



Department of  
Transportation



Weather and Climate  
Analytics Center of  
Excellence

# NYSDOT Snow & Ice Operations WINTRE-MIX Workshop

WEATHER FORECASTING TRIGGERS AND  
OBSERVED WEATHER RESPONSE TACTICS

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Snow and Ice Program Manager

May 2023

# Snowbank Graffiti

## Courtesy of Pompey in CNY



## Background

### Operational Goals:

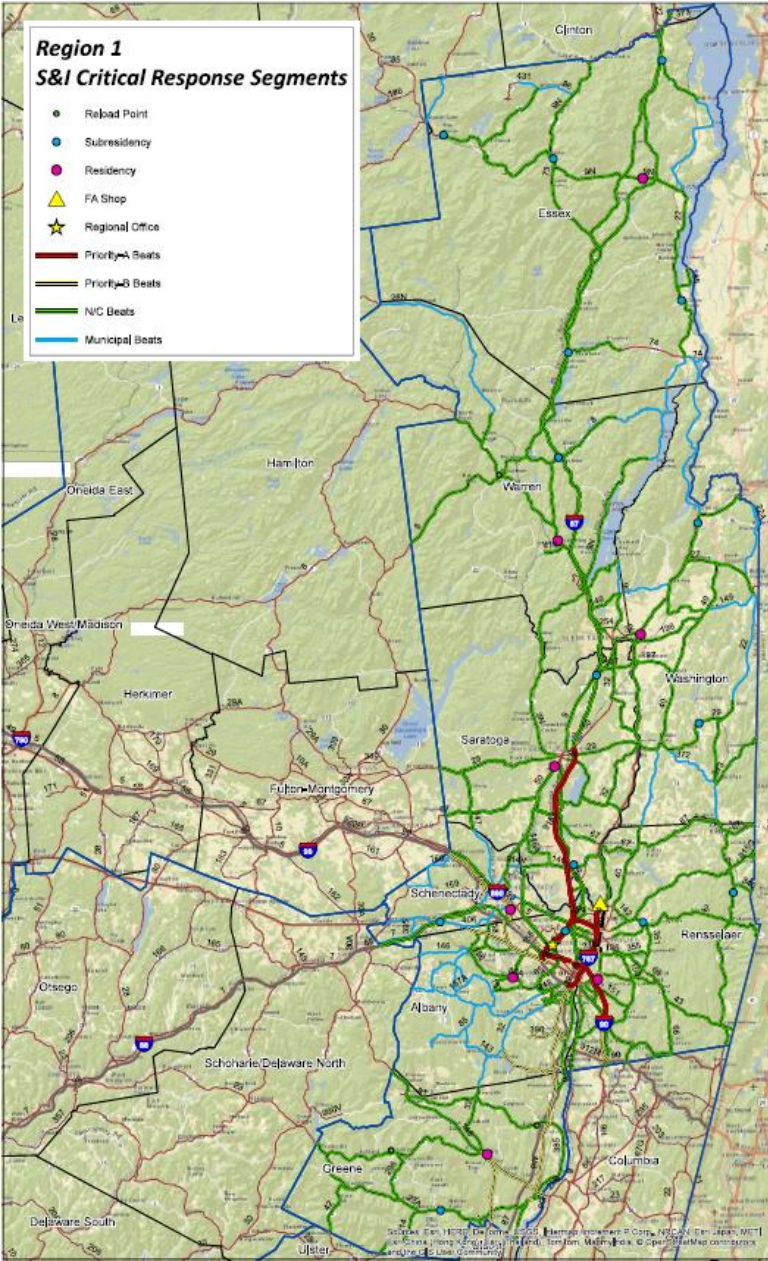
Control of snow and ice is mandated by the **NYS Highway Law Section 12**, which states “The maintenance of State Highways shall include the control of snow and ice...”, and the Snow & Ice control shall “**provide reasonable passage** and movement of vehicles over such highways.”

# NYSDOT Weather Forecasting Triggers and Observed Weather Response Tactics:

- Introduction
- Timing, Coordination and Traffic
- Priority Network
- Snow and Ice 101 (NYSDOT Perspective)
- Science of Salt
- Lake Effect (BUF/BTV)
- Freezing Rain
- Snow + Wind
- Typical Forecasting DOT questions

