

Using Social Media as a Source of Weather Intelligence in ITS

National Rural ITS Conference

St. Cloud, MN

August 27th, 2013



Agenda

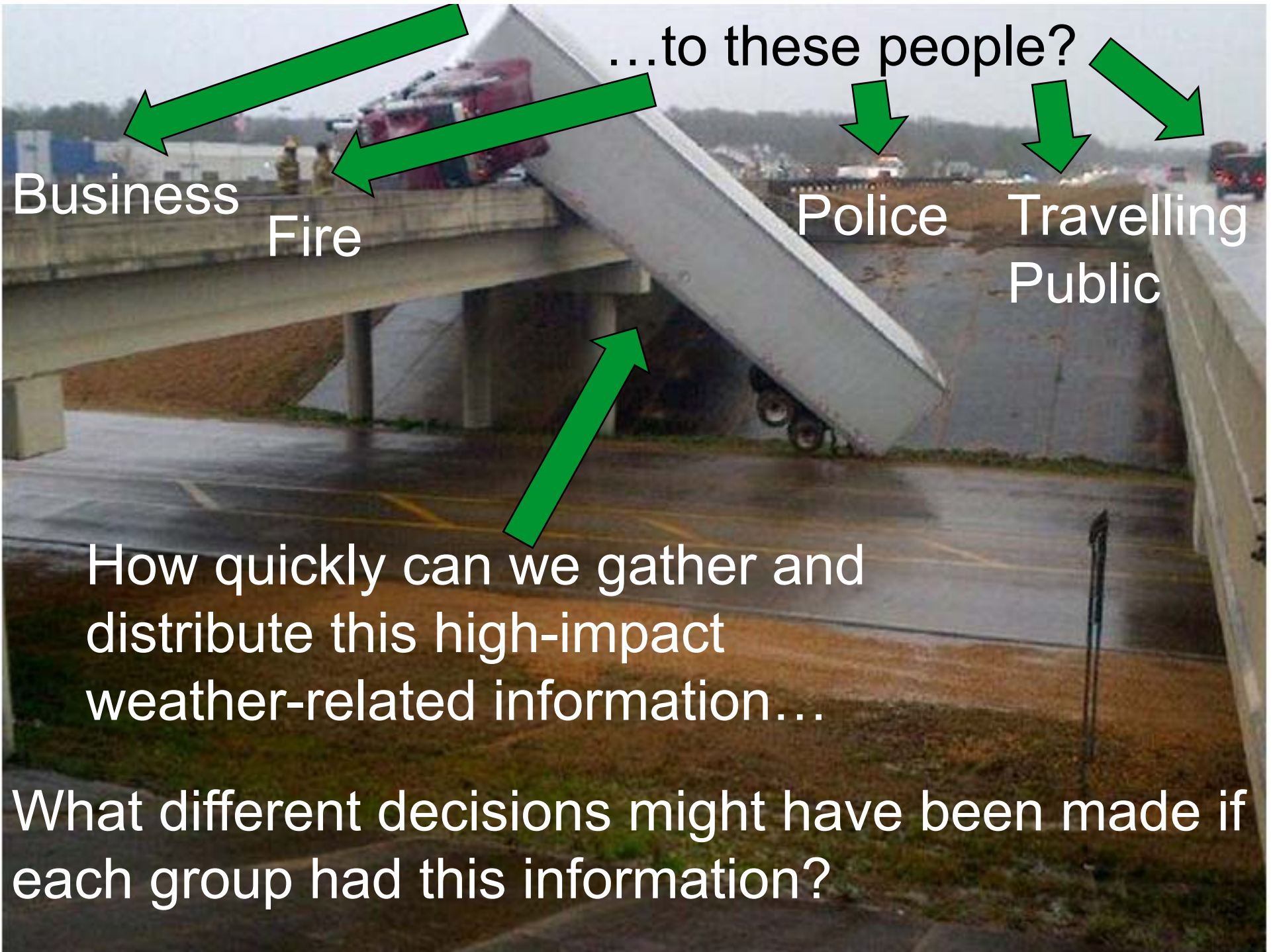
- Introduction – Why are we here?
- Sources of Weather Observations
- Additional Sources of Weather Observations
 - Social Media
 - Smart Phones
- Using a Human as a Weather Observation Source
- Local Storm Reports
 - Background
 - Examples
- ITS Applications
 - Examples
- Questions



I-90 Near Belvidere, SD
October 12th, 2012
80+ mph winds (non-
thunderstorm)



Tupelo, MS
March 13, 2013
50-60 mph winds in thunderstorms



...to these people?

