

# **Preliminary Study:** An Assessment of Hazardous Weather Impact on Traffic Flow in the Kansas City Metropolitan Area

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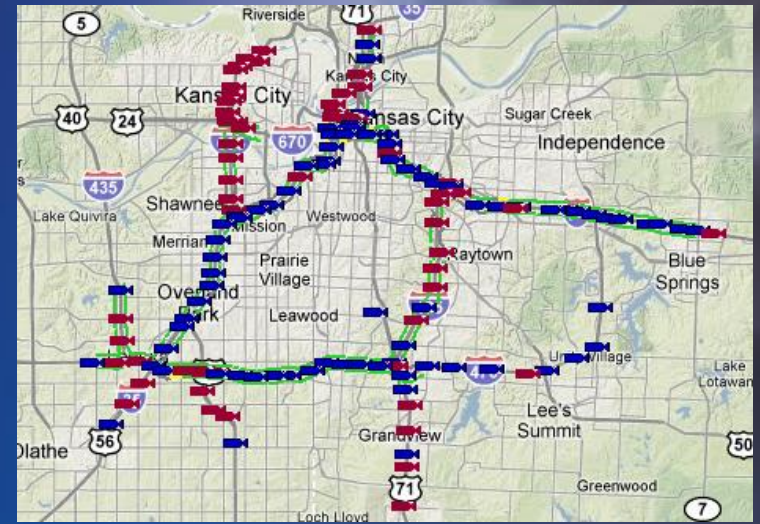
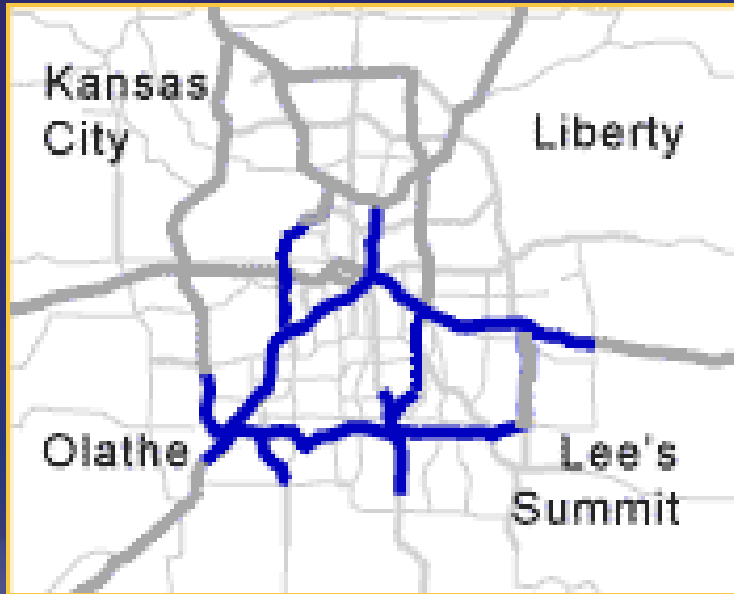
\* The University of Oklahoma/National Weather Service Pleasant Hill, Missouri

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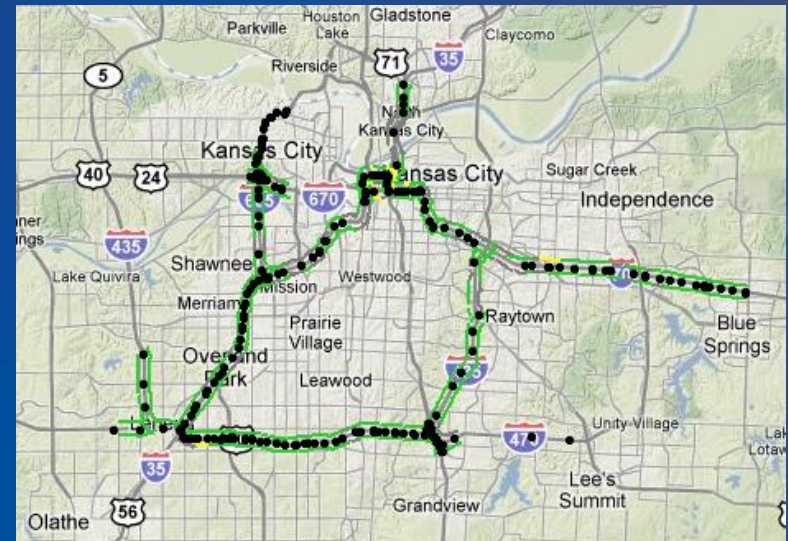
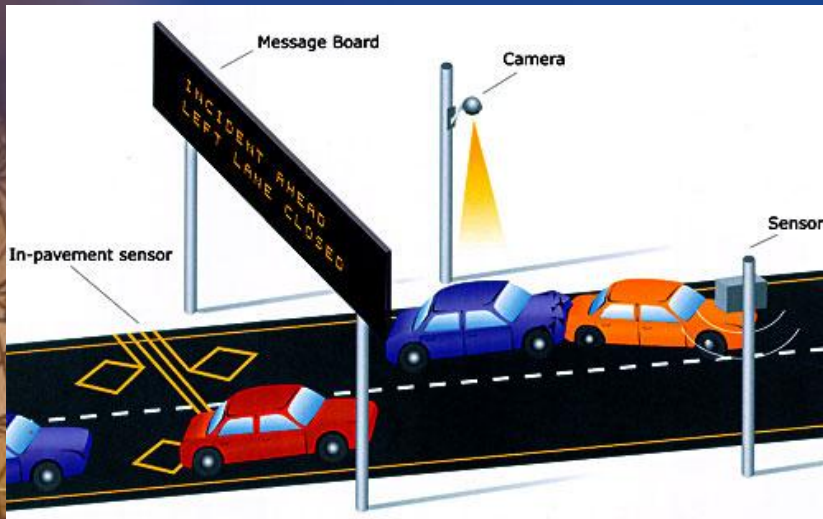
# Motivation

- A few recent events highlighted the fact that impacts don't always follow the "rules"
- Mirroring similar studies.
- High density network of traffic data available to analyze and compare with weather data.
  - KC Scout: Traffic Flow Data
  - ASOS: Weather Information
- Previous Studies: Hultquist and Schmit, 2010; Graham et al., 2006, Stern et al., 2003, Cools et al., 2010; DOT 2006-2009