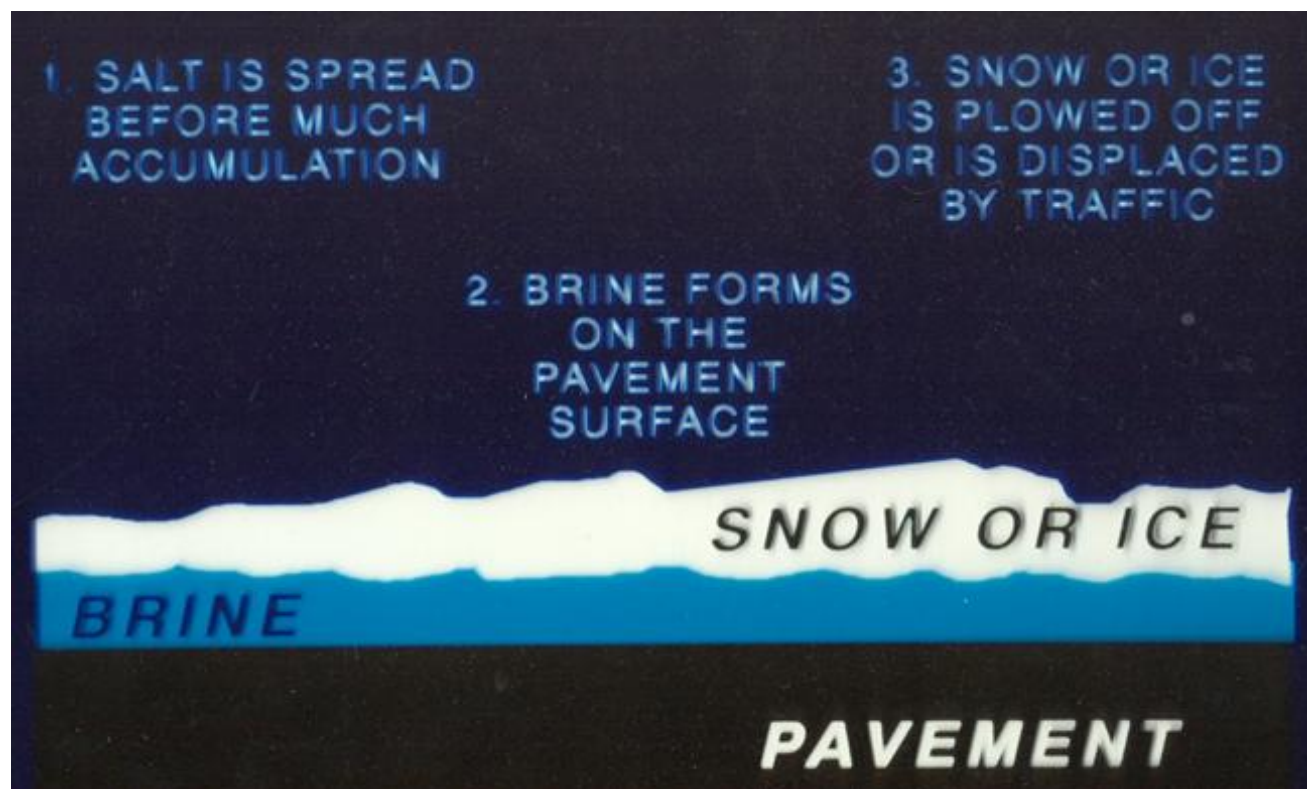
# Priority Highway Network by Region:

- Region 1  
S&I Critical Response Segments**
- Rebad Point
  - Subresidency
  - Residency
  - ▲ FA Shop
  - ★ Regional Office
  - Priority A Beats
  - Priority B Beats
  - NIC Beats
  - Municipal Beats



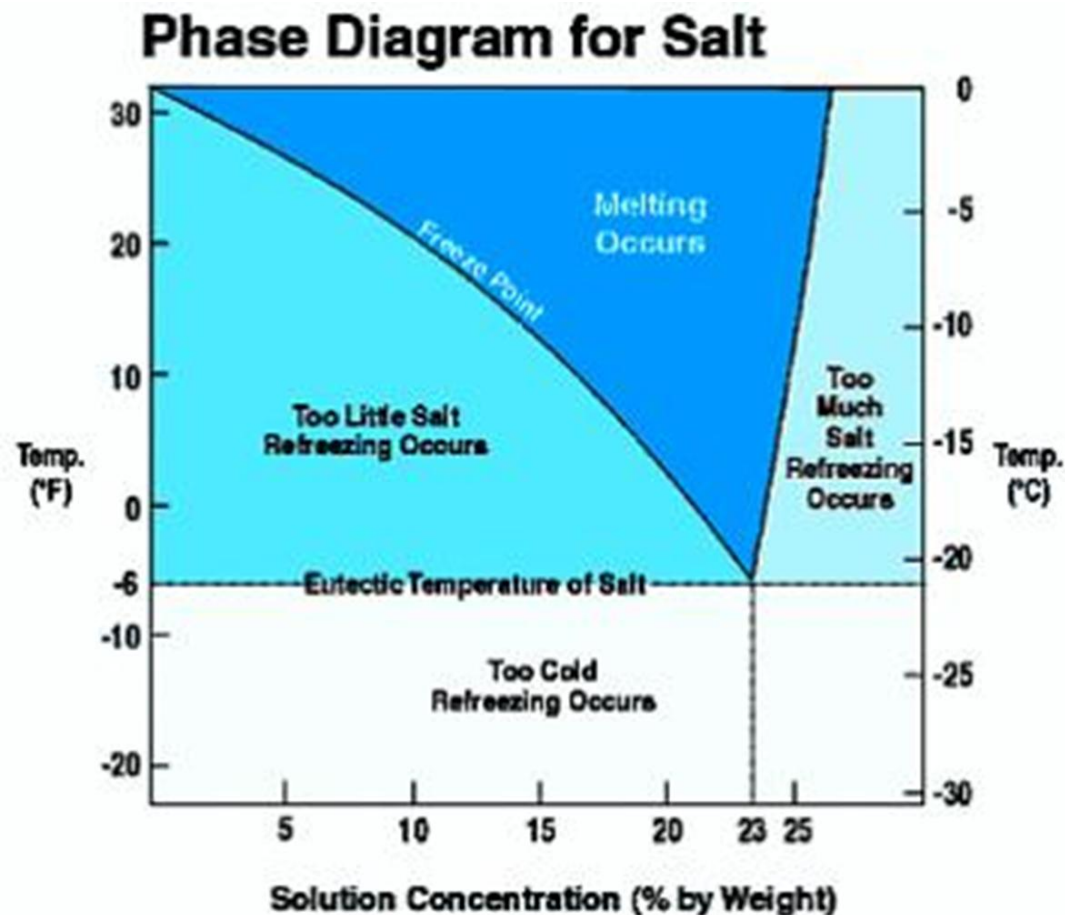
# Snow & Ice 101

- Prevent the bond of ice to the Pavement.