Business

Fire

Police

Travelling
Public

How quickly can we gather and
distribute this high-impact
weather-related information...

What different decisions might have been made if
each group had this information?

“Traditional” Sources of Weather Observations

Automated Weather Observing System (AWOS)
Automated Surface Observing System (ASOS)



- Parameters

- Air Temperature
- Wind Speed
- Cloud Cover
- Visibility

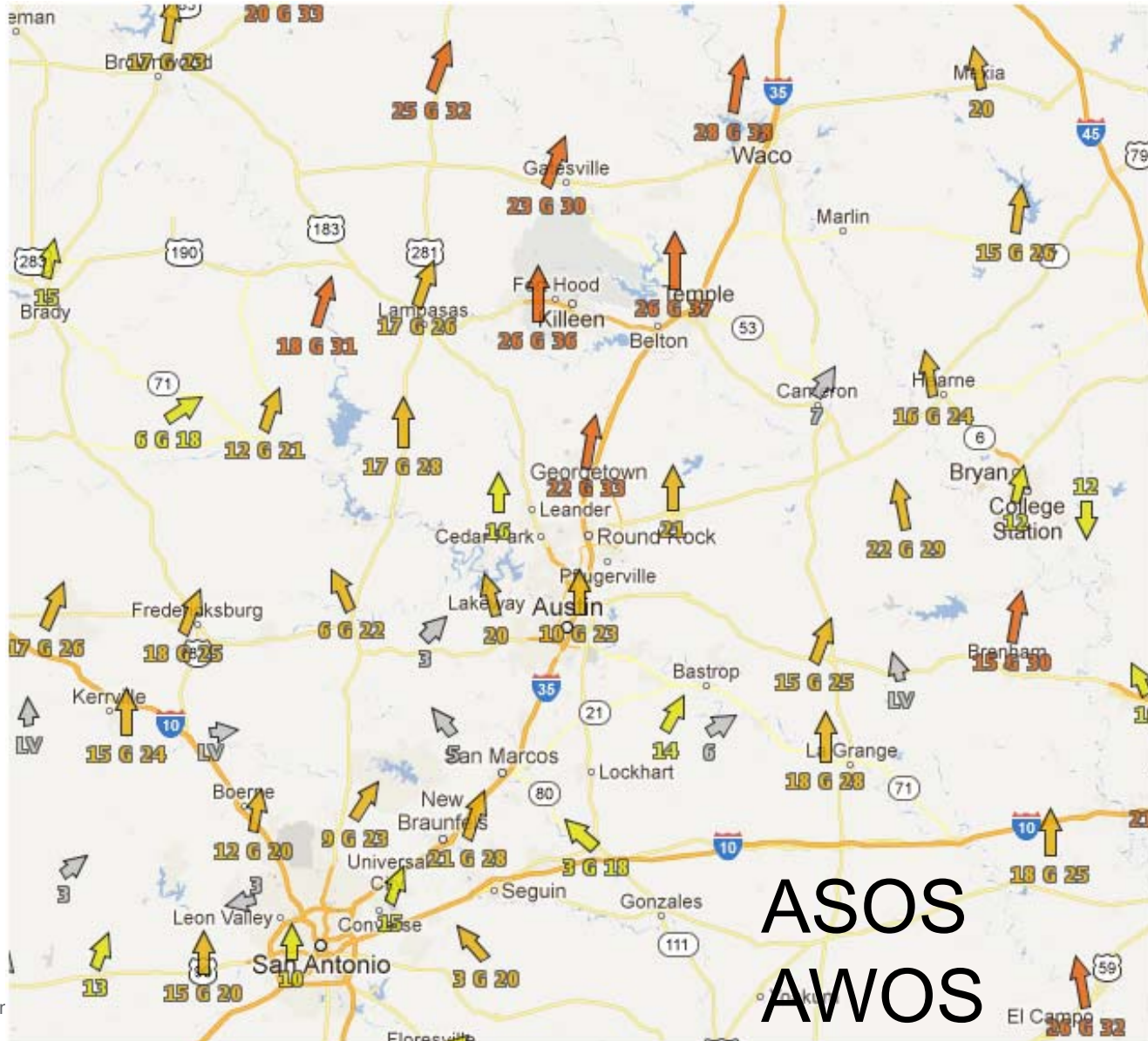
- Timing

- 1 report per hour (minimum)