# What is Kansas City SCOUT?

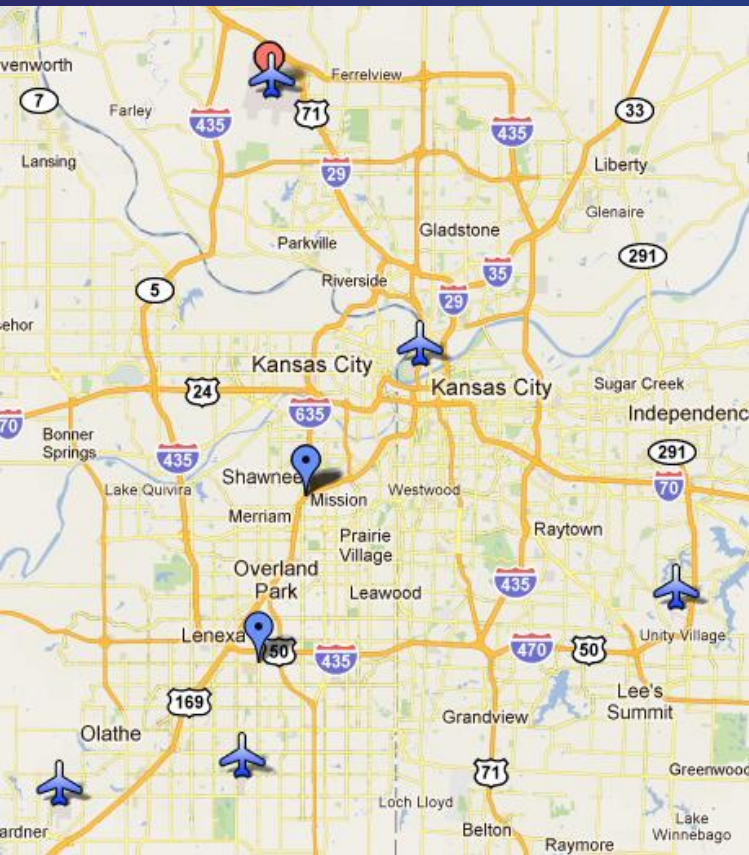


Camera Network

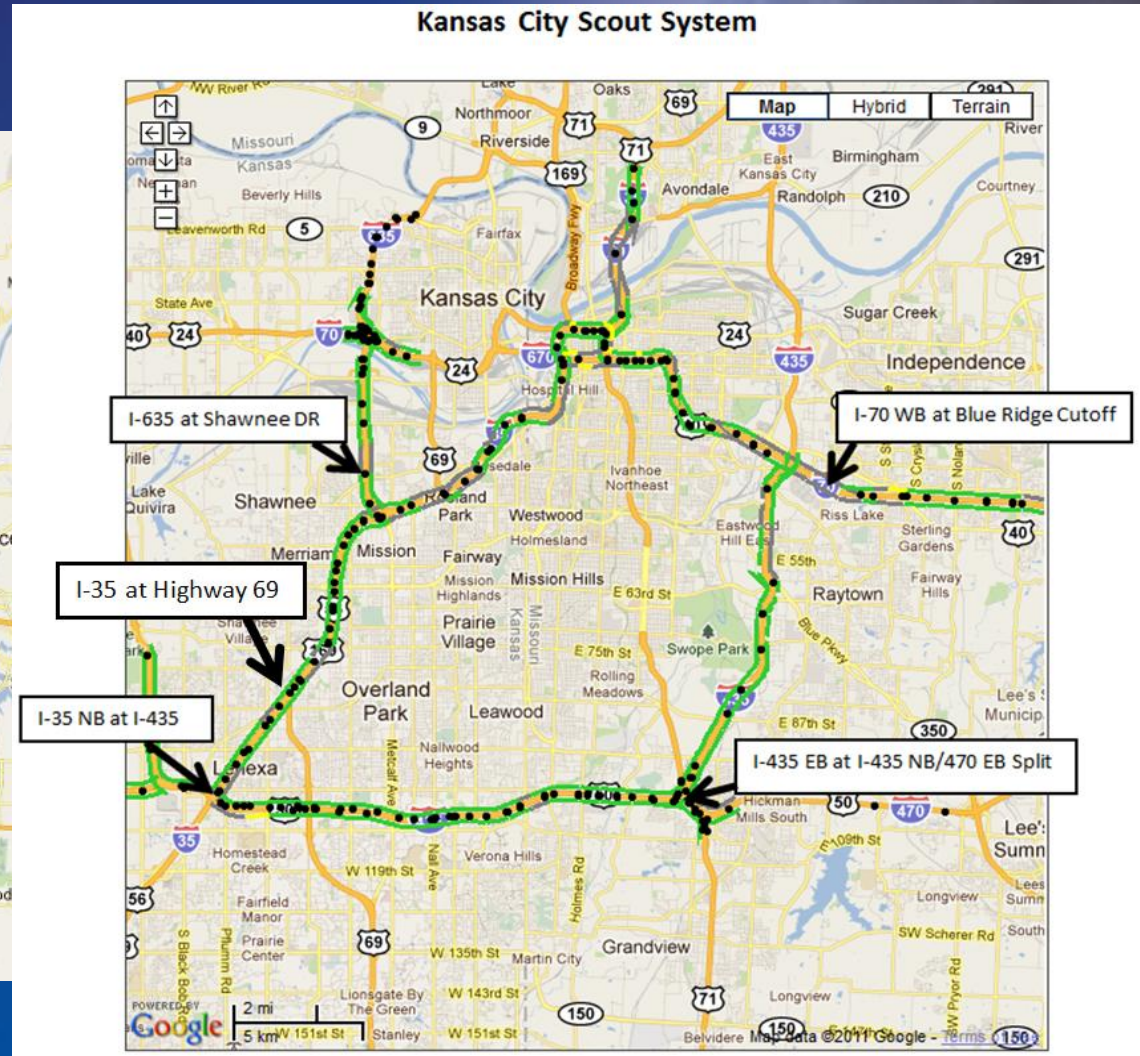


Detector Network

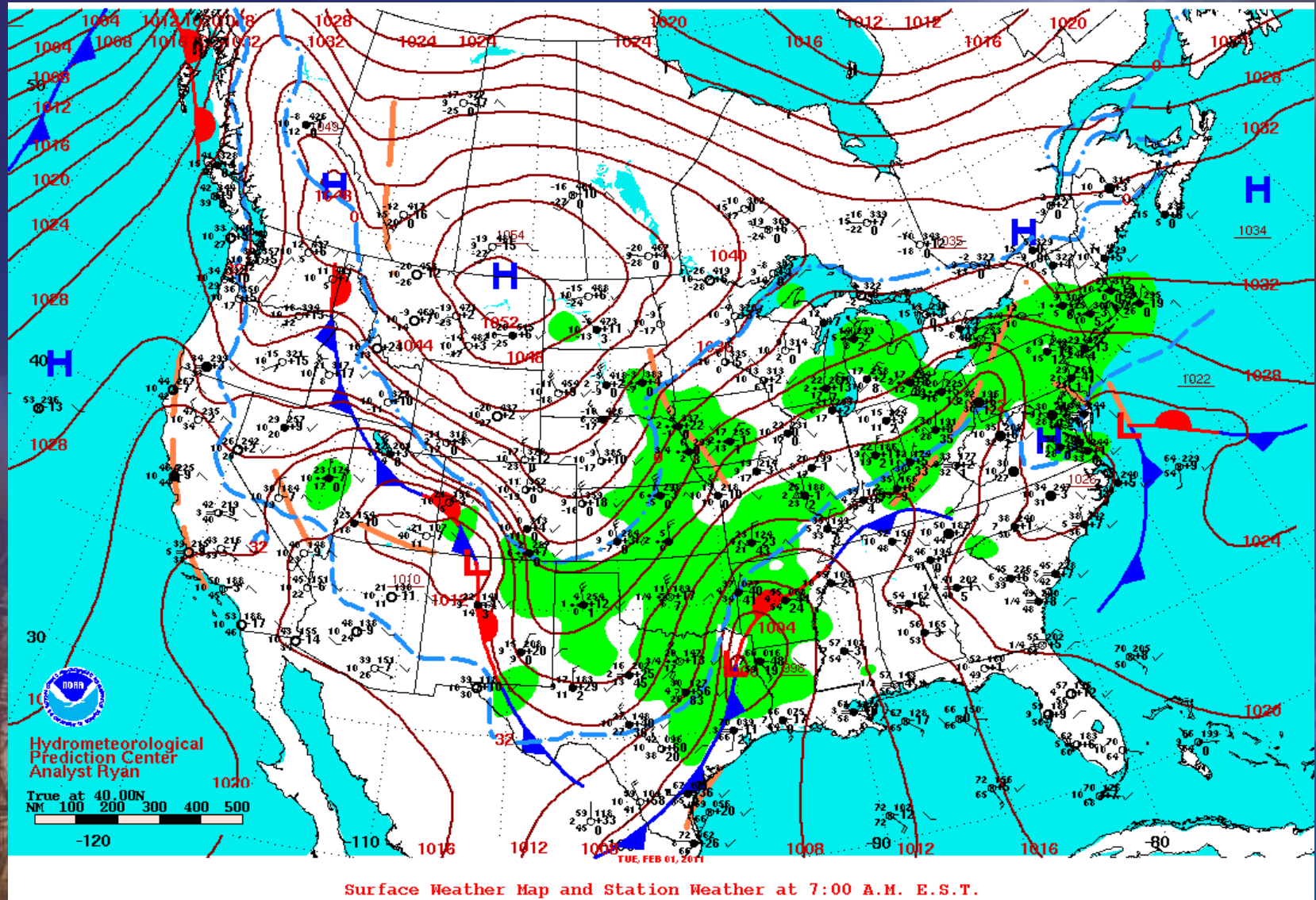
# Detector Sites Chosen For Study



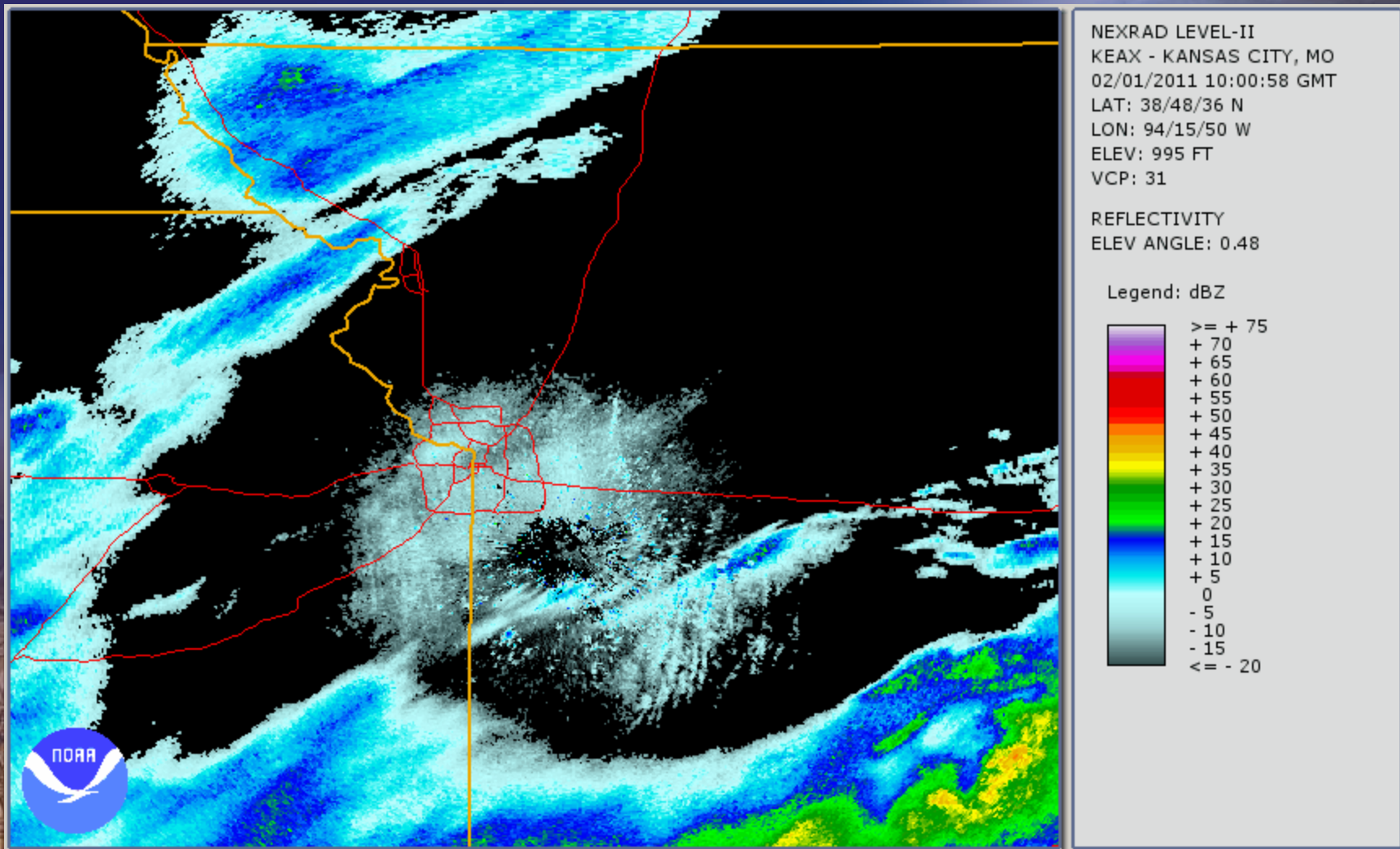
Observation Data Points



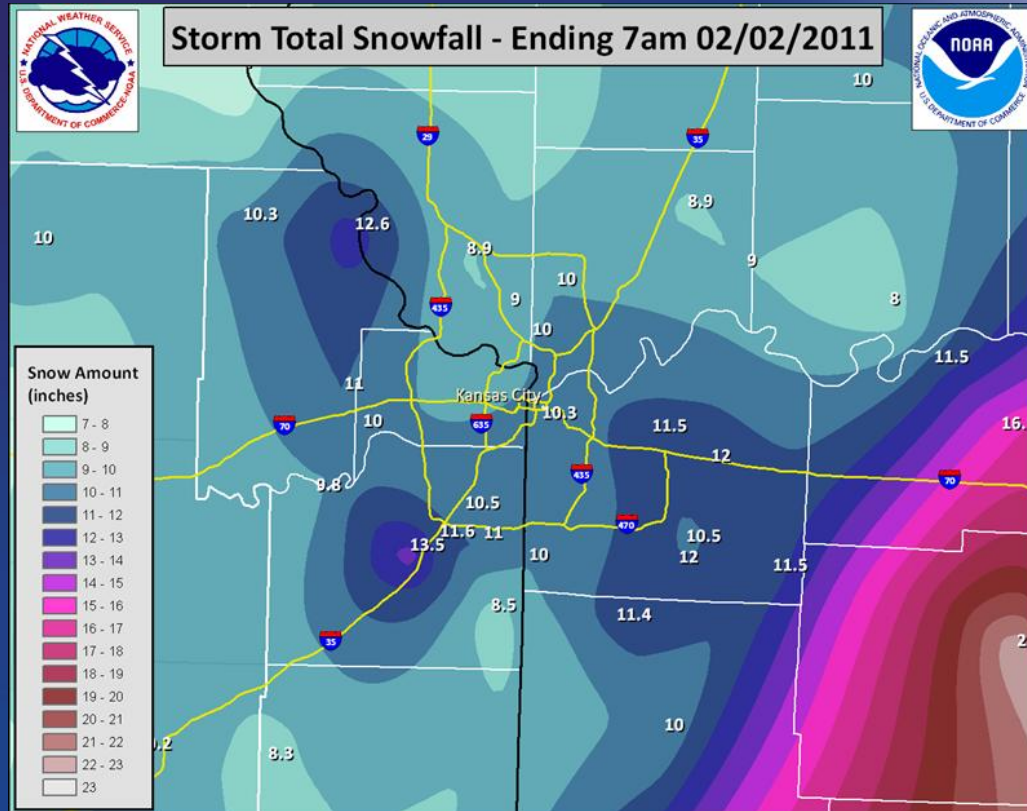
# February 1-2, 2011 Blizzard and Record Snowfall Event



# February 1-2, 2011 Blizzard and Record Snowfall Event



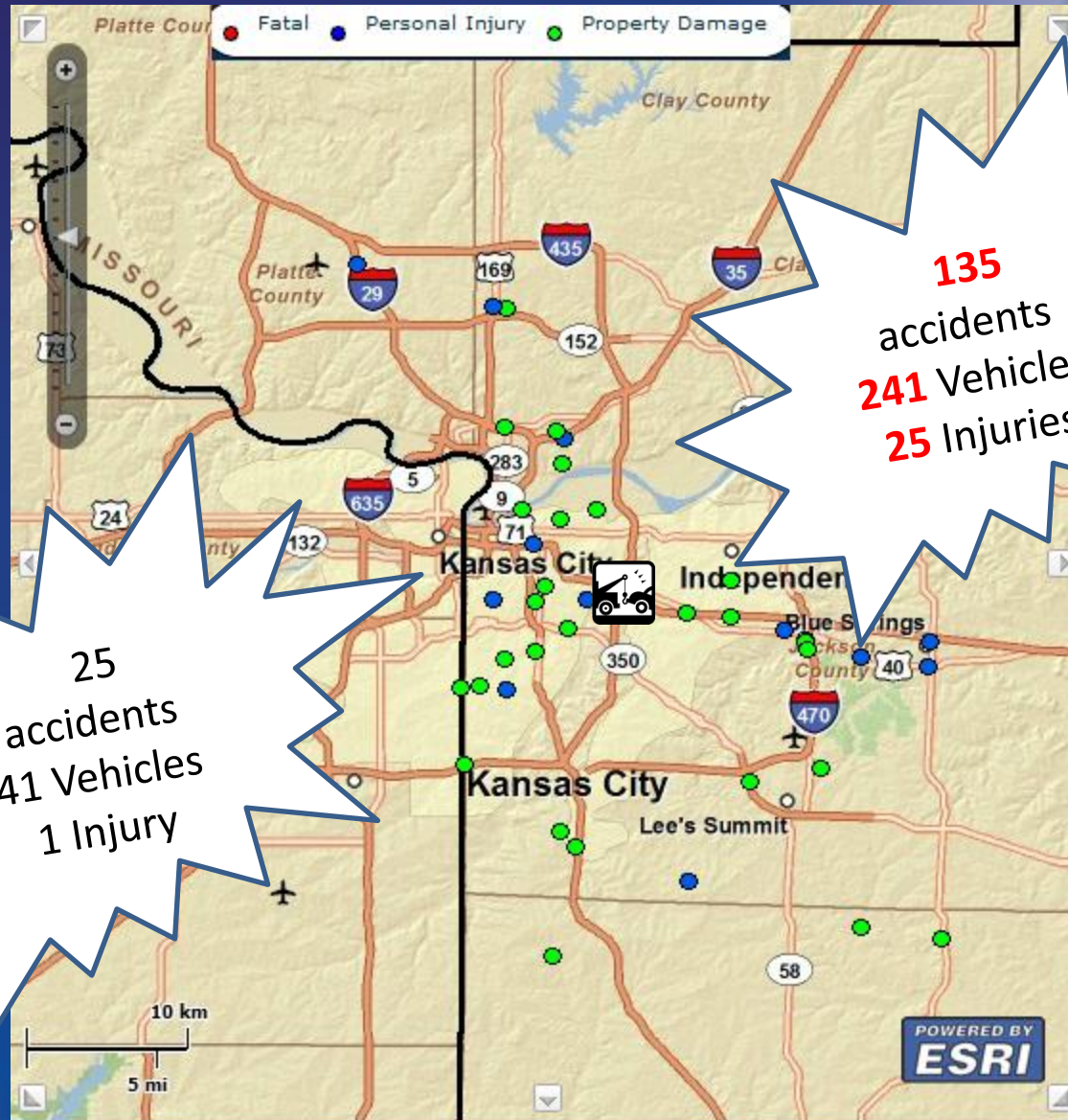
# Daily snowfall from 1-2 February 2011 & Previous Records