# Science of Salt

- The solution is in the dilution to a solution.
- Temperature & Precipitation



# Science of Salt (cont.)

- Temperature is the most influential variable when it comes to the effectiveness of salt and brine.

<b>Temperature °F</b>	<b>Pounds of ice melted per pound of salt</b>
30°	46.3
25°	14.4
20°	08.6
15°	06.3
10°	04.9
5°	04.1
0°	03.7
-6°	03.2



# Forecasting for NYSDOT

- Confidence (High/Medium/Low)
- Where (Specific Geographic and Elevation detail)
  - North/South of I-90
  - Adirondacks/Catskills
  - Lake Effect I-81 Between Exits (XX-XX)
  - Lake Effect I-90 Between Exits (XX-XX)
  - Precipitation changeover Location(s)
  - System Track & Axis predictions

# Forecasting for NYSDOT (cont.)

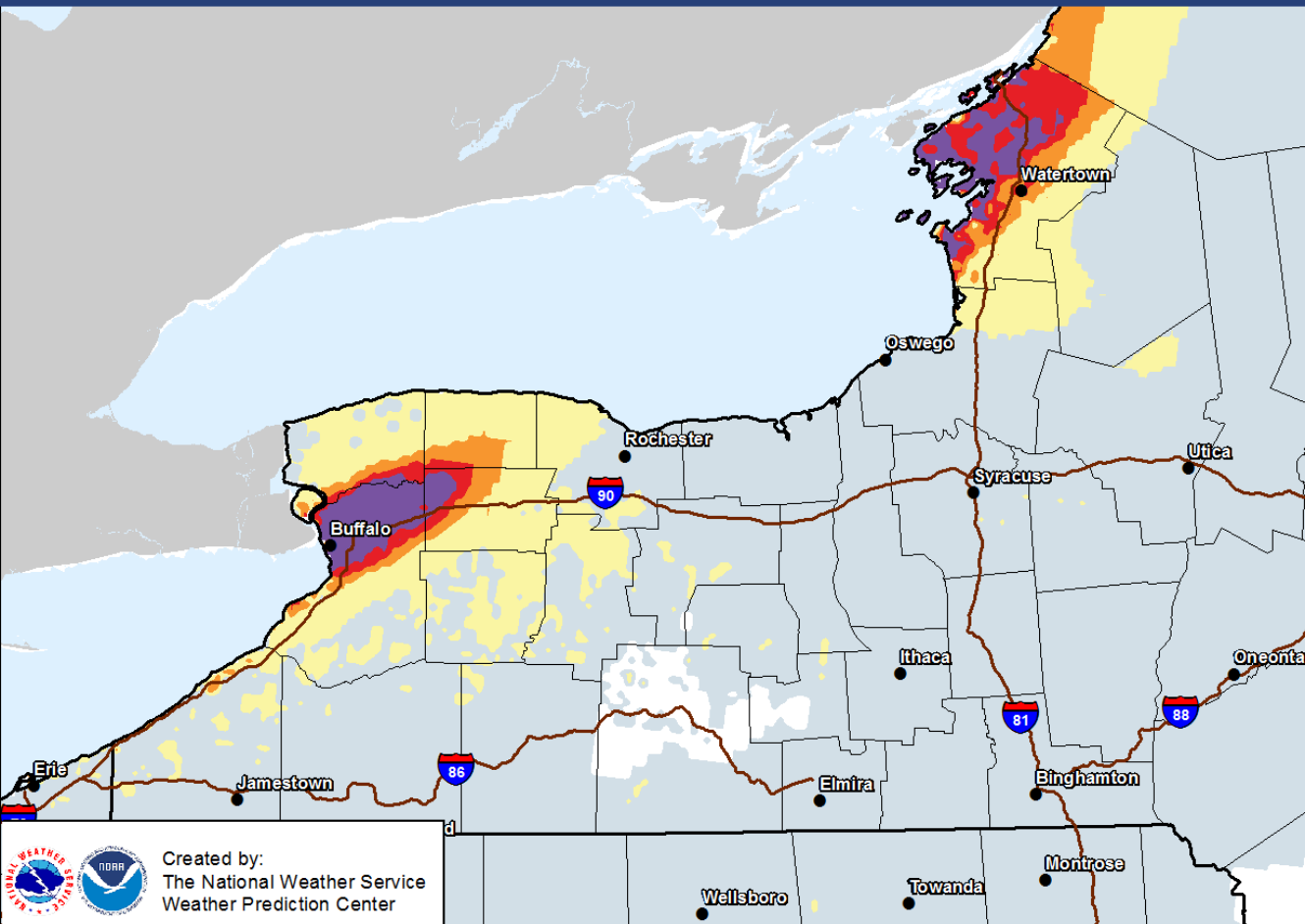
- Timing (**Duration – 3hr cycle time**)
  - Morning commute (7-9AM)
  - Evening commute (4-7PM)
  - Weekend timing
  - Holiday Travel
  - Precipitation changeovers Time(s)
  - Daylight timing