- Coverage

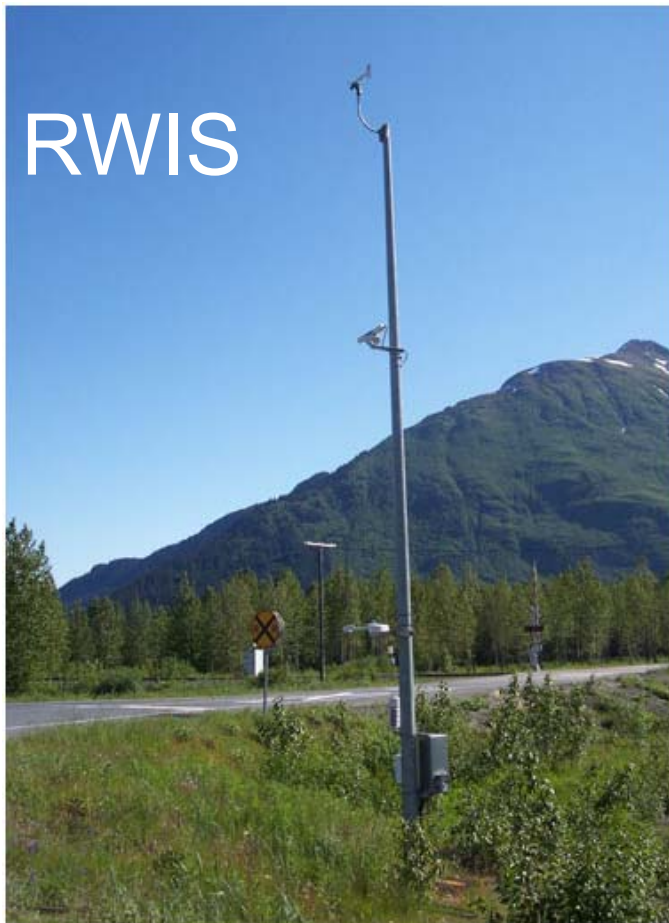
- Airports
- First-order climate locations

“Traditional” Sources of Weather Observations



“Traditional” Sources of Weather Observations

Road Weather Information System (RWIS)