## Peak Official Wind Gusts:

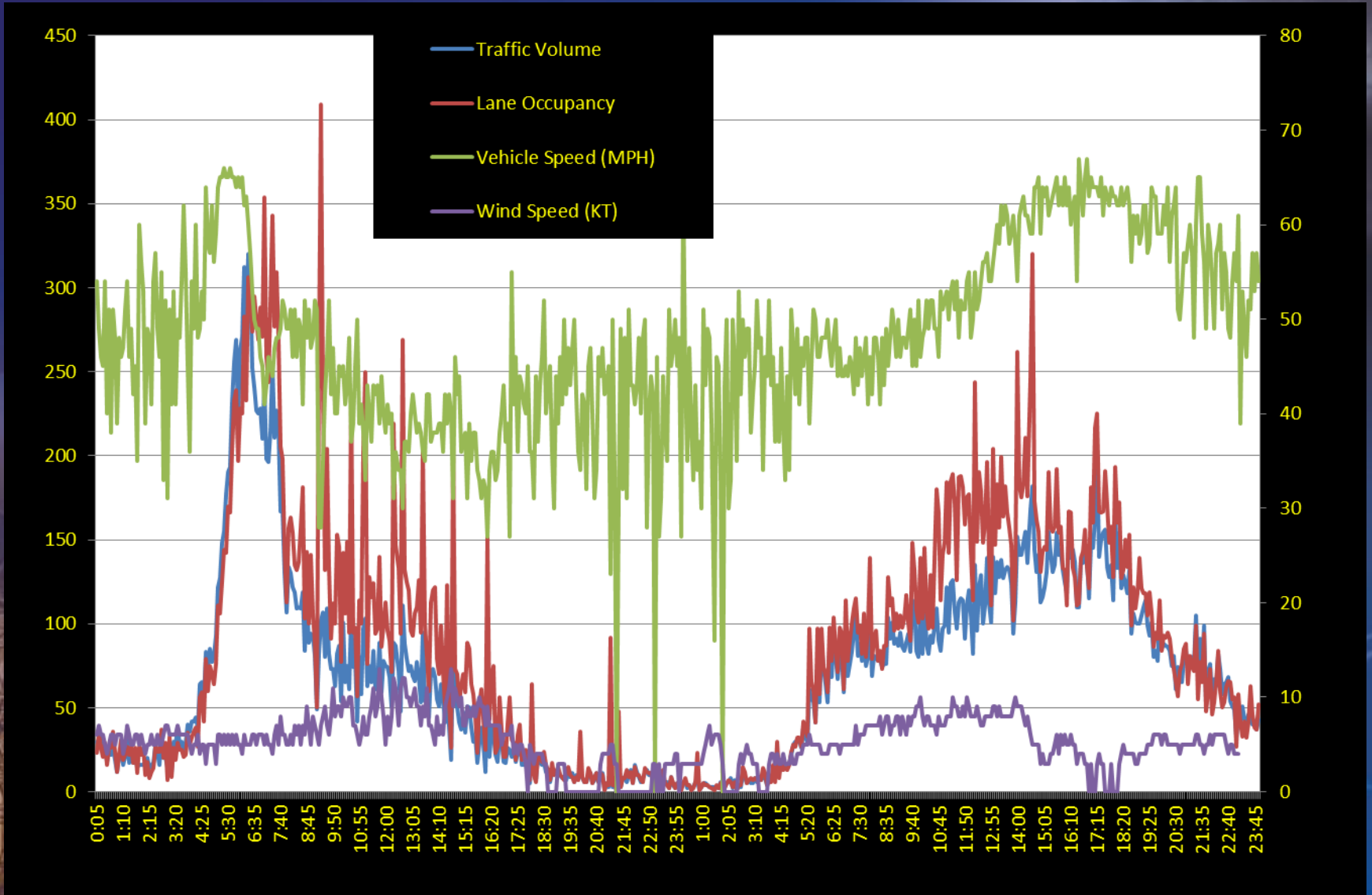
Kansas City International	47 mph	4:54 PM
St. Joseph (Rosecrans)	51 mph	5:04 PM
Olathe (Johnson County Executive)	44 mph	1:07 PM
Olathe (New Century Air Center)	45 mph	4:42 PM
Chillicothe	41 mph	8:21 PM
Kirkville	52 mph	8:27 PM
Lee's Summit	46 mph	8:28 PM
Whiteman AFB	35 mph	4:07 PM

# February 1-2, 2011 Blizzard Traffic Impacts

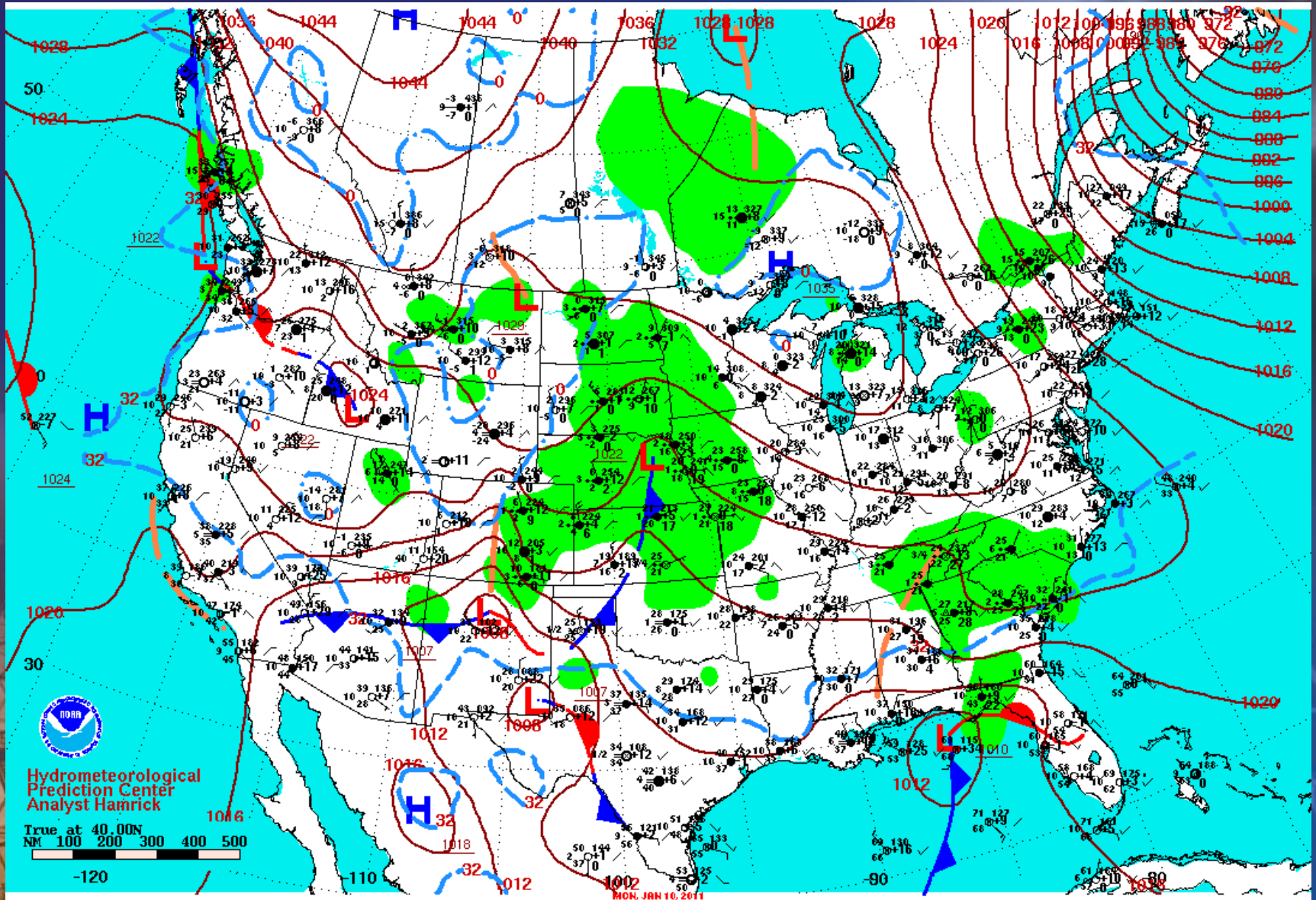




# 02-01-2011 Blizzard Traffic Impacts

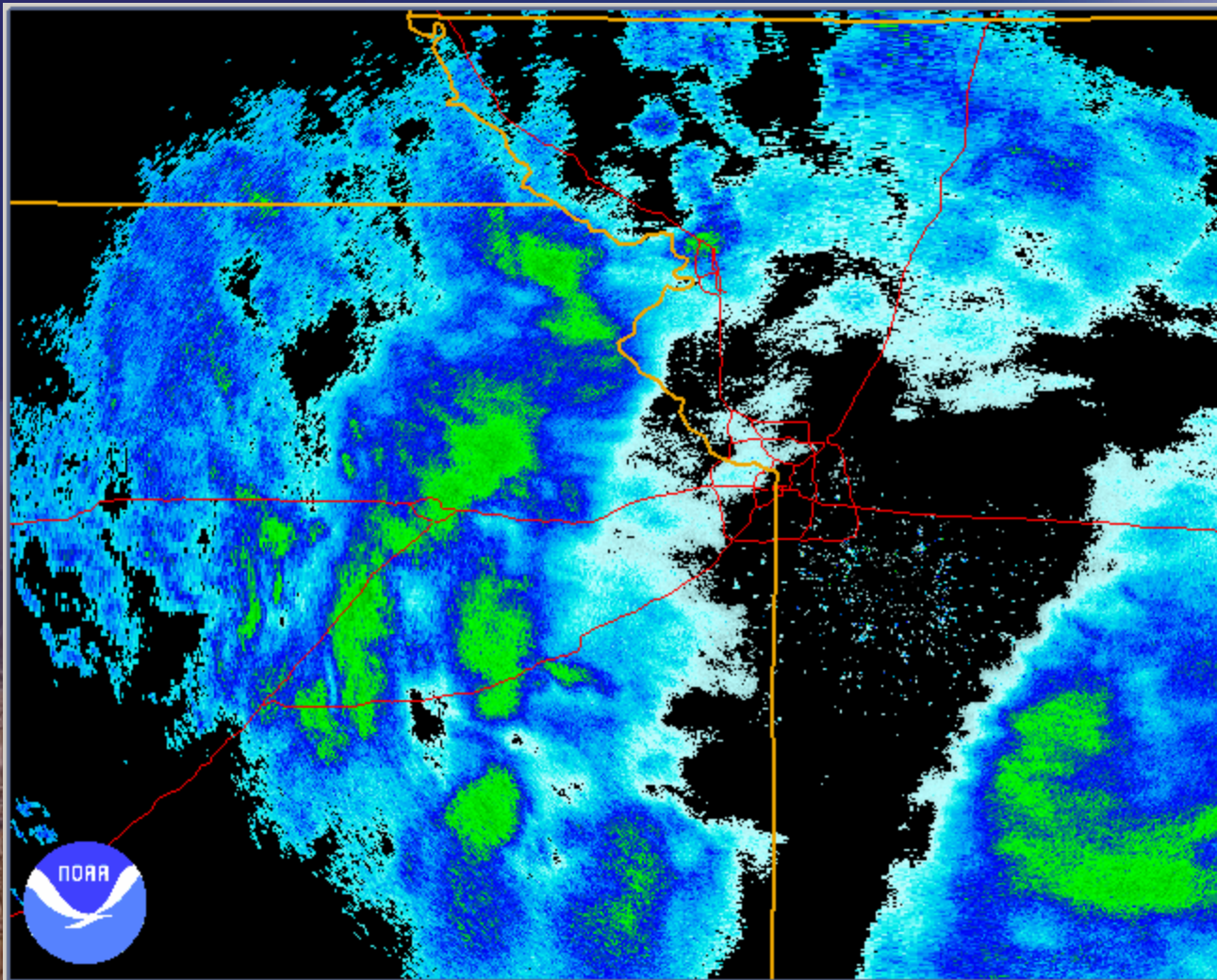


# January 10, 2011



Surface Weather Map and Station Weather at 7:00 A.M. E.S.T.