# Forecasting for NYSDOT (cont.)

- Precipitation type(s)
  - Snow/Sleet/Freezing Rain/Black Ice
    - Expected/Max/Min inches
    - Surface temperature(s) (Before, During, After)
    - Duration
    - Changeovers
    - Moisture content
    - Snow Load + Wind (>30MPH) + Downed tree risk potential (gusts/sustained) timing

# WSSI Overall Winter Storm Impacts -- Day 1

Valid through Sat, Dec 24, 2022 07 PM ET

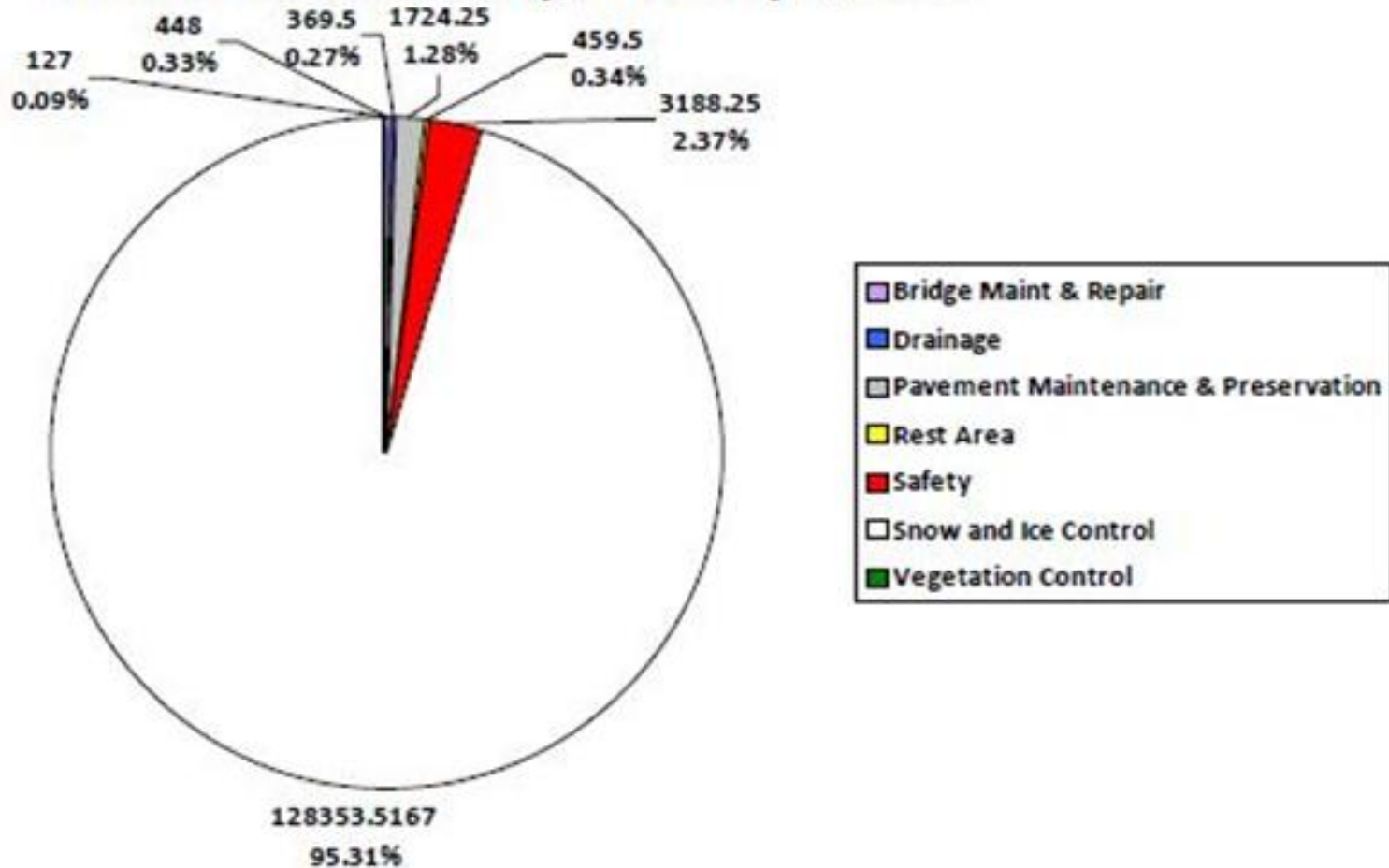


Created by:  
The National Weather Service  
Weather Prediction Center

Potential Winter Storm Impacts Winter Storm Severity Index (WSSI) Issued: Fri, Dec 23, 2022 07 PM ET