- Parameters

- Air Temperature
- Wind Speed
- Pavement Temperature
- Pavement Condition

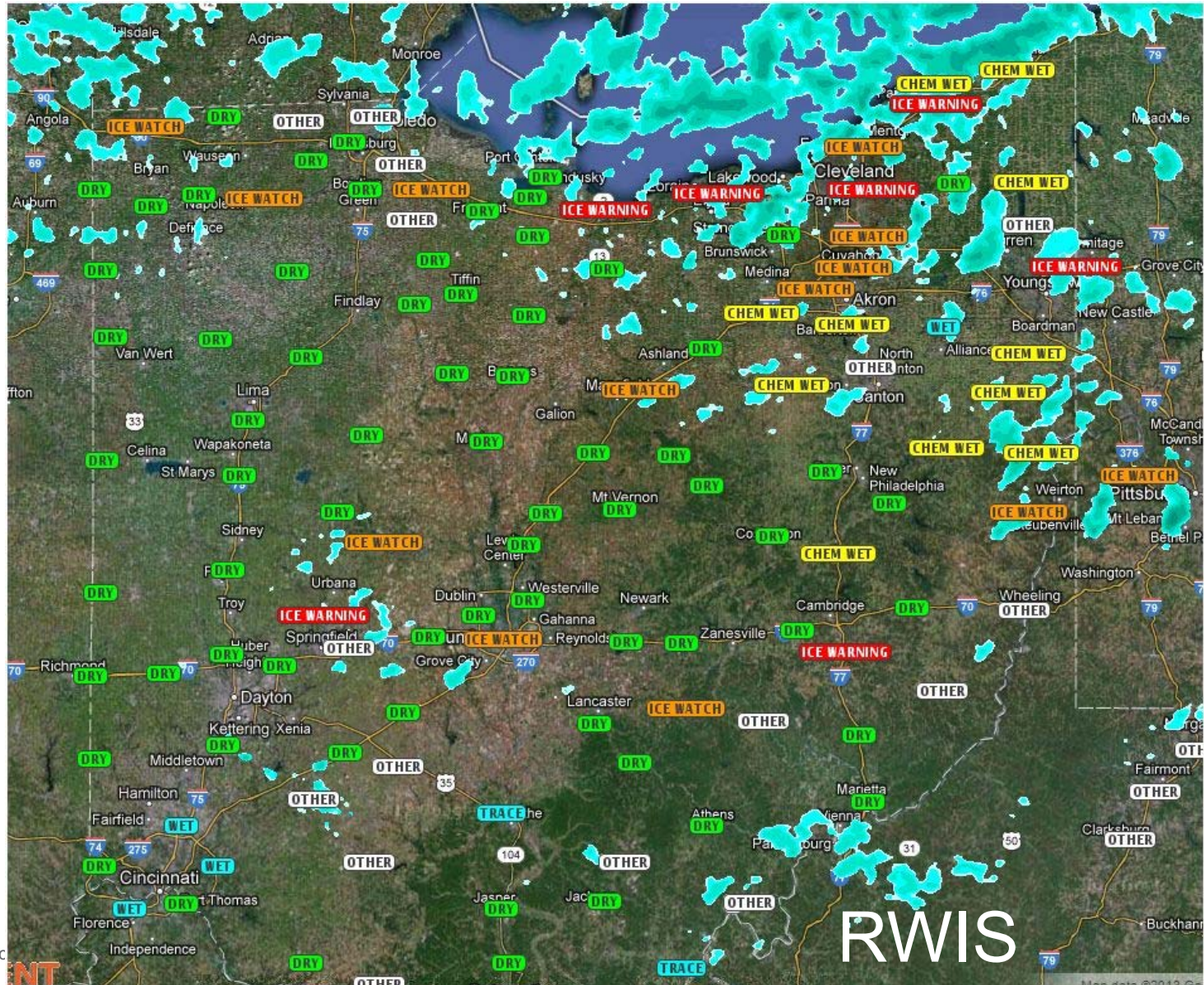
- Timing

- 2-3 reports per hour (varies)

- Coverage

- Along roadways of states where winter has an impact
- Every 20-50 miles (varies)