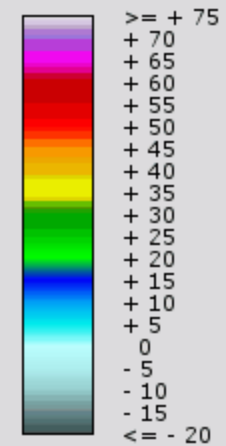
# January 10, 2011



NEXRAD LEVEL-II  
KEAX - KANSAS CITY, MO  
01/10/2011 04:05:33 GMT  
LAT: 38/48/36 N  
LON: 94/15/50 W  
ELEV: 995 FT  
VCP: 32

REFLECTIVITY  
ELEV ANGLE: 0.48

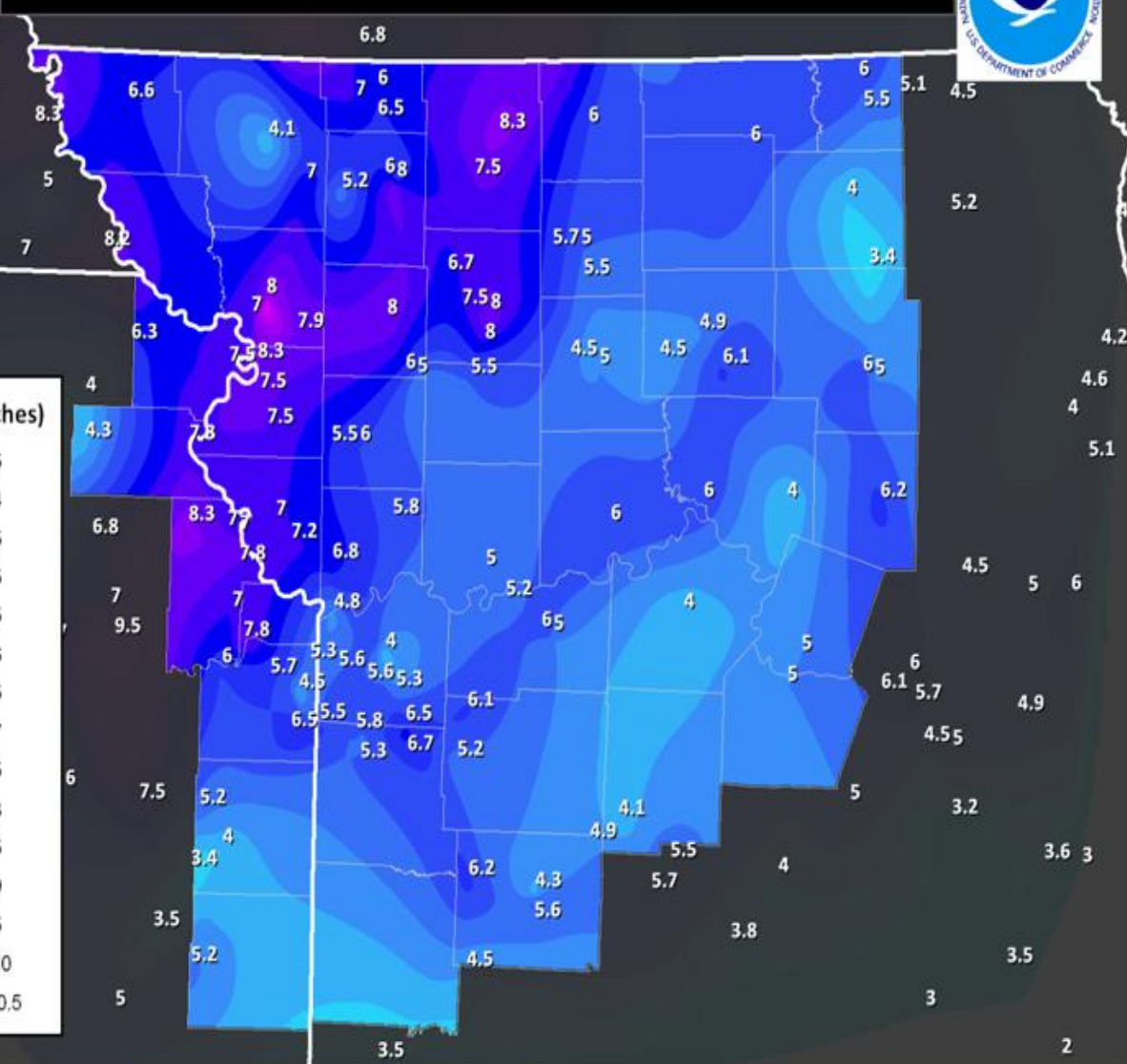
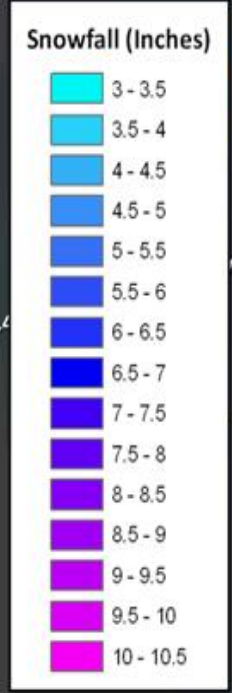
Legend: dBZ



# January 10, 2011 – Widespread Snow



## Storm Total Snowfall 7am 1/9 - 7am 1/11

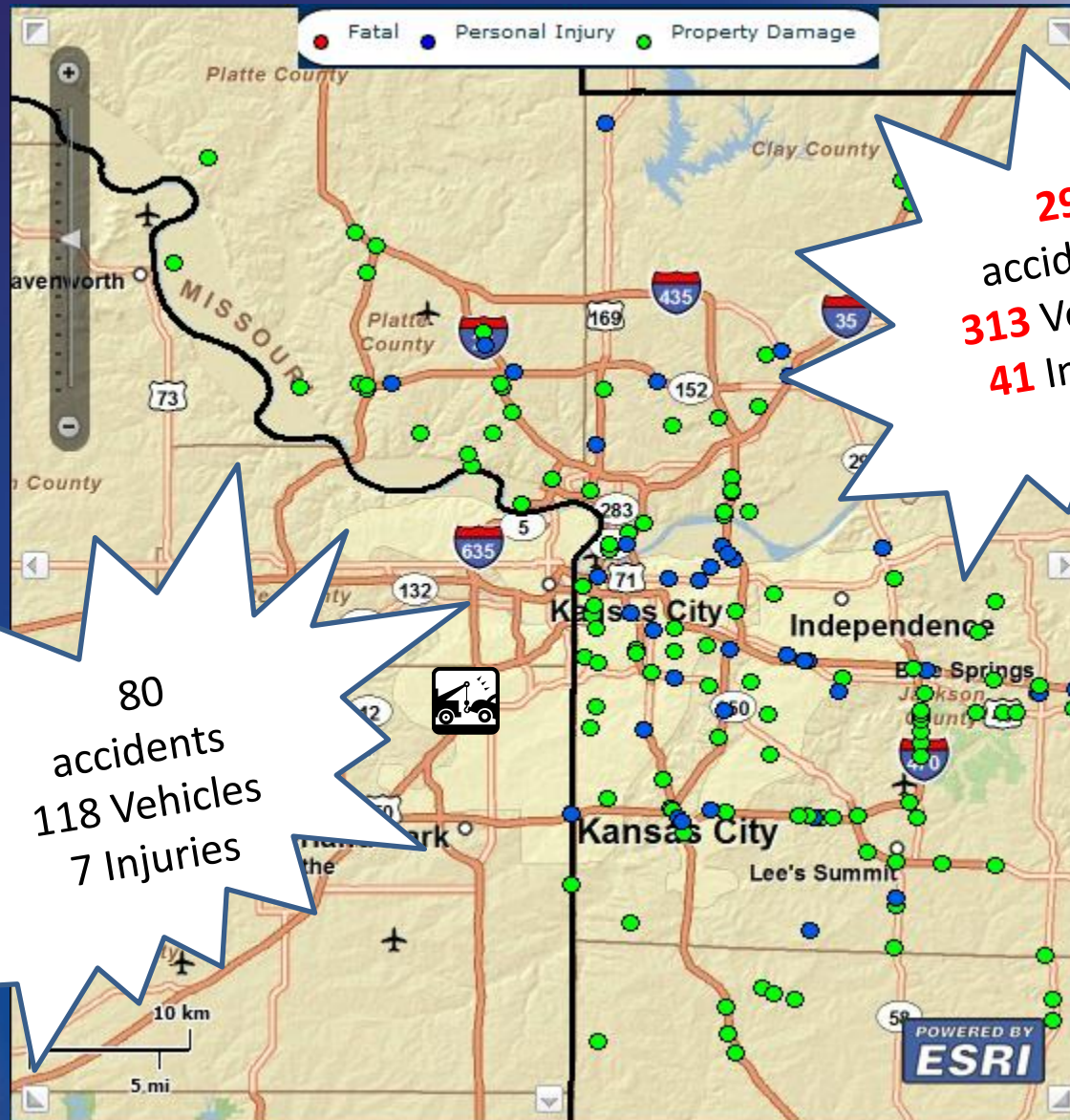


- Long duration snow event over 3 days

- Snow totals between 4-8"

- Snow Advisory

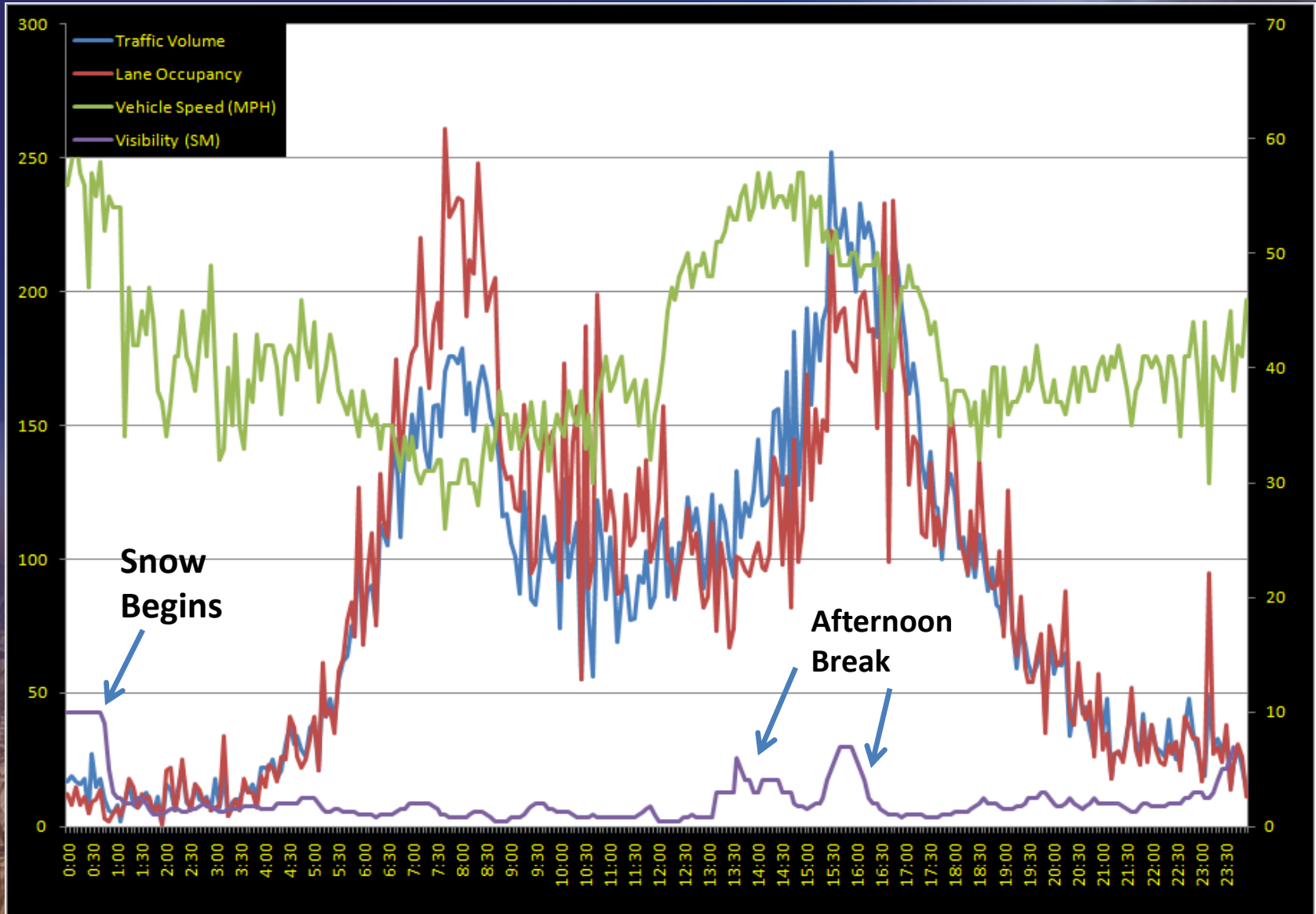
# 01/10/2011 Snow Advisory Traffic Impacts