<p><b>Winter Weather Area</b> Expect winter weather.</p> <ul style="list-style-type: none"> <li>Winter driving conditions. <b>Drive carefully.</b></li> </ul>	<p><b>Minor Impacts</b> Expect a few inconveniences to daily life.</p> <ul style="list-style-type: none"> <li>Winter driving conditions. <b>Use Caution while driving.</b></li> </ul>	<p><b>Moderate Impacts</b> Expect disruptions to daily life.</p> <ul style="list-style-type: none"> <li>Hazardous driving conditions. <b>Use extra caution while driving.</b></li> <li>Closures and disruptions to infrastructure may occur.</li> </ul>	<p><b>Major Impacts</b> Expect considerable disruptions to daily life.</p> <ul style="list-style-type: none"> <li>Dangerous or impossible driving conditions. <b>Avoid travel if possible.</b></li> <li>Widespread closures and disruptions to infrastructure may occur.</li> </ul>	<p><b>Extreme Impacts</b> Expect substantial disruptions to daily life.</p> <ul style="list-style-type: none"> <li>Extremely dangerous or impossible driving conditions. <b>Travel is not advised.</b></li> <li>Extensive and widespread closures and disruptions to infrastructure may occur.</li> <li>Life-saving actions may be needed.</li> </ul>
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## Total Hours by Program Area - Statewide Period Ending: Sunday, February 7, 2021



# BEFORE

(ANTI-ICING)

- PLANNING
- FORECASTING
  - RATE & TYPE
  - TEMPERATURE
- CYCLE TIME
  - RATE (2-3HR)
  - LOCATION/RISK



# Expected Snowfall - Official NWS Forecast

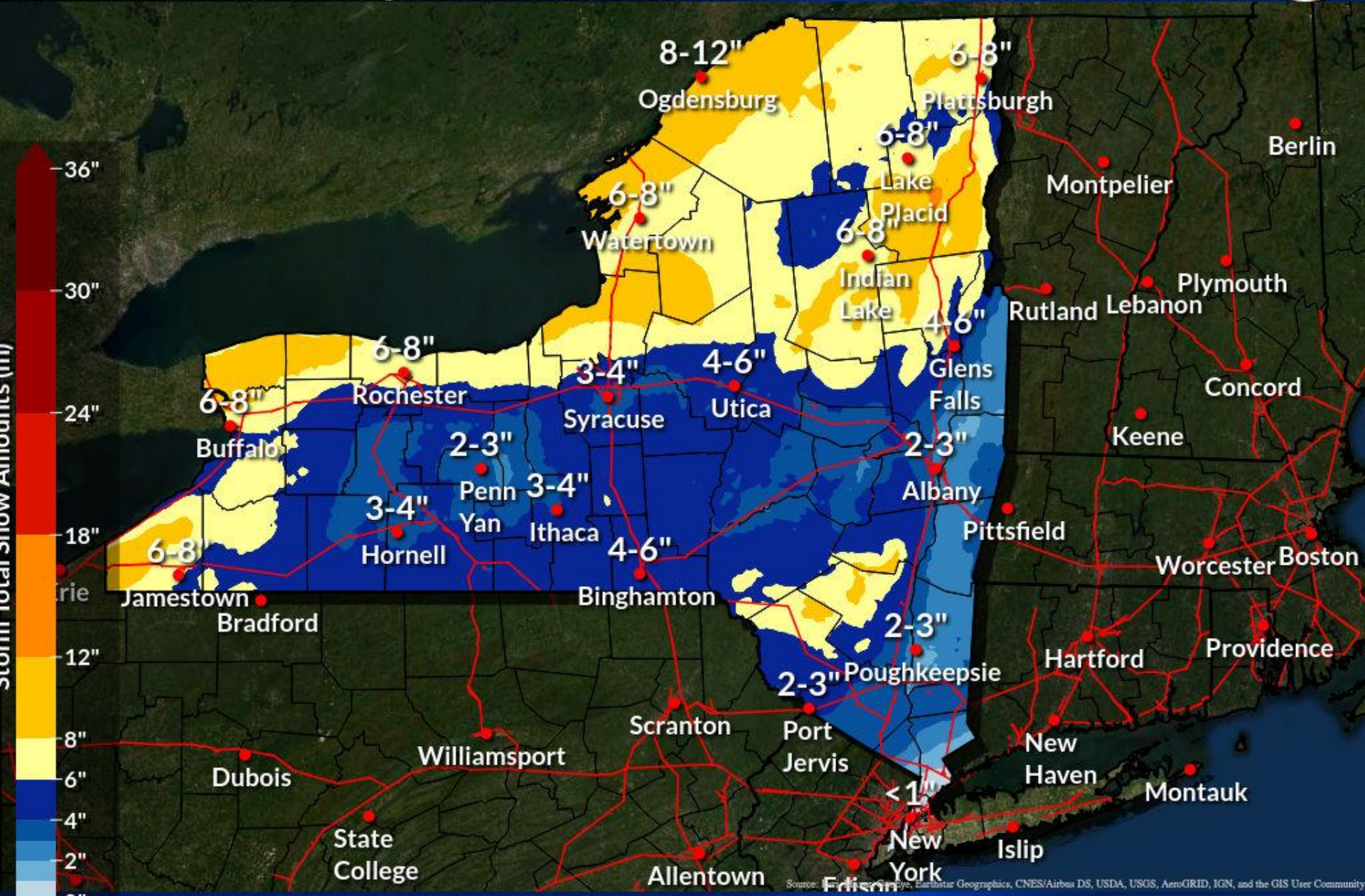
Weather Forecast Office

Albany, NY



Valid 7 AM Wed Jan 25, 2023 through 7 PM Thu Jan 26, 2023 EST

Issued Jan 25, 2023 3:26 AM EST



Source: National Weather Service, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