“Traditional” Sources of Weather Observations



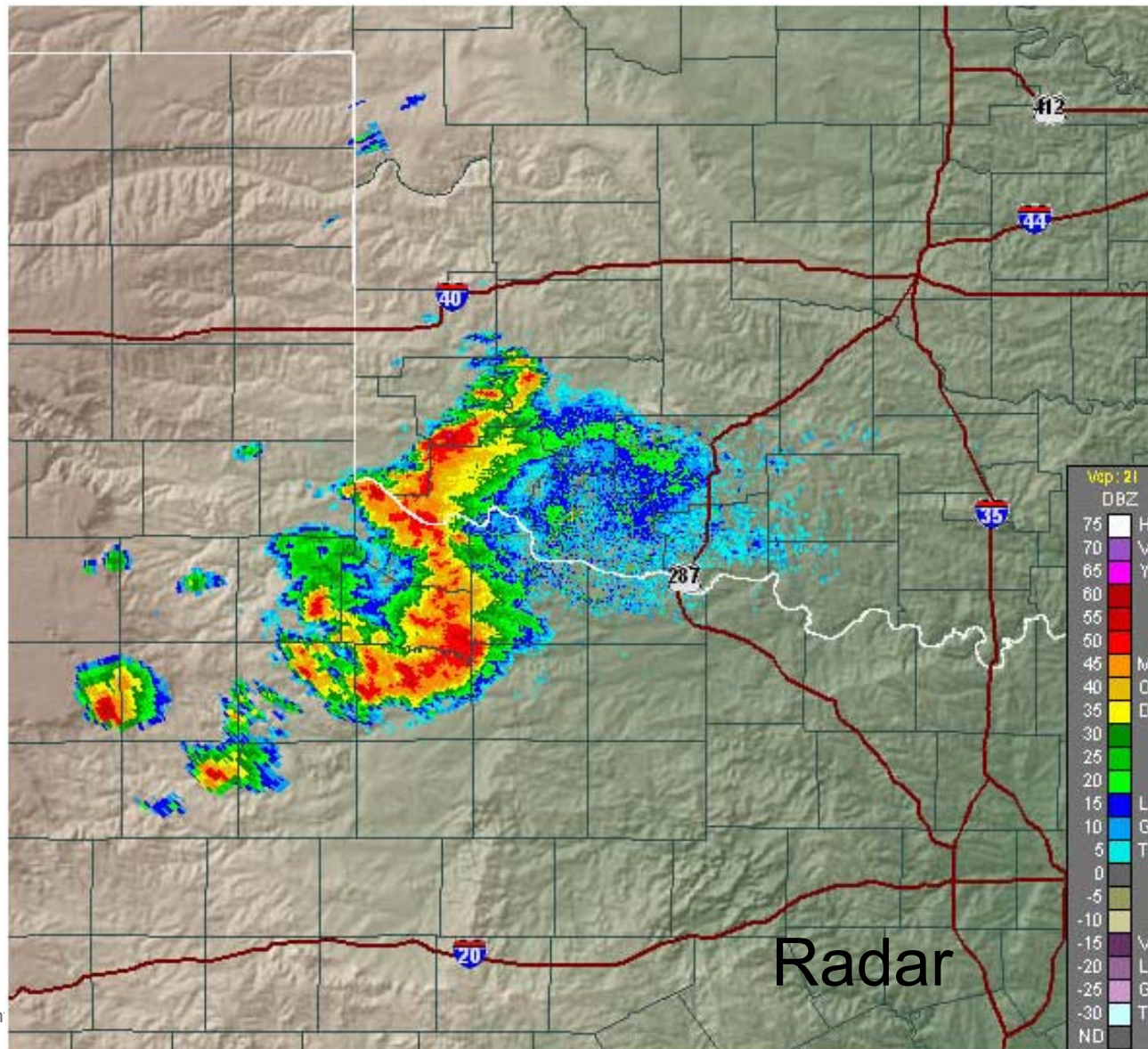
“Traditional” Sources of Weather Observations

Radar



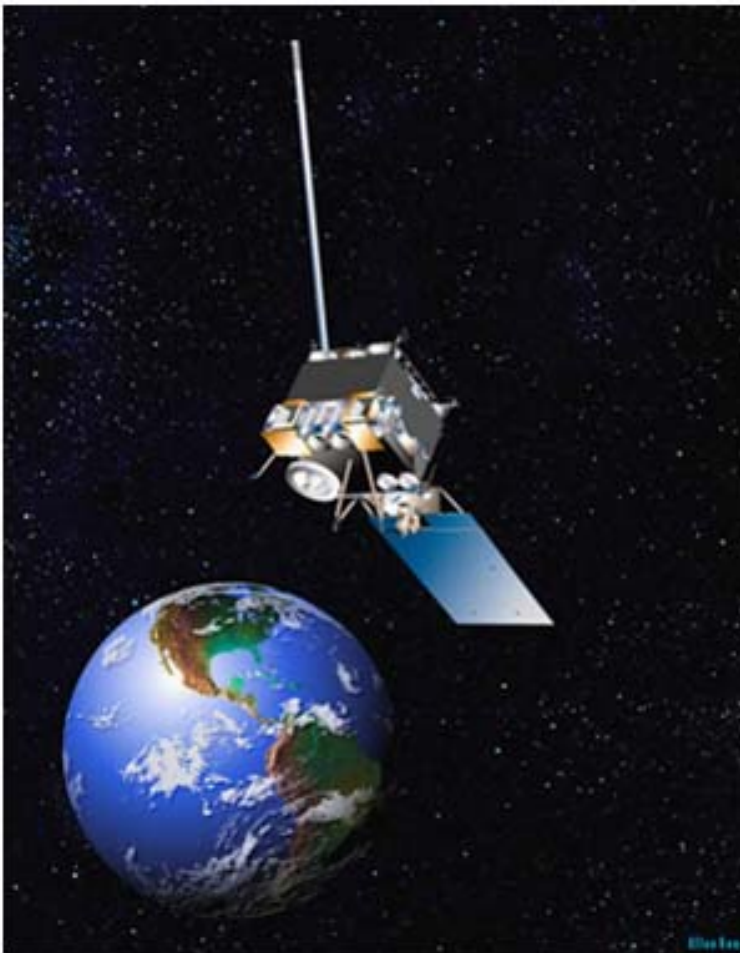
- Parameters
 - Decibels (dBZ) - Presence and intensity of precipitation
- Timing
 - 1 scan every ~5 minutes
- Coverage
 - 155 United States National Weather Service offices

