening:

- Airport still closed
- Unable to get into Upper Air Building
- Relief for those stuck!



Monday – 12/26/2022

4th day of the storm



- Finally able to get inside the Upper Air Building
- First balloon release since Friday morning.

Buffalo Airport reopened on Wednesday



Some scenes from around the office



Summary of IDSS

- 35 Partner Conference calls over seven days
 - NYS DOT, NYS Thruway, NYS MAC, NFTA (BUF Airport), Emergency Management
- 15 Email briefing packages sent (12/20-12/27)
- Media calls from local, national, and international outlets
- Over 200 Twitter/Facebook Posts over a 10-day period
 - Impressions: Over 3 million on Twitter and 1 million on Facebook on 12/23 alone!

Storm Summary

- **Start Time of Blizzard Conditions** at Buffalo Airport: 8:40AM EST Friday 12/23/22
 - Continuous blizzard conditions *(using 5 minute obs) at the Buffalo Airport for about 37 hours from 8:40AM Friday 12/23/22 to 9:54PM Saturday 12/24/22
- **Snowfall Totals:**
 - Buffalo Airport: 51.9”
Widespread 2-3 feet across the Buffalo Metro area with local amounts of over 3 feet, difficult to measure due to severe blowing and drifting
 - Daily Record Set: 22.3” on Friday 12/23/22 - previous record 12.6” in 1976
- **Peak Wind Gusts:**
 - Buffalo Airport: 72mph at 9:40AM EST 12/23/22
 - Niagara Falls Airport: 74 mph at 9:24PM EST 12/23/22
 - Downtown Buffalo: 79 mph at 10:10AM EST 12/23/22

A Total of 48 Deaths Attributed to the Storm

Deaths by Age:

- 20s – 3
- 30s – 0
- 40s – 5
- 50s – 9
- 60s – 14
- 70s – 8
- 80s – 4
- 90s -1
- Unknown – 4

Deaths by Gender:

- Female – 19
- Male – 25
- Unknown - 4

Deaths by Location/Cause:

- Outside – 18
- Indoors – 11
- Automobile – 4
- Shoveling/Snowblowing – 4
- Delayed EMS response – 7
- Injuries sustained during the storm - 2
- Unknown - 2

Lessons Learned, Best Practices, and Reflections

- Facilities
- Briefing consistency
- Email briefing templates
- Social Media Engagements
- How is everyone doing?
- The Outcomes





Questions?

Photo Credits:

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Jon Hitchcock, WFO Buffalo

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Phillip Pandolfo, WFO Buffalo

David Thomas, WFO Buffalo

Dave Zaff, WFO Buffalo