**295**  
accidents  
**313** Vehicles  
**41** Injuries

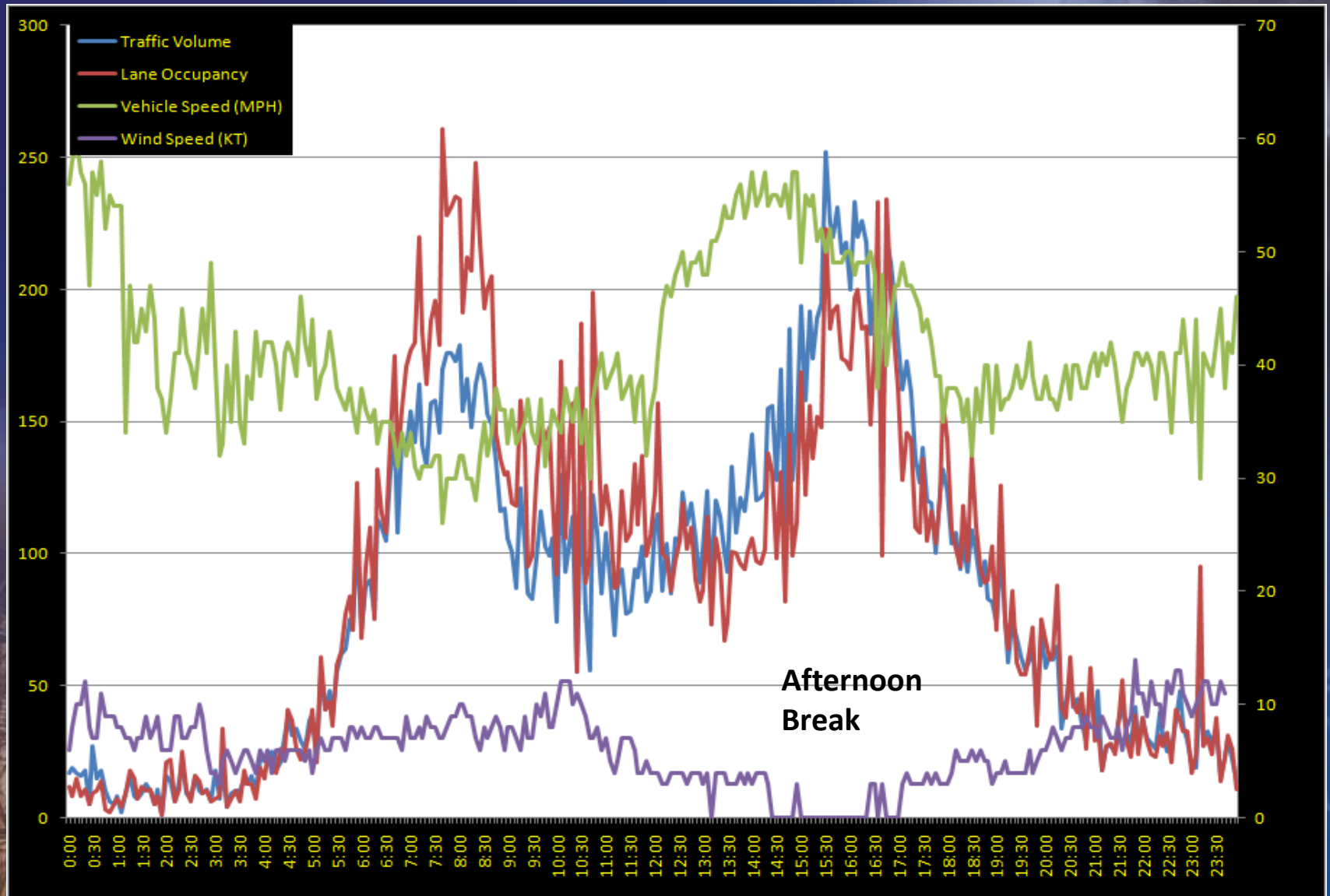
**80**  
accidents  
**118** Vehicles  
**7** Injuries

# 01/10/2011 Snow Advisory Traffic Impacts



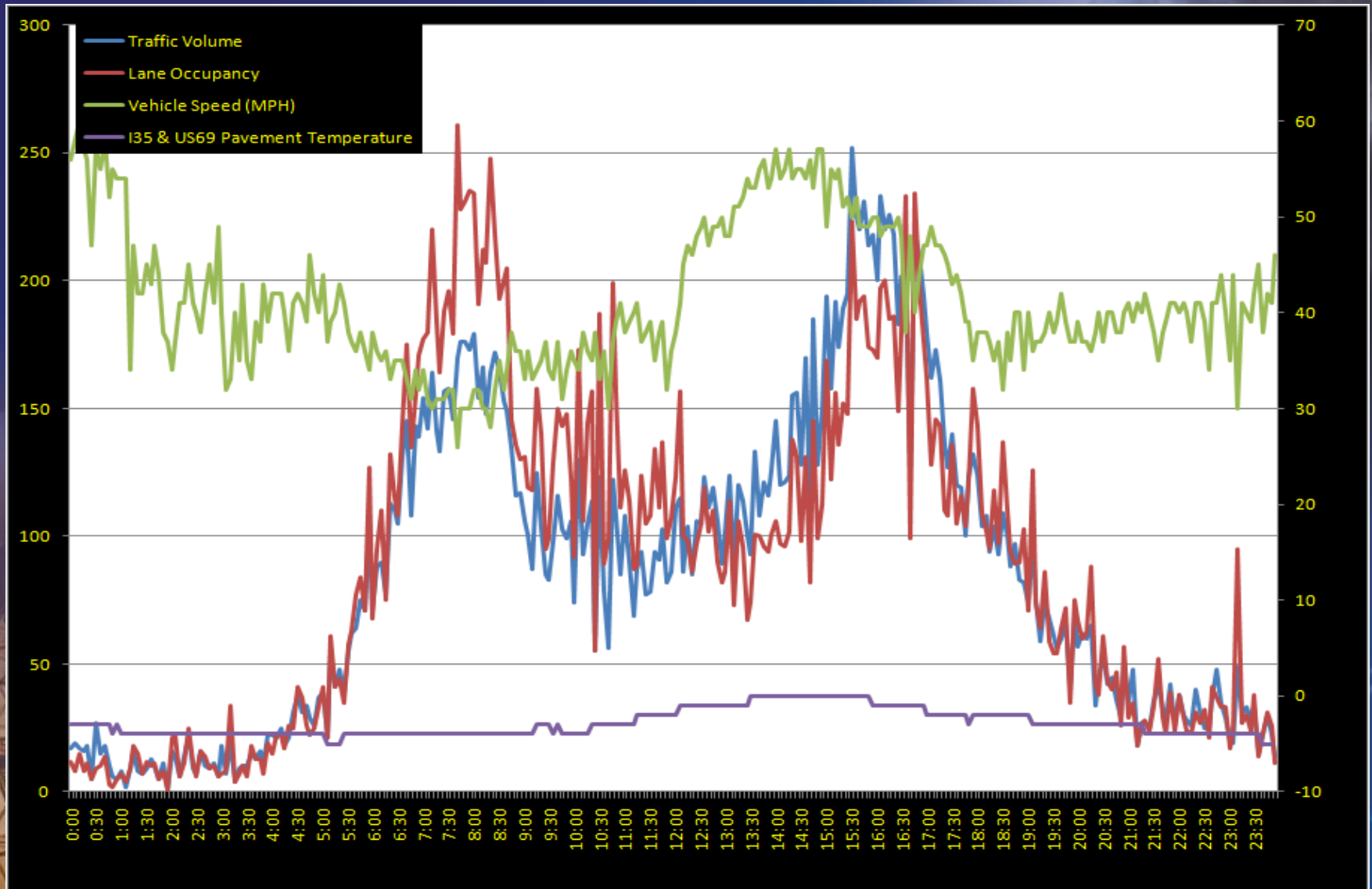
Visibility (SM)

# 01/10/2011 Snow Advisory Traffic Impacts



Wind Speed (kt)

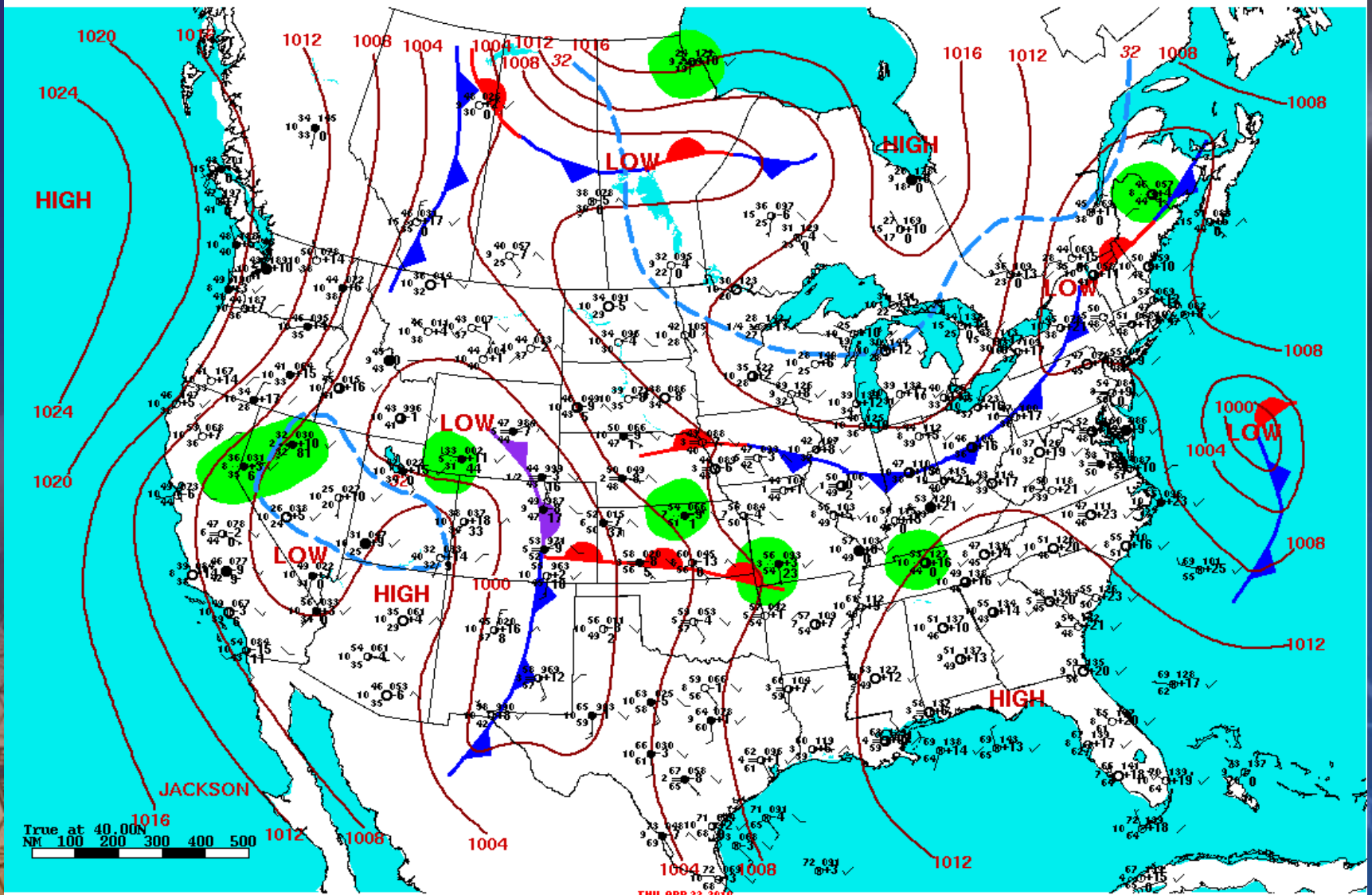
# 01/10/2011 Snow Advisory Traffic Impacts