“Traditional” Sources of Weather Observations



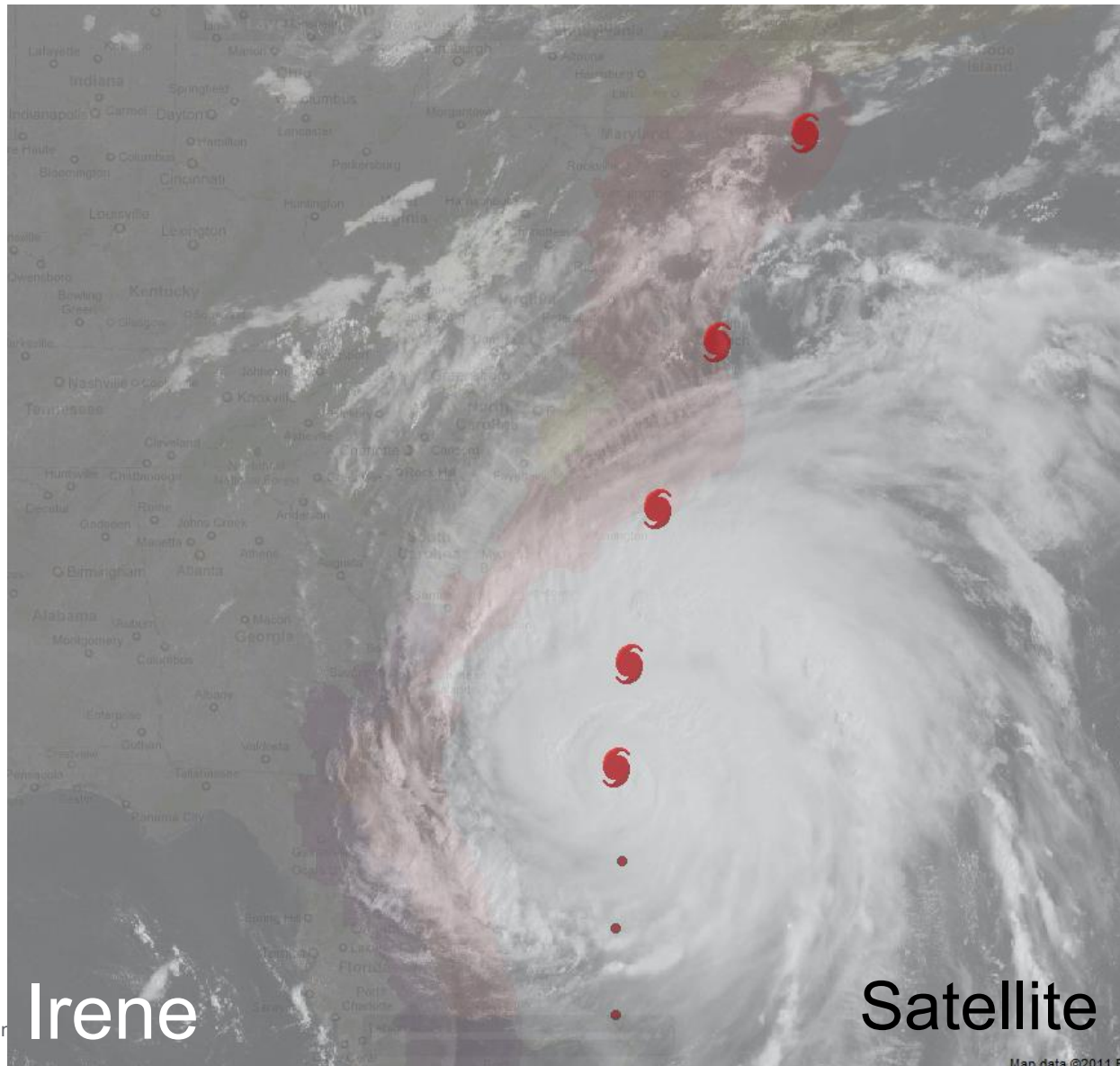
“Traditional” Sources of Weather Observations

Satellite



- Parameters
 - Picture of the earth's surface
 - Presence and temperature of moisture in the atmosphere
- Timing
 - 1 scan every ~15-60 minutes
- Coverage
 - Globe

“Traditional” Sources of Weather Observations



“Traditional” Sources of Weather Observations



“Traditional” Sources of Weather Observations



“Traditional” Sources of Weather Observations



Changing the Landscape

- Two factors that are changing the landscape

1. Social Media

- Capturing and sharing information on...everything



2. Mobile Devices

- The ability to connect to the internet from anywhere



How Many People Use the Top Social Networks, Apps & Services??