# DURING (ANTI-COMPACTION)

- PLOWING
- SPREADING
  - RATE VS TEMP
  - RATE VS TYPE
- CYCLE TIME
  - RATE (2-3HR)









# Post-storm Cleanup



# AFTER (DE-ICING)

- RETURNING THE SYSTEM
- TIMING DAY/NIGHT
- BLOWING & DRIFTING
- TEMPERATURE
- WIND





# National Weather Service State of New York

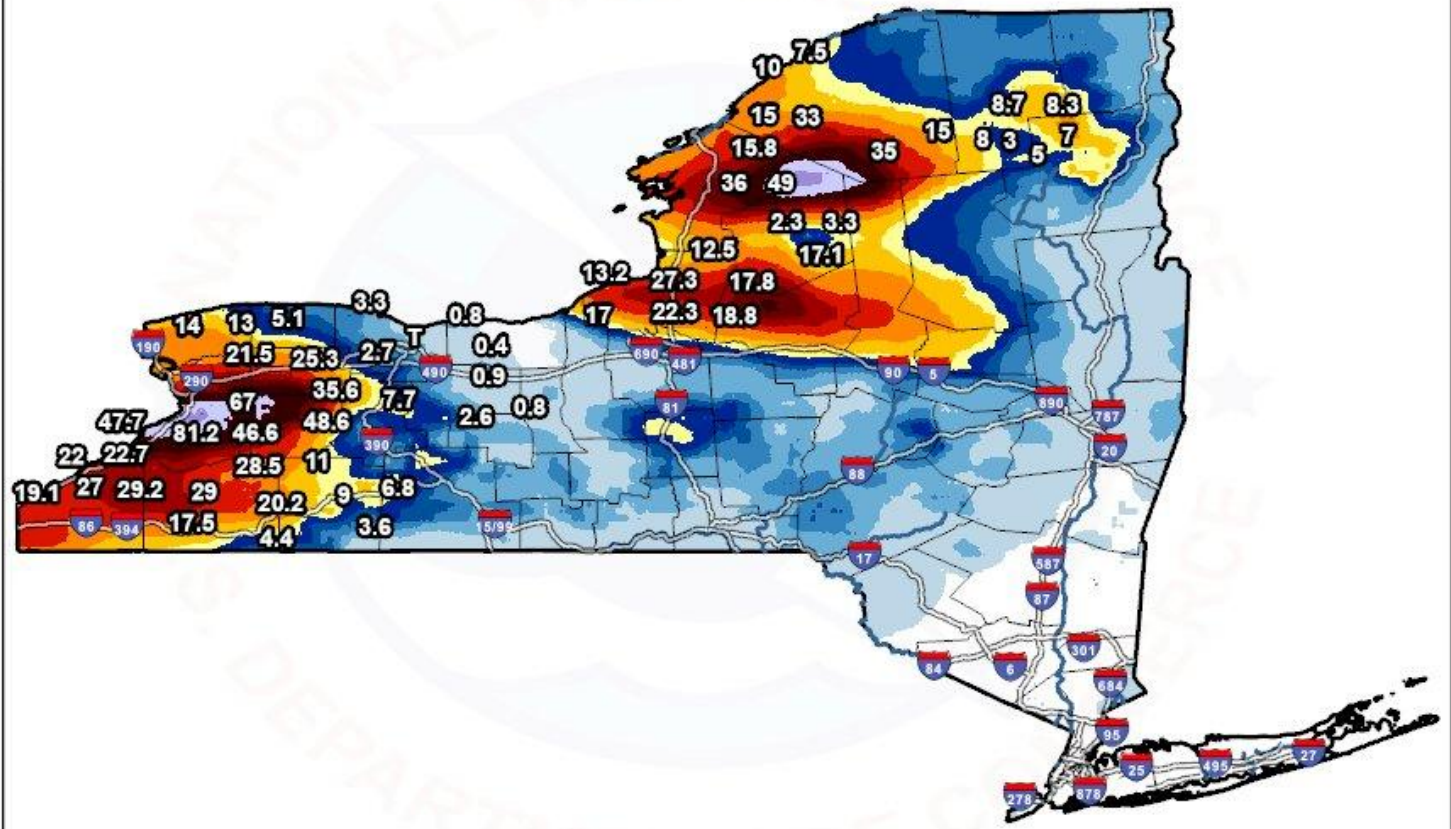
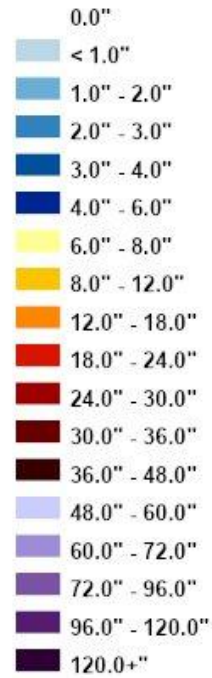
New York State Lake Effect Snow November 16-21, 2022