Pavement Temperatures

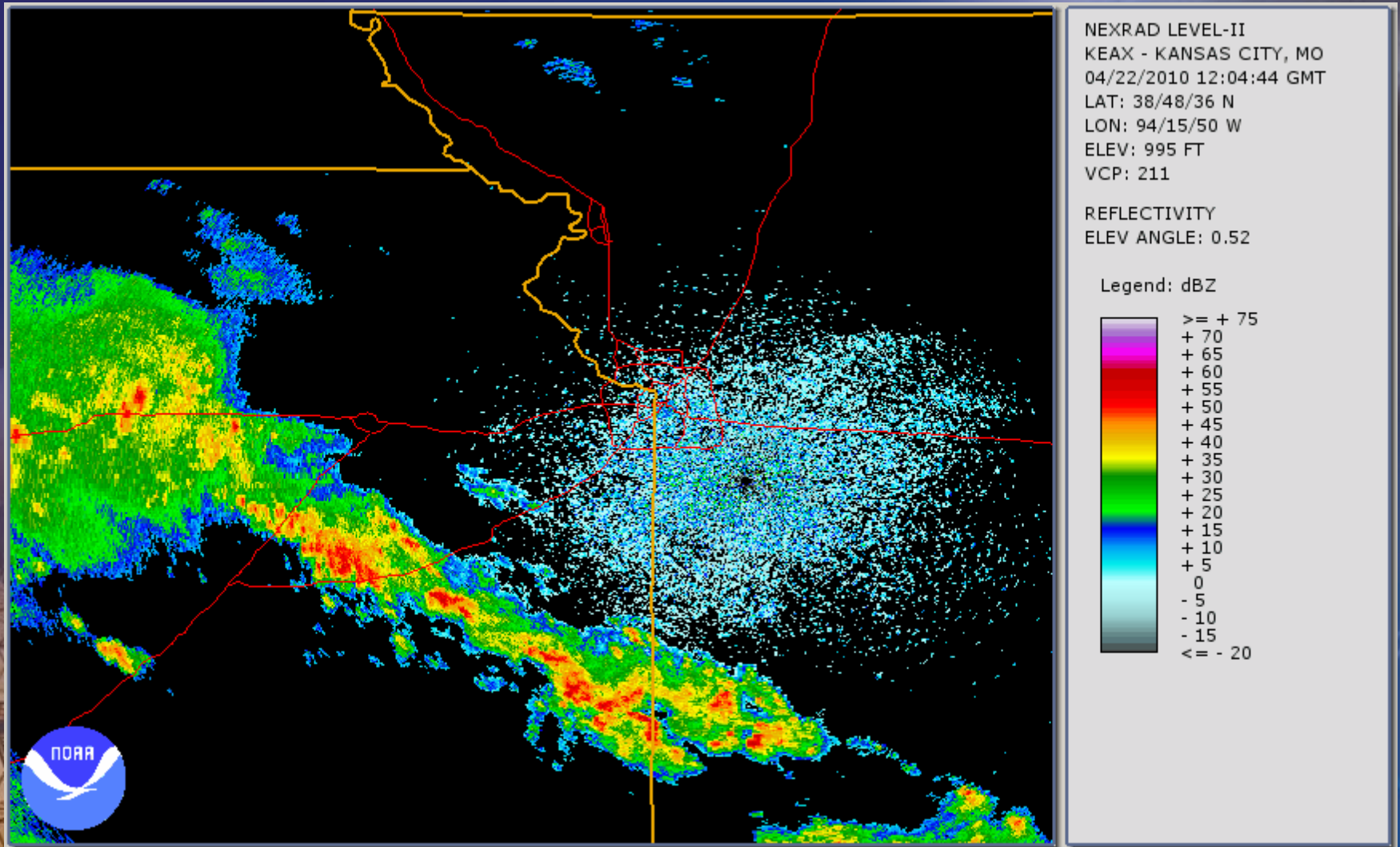


# April 22, 2010 Heavy Rain and Flooding

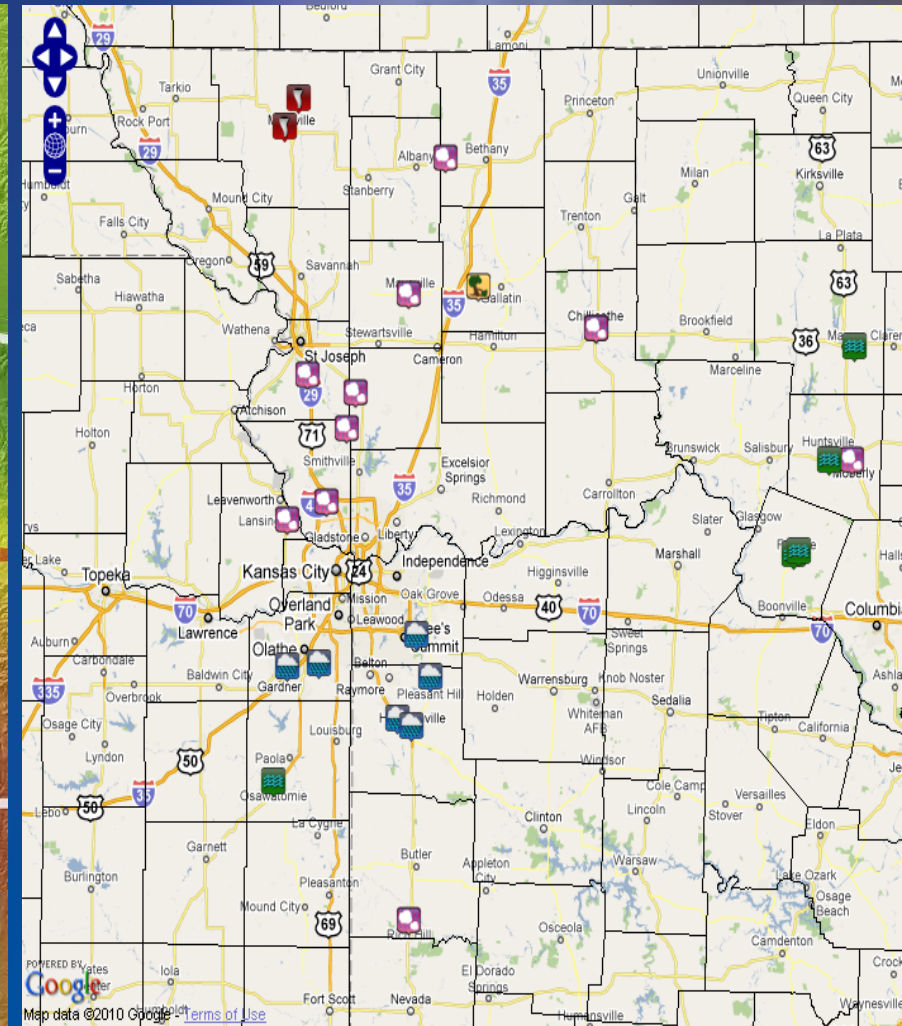
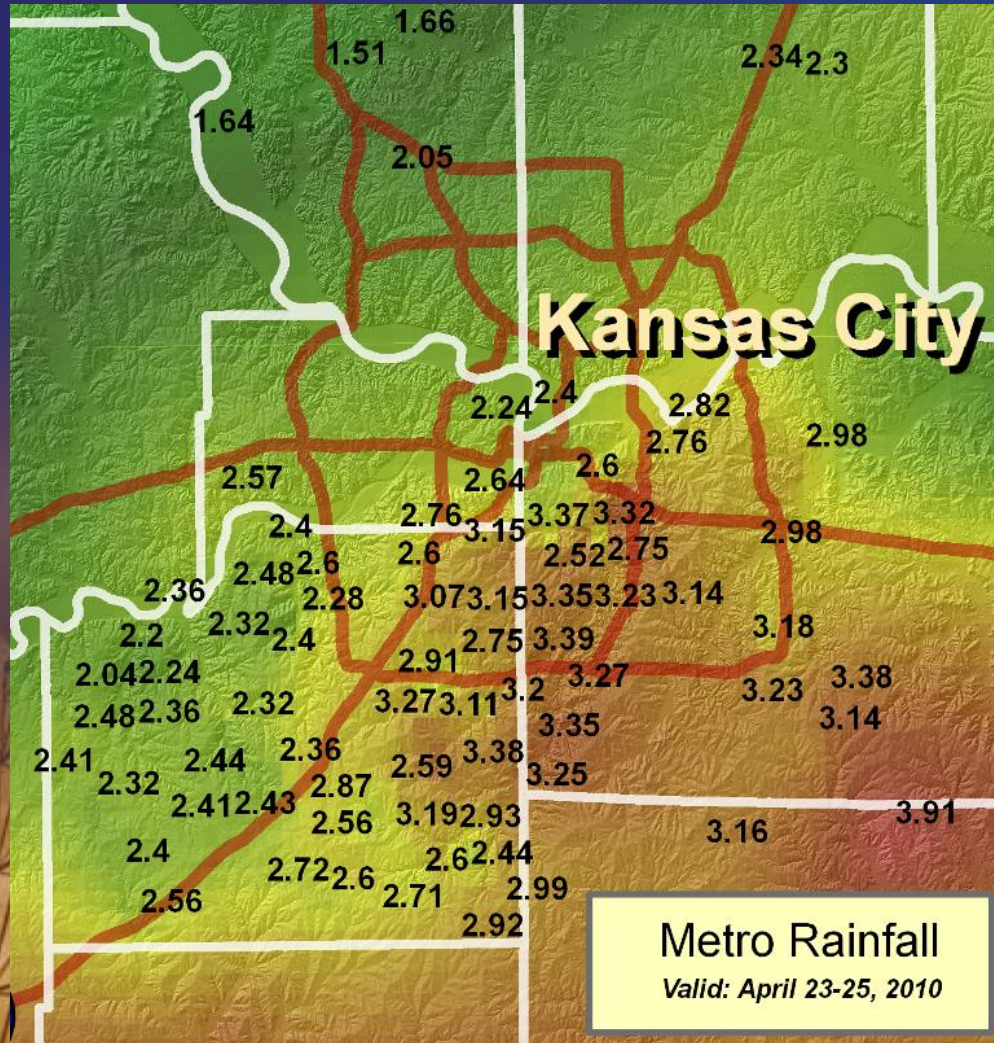


Surface Weather Map and Station Weather at 7:00 A.M. E.S.T.

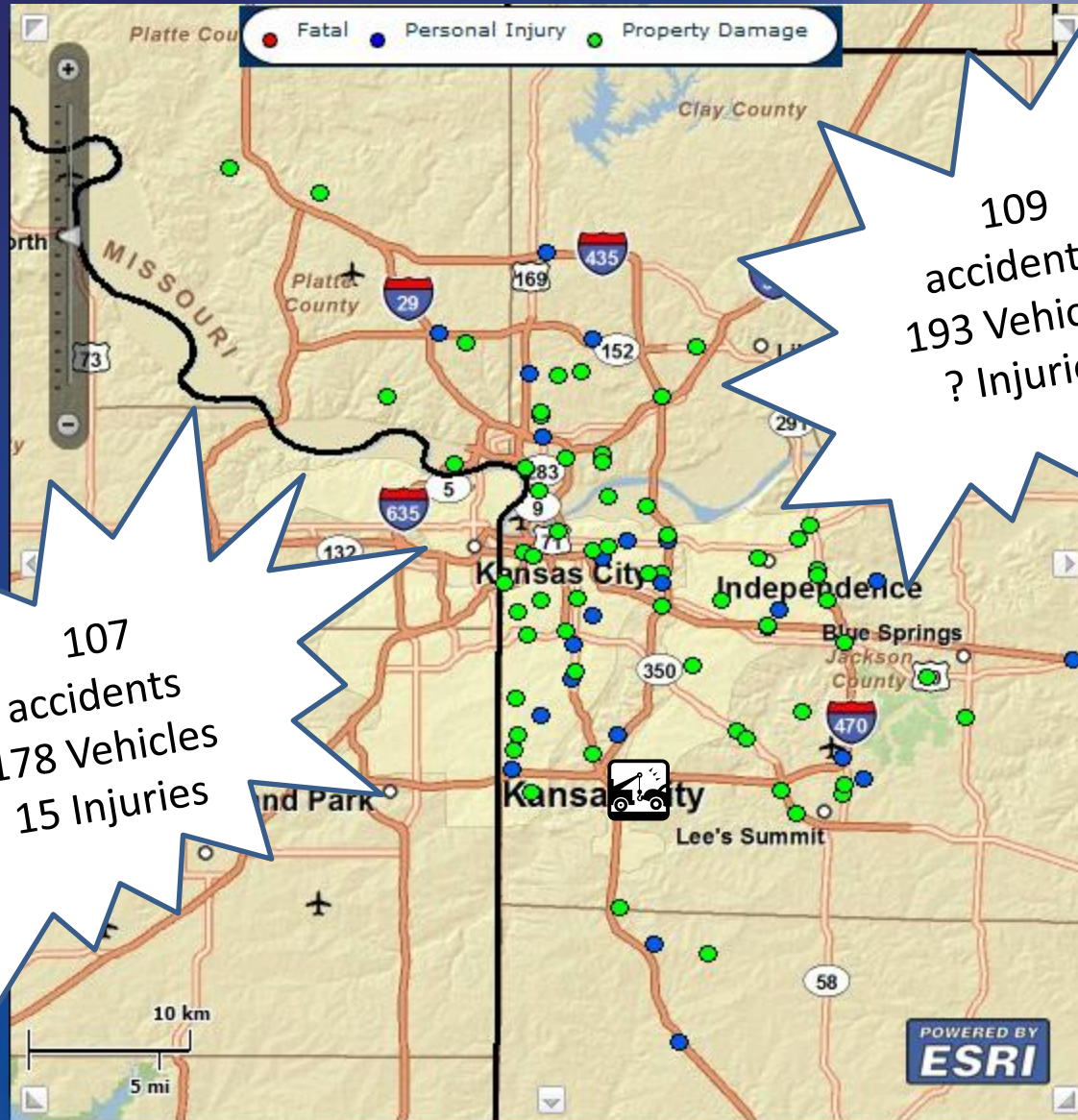
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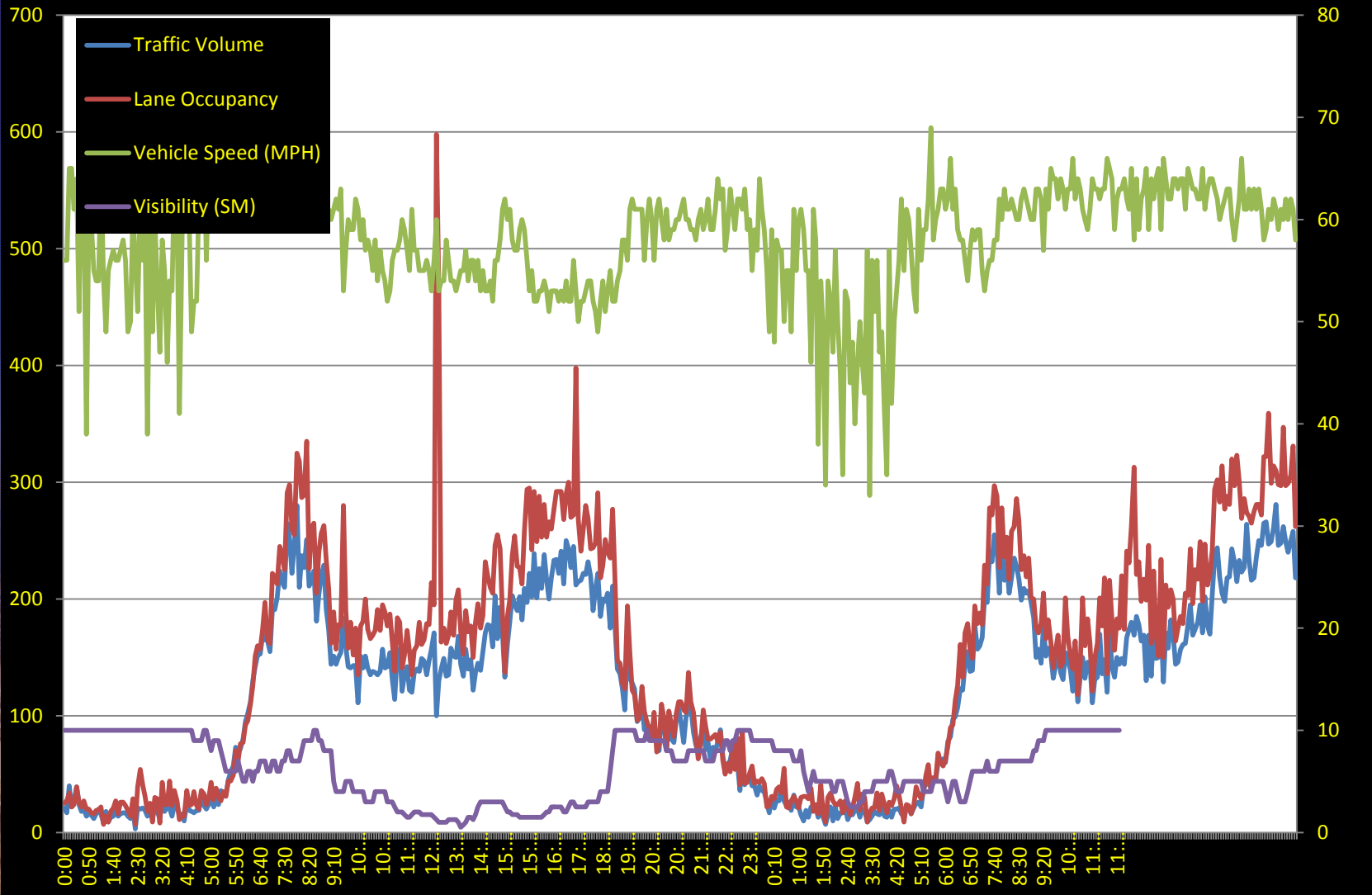
# April 22, 2010 Heavy Rain and Flooding Traffic Impacts