Analysis Data Source: NOHRSC and Regional Observations

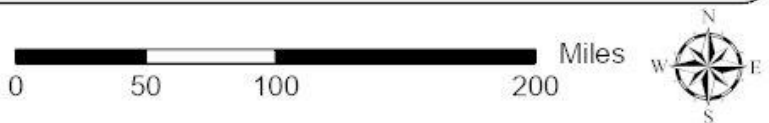


Created:  
11/22/2022 01:19AM

### Snowfall (in)

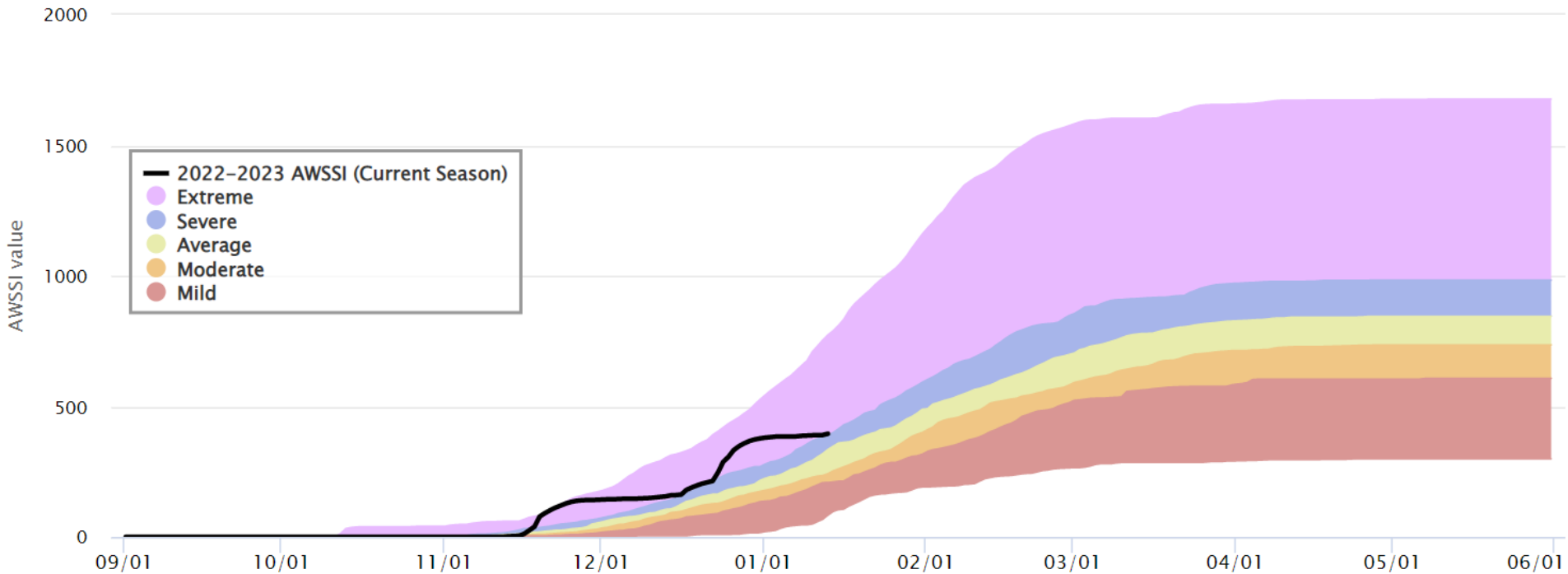


This is an experimental product of the NWS GAZPACHO software package. Care should be taken in using the data. Unofficial observations may be plotted. Values at interpolated locations may not represent actual reports at that location.



# 2022-2023 AWSSI: "NY - Buffalo"

Season: 2022-11-13 to 2023-01-13, 62 days



© Midwest Regional Climate Center

Click and drag to zoom

# About ETO

**Official program created in 2006**

**Mission Statement:** Prepare for, respond to, and recover from all transportation and cyber related hazards.

## **Core Functions:**

- Traffic Incident Management (Regions only)
- Disaster Response & Recovery
- Emergency Planning/Management
- Cyber Security-Related Operations



# Overview

- Coordinate Department's preparedness and response to planned and unplanned events.
  - Statewide Transportation Information and Coordination Center (STICC)
  - Emergency Plans/Procedures
  - Training
  - Reporting protocols
- Coordinate with other state agency partners and the Office of Emergency Management (OEM).
- Ensure DOT assets are secure from cyber and physical threats.
- Ensure staffing and equipment are available and ready to respond to all hazards.

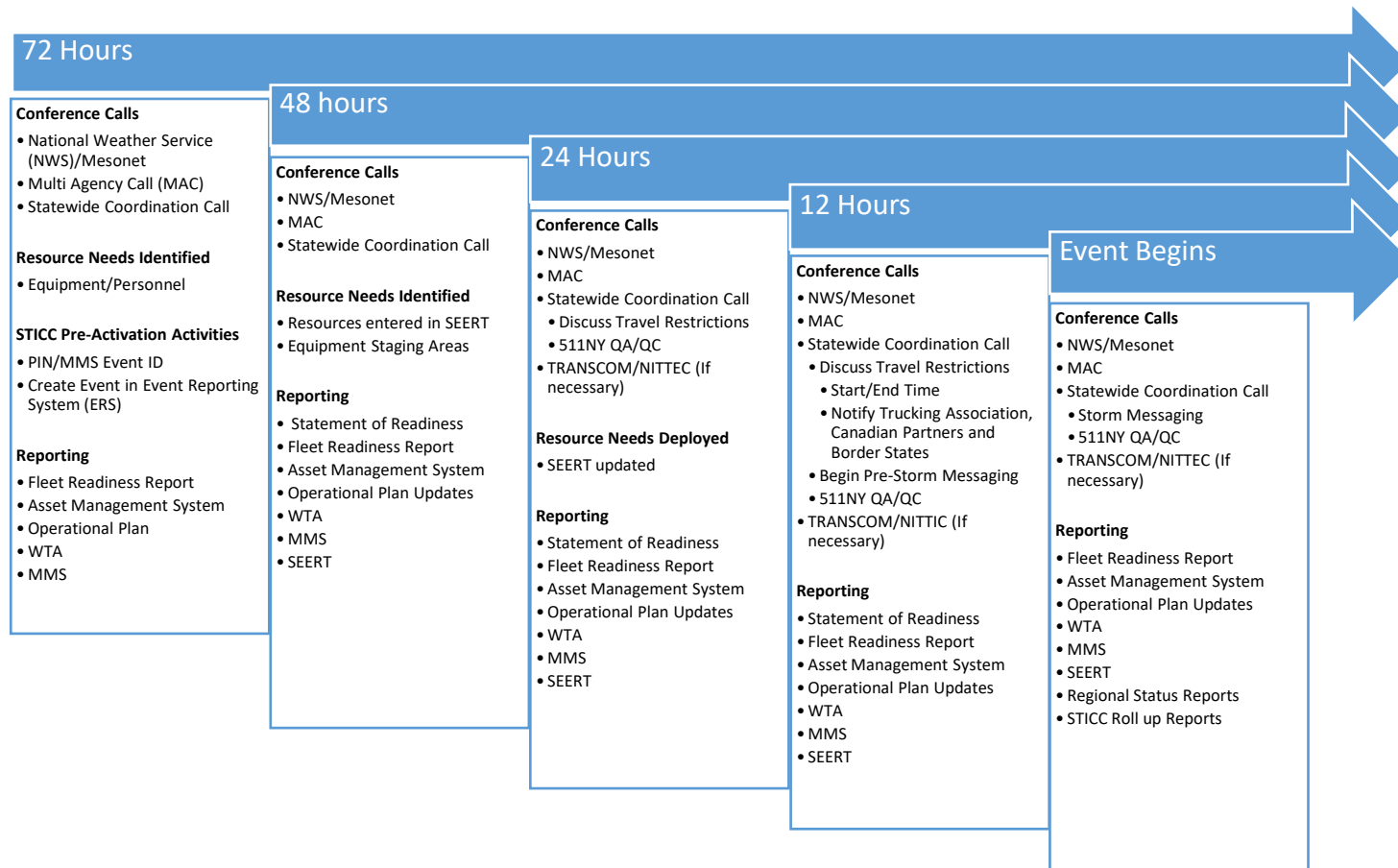


# Pre-Event Operations

Prior to an event, several steps occur:

- Weather Calls with NWS/NYS Mesonet
- Coordination Calls (DOT and multi-agency)
- Official Event Creation
- Event PIN / MMS Event ID Created
- Event created in SharePoint, SEERT, AMS, and RSDA
- Statement of Readiness
- Communication with affected Regions

# DOT Event Planning Timeline



PIN = Project Identification Number  
 WTA = Winter Traveler Advisory  
 MMS = Maintenance Management System  
 SEERT = Statewide Emergency Event Resource Tracking



# Main Office ICS Response

- STICC - Statewide Transportation Information & Coordination Center
  - DOT's information clearing house for all incidents on the State's Transportation System.
  - Operates 24 hours a day / 365 days a year
- Coordinates response activities and communications within DOT as well as with other state agencies.
- Maintains schedules for ICS staffing.
- Distributes consolidated status reports every 2 hours.
  - Information on road status, weather conditions, response actions, areas of concern, road closures, and traffic signal outages.
  - Refines and performs QA on regional reports.
  - Emails to predefined distribution lists.

# Regional ICS Response

- Each Region activates their Regional Operations Center (ROC) for overall management of the event.
  - Regional focus is on operations and tactical response.
- ROCs:
  - Coordinate sending/receiving of personnel and equipment.
  - Monitor and gather information for situational awareness.
  - Coordinate with other State agencies, County Reps, Utility Companies, etc.
  - Submit status reports to STICC.
  - Deploy field assessment teams/damage inspectors as needed.

# Large Scale Event Operations

During larger events, additional assistance may be request by locals (Counties).

- New York Responds (NYR) Requests
  - Office of Emergency Management (OEM) may activate Emergency Support Function #1, 3, or 7
- Shared Service Agreements (SSA) for local work
  - Debris / Snow Removal



# Post-Event

- After Action Surveys distributed
- After Action Review (AAR)
  - Identify gaps/weakness, strengths, etc.
- Work with local programs for reimbursement, as necessary
  - RSDA II



*Photo Source: EmergingRNLeader, 2020*

# Wish List:

- NYS Storm Severity Index based on Mesonet Observations
- Material Application Effectiveness - performance measurement (AI based on road conditions from forward-facing camera images from plow trucks and subsequent passes)
- Events forecasted for DLA treatments by geographic zone
- Prime DLA locations geographically based on historical events



# Questions?

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