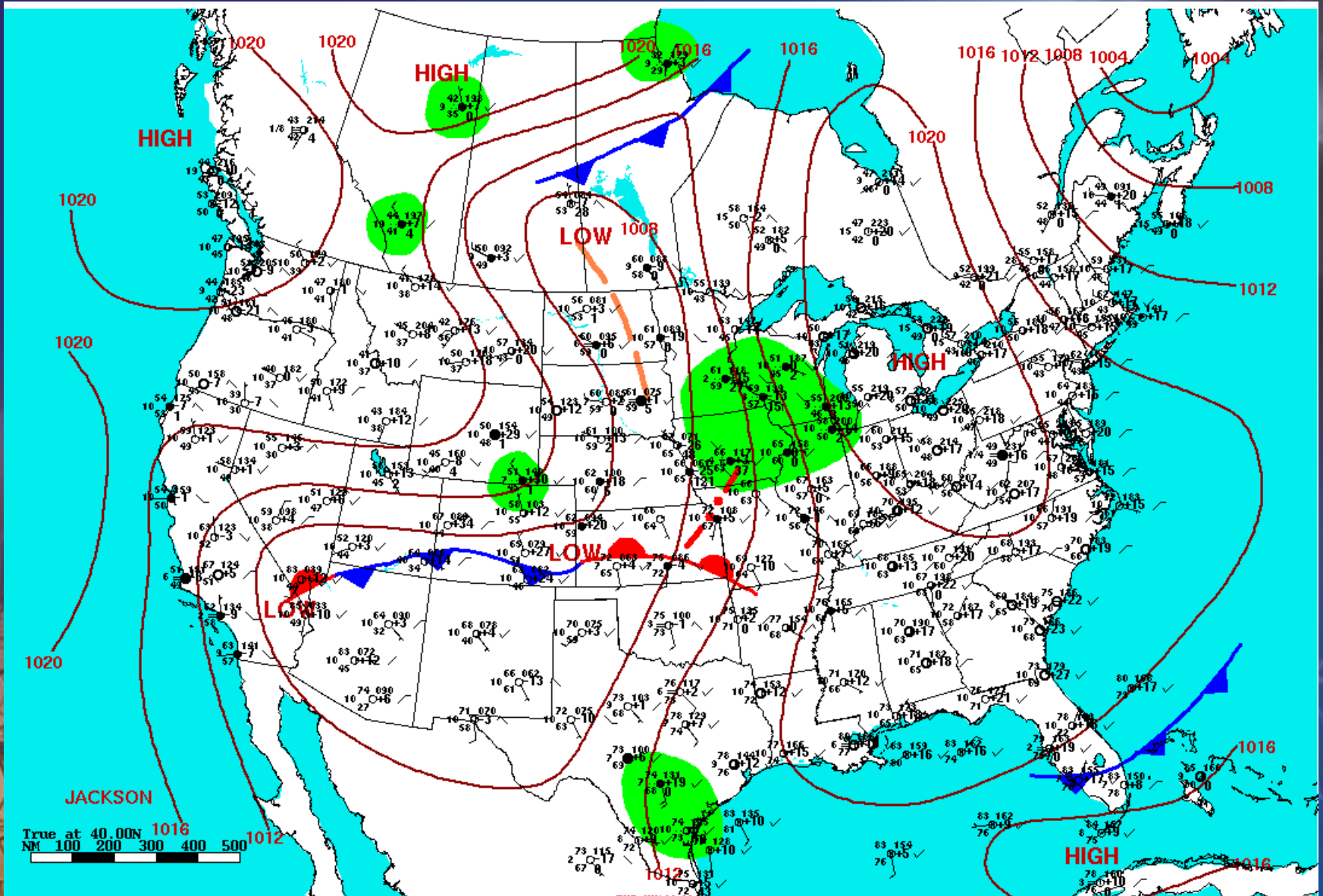
107  
accidents  
178 Vehicles  
15 Injuries

109  
accidents  
193 Vehicles  
? Injuries

# April 22, 2010 Heavy Rain and Flooding Traffic Impacts

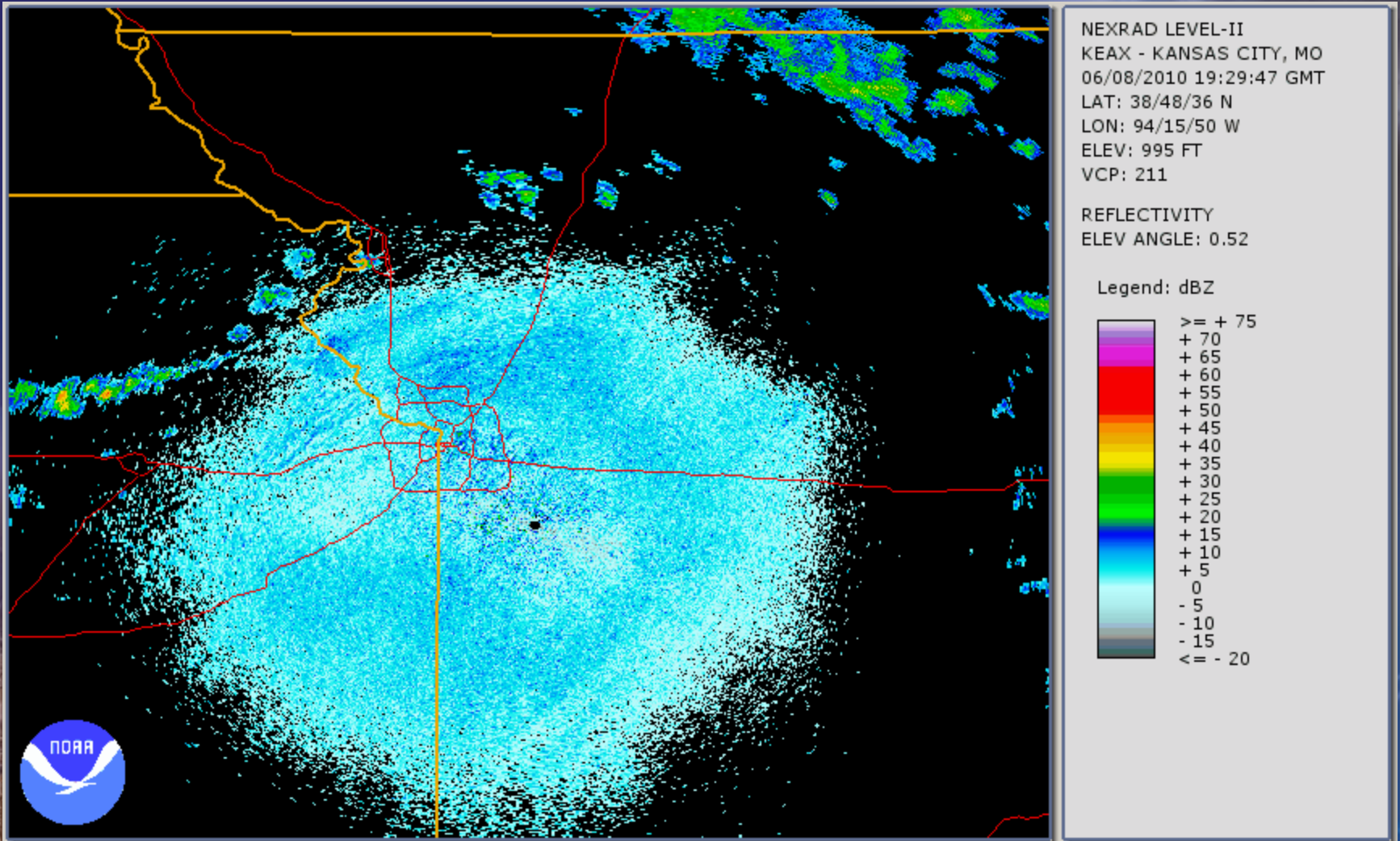


# June 8, 2010 Severe Weather and Flooding

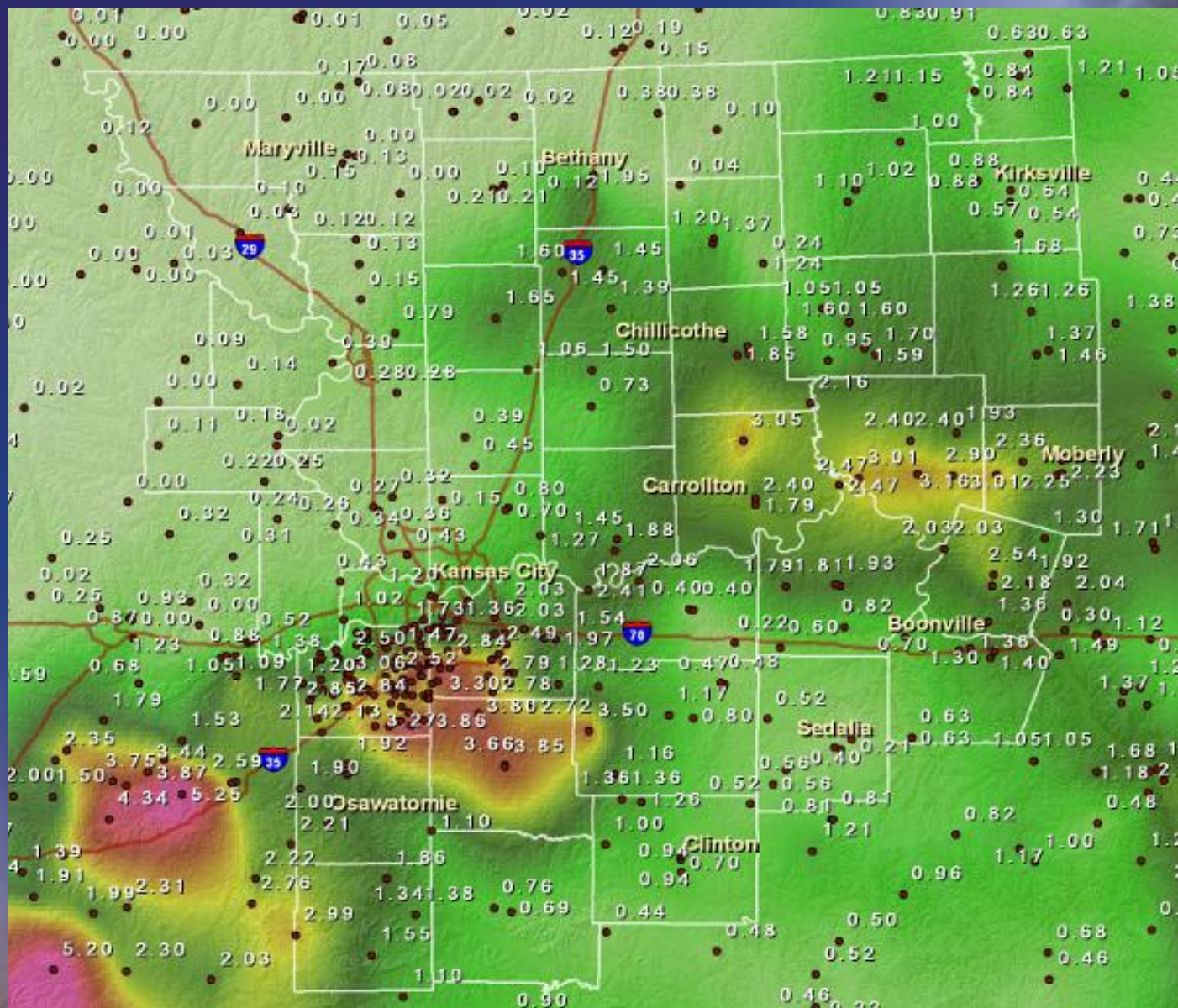


Surface Weather Map and Station Weather at 7:00 A.M. E.S.T.

# June 8, 2010 Severe Weather and Flooding

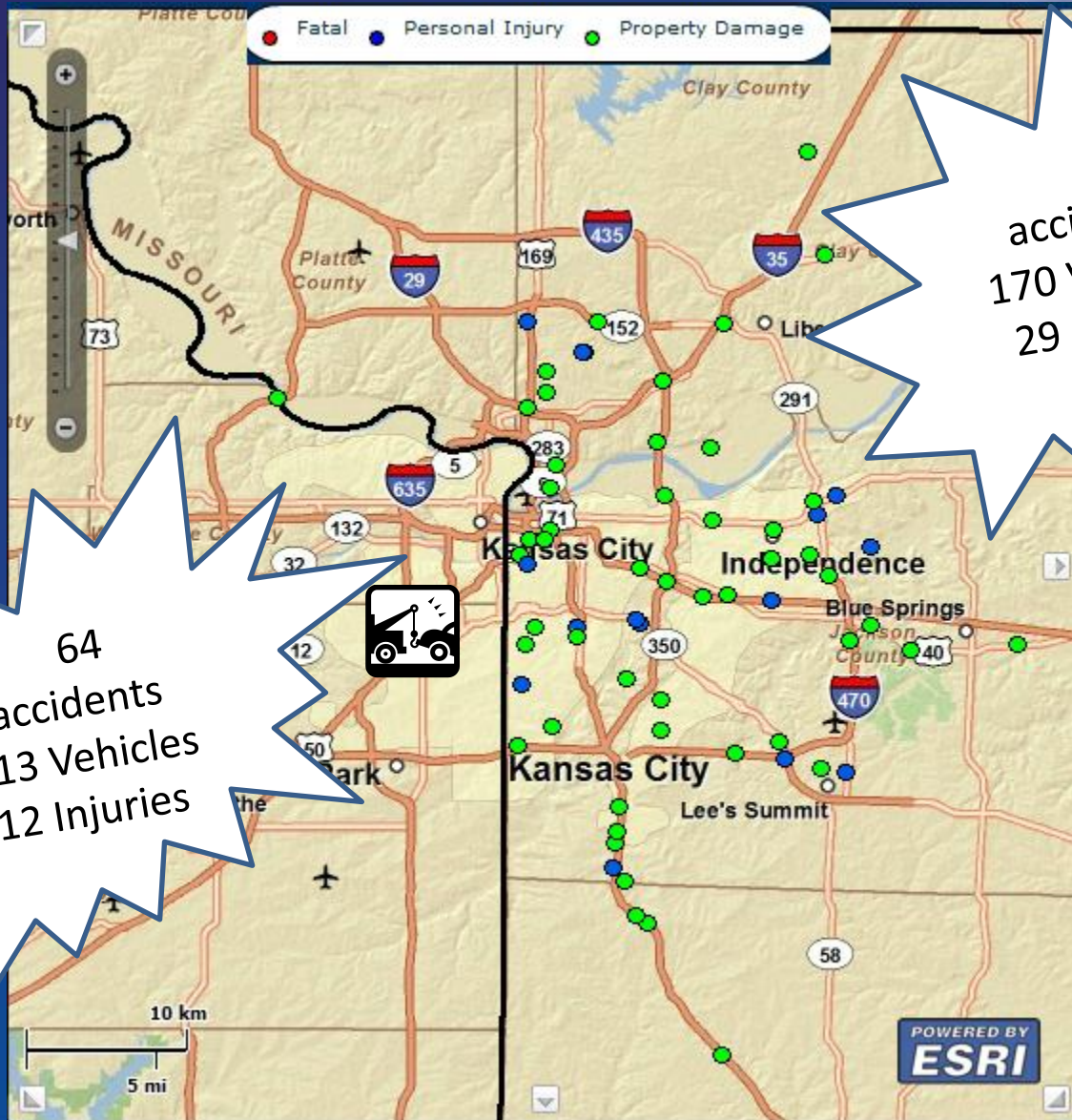


# June 8, 2010 Severe Weather and Flooding





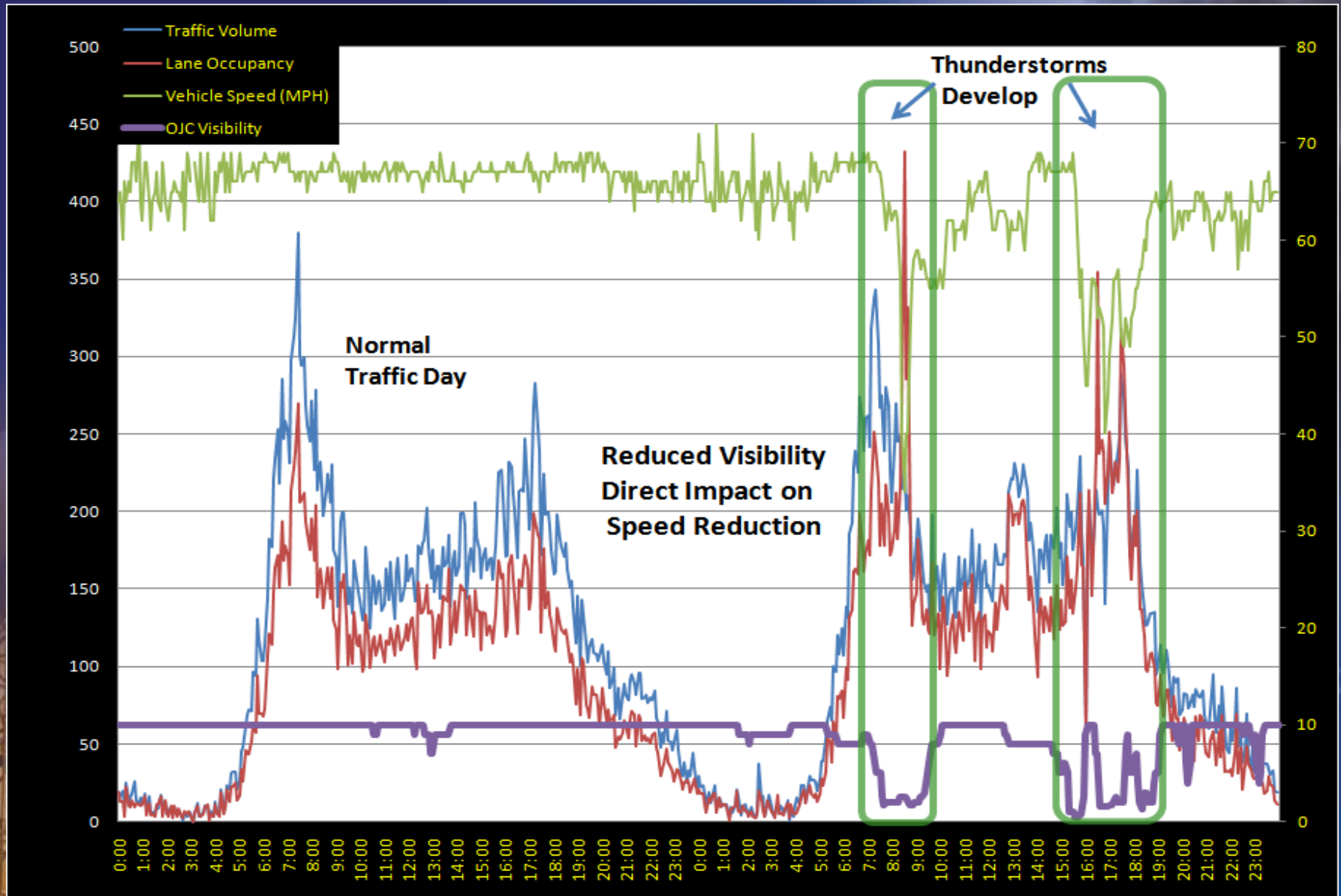
# June 8, 2010 Traffic Impacts from Severe Weather and Flooding



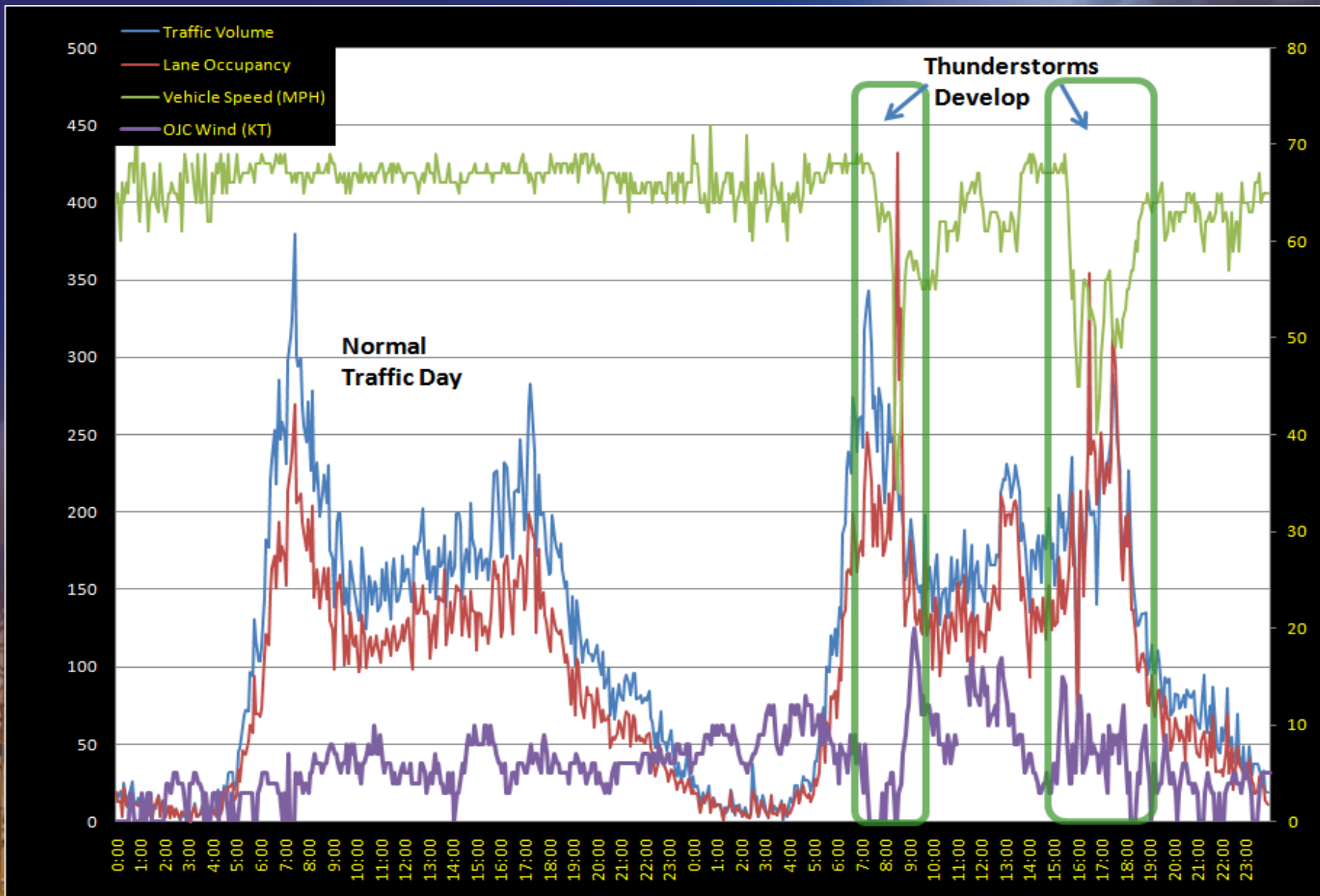
64  
accidents  
113 Vehicles  
12 Injuries

91  
accidents  
170 Vehicles  
29 Injuries

# June 8, 2010 Traffic Impacts



# June 8, 2010 Traffic Impacts



# Findings

- Qualitatively – weather appears to have an impact!
- Traffic Impact (accidents, travel time ) less when well advertised warning in effect
- Traffic impact greater during advisory/sub-advisory events
- No strong correlation of one weather element being more impactful...though some evidence that wind speeds greater than 10 kts in combination with weather disrupted traffic flow
- Sample size limited...for now

# Future Work

- Analysis of more events – winter, rain, severe weather
- Integration of local mesonet data in proximity to KC Scout sites
- Utilize large database of events to perform regression analysis to determine which elements have greatest impact
- KC Scout system will be expanded along I-70 from St Louis to Kanarado, KS; I-44 from Joplin, MO to Tulsa, OK thus findings may have relevance for other NWS County Warning Areas