Ever wondered how many people are also using your favorite social network, app or service? We've got you covered! Here's a list of the top social networks, apps and services, ranked by the number of users.

Rank	Network or App	Users (in millions)	Users (in billions)
1	Facebook	1,150	1.15
2	Twitter	500	0.5
3	Google+	43	0.043
4	LinkedIn	10	0.01
5	MySpace	10	0.01
6	Instagram	10	0.01
7	YouTube	10	0.01
8	WhatsApp	10	0.01
9	Skype	10	0.01
10	Nextdoor	10	0.01
11	Blackboard	10	0.01
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99	Blackboard	10	0.01
100	Blackboard	10	0.01

Social Media Users



1.15 billion users



500 million users



43 million active users

2 billion total users*
 *(January 2013 NRITS abstract had 1.3 billion)

<http://expandedramblings.com/index.php/resource-how-many-people-use-the-top-social-media/>

Who uses social networking sites

% of internet users within each group who use social networking sites

	All internet users (n=1,895)	72%
a	Men (n=874)	70
b	Women (n=1,021)	74
	Race/ethnicity	
a	White, Non-Hispanic (n=1,331)	70
b	Black, Non-Hispanic (n=207)	75
c	Hispanic (n=196)	80 ^a
	Age	
a	18-29 (n=395)	89 ^{bcd}
b	30-49 (n=542)	78 ^{cd}
c	50-64 (n=553)	60 ^d
d	65+ (n=356)	43
	Education level	
a	No high school diploma (n=99)	67
b	High school grad (n=473)	72
c	Some College (n=517)	73
d	College + (n=790)	72
	Annual household income	
a	Less than \$30,000/yr (n=417)	75
b	\$30,000-\$49,999 (n=320)	72
c	\$50,000-\$74,999 (n=279)	74
d	\$75,000+ (n=559)	71
	Urbanity	
a	Urban (n=649)	74
b	Suburban (n=893)	71
c	Rural (n=351)	69

Source: Pew Research Center's Internet & American Life Project Spring Tracking Survey, April 17 – May 19, 2013. N=1,895 adult internet users ages 18+. Interviews were conducted in English and Spanish and on landline and cell phones. The margin of error for results based on all internet users is +/- 2.5 percentage points.

Note: Percentages marked with a superscript letter (e.g., ^a) indicate a statistically significant difference between that row and the row designated by that superscript letter, among categories of each demographic characteristic (e.g. age).

Social Media

- Usage spans...
 - Gender
 - Race
 - Education level
 - Income
 - Location (Urban/**Rural**)
- Still heavily favors less than 50 yr olds
 - This is rapidly changing...
 - Number of social media users age 65+ has tripled
 - <http://www.bizreport.com/2013/08/pew-number-of-social-media-users-age-65-triples.html>

<http://pewinternet.org/Commentary/2012/March/Pew-Internet-Social-Networking-full-detail.aspx>

Smart Phones

● Amount

- 138.5 million people in the US own a smart phone (56% of all adults)
- 1.3 million Android devices are activated every day (4 times more than the number of babies born each day)

● Usage

- Smart phones are checked 150 times per day (once every 6.5 minutes)



<http://www.forbes.com/sites/markrogowsky/2013/06/06/more-than-half-of-us-have-smartphones-giving-apple-and-google-much-to-smile-about/>

<http://www.nydailynews.com/life-style/smartphones-world-article-1.1295927>

A Powerful Combination

Social Media

The desire (and obsession?) to share information



Smart Phones

The communication method to do so anywhere



A Source of Weather Observations!



An Excellent Source of Weather “Observations”



- Parameters

- Weather's impact at the surface not static-parameters

- Timing

- Event-driven not clock-driven
 - Smart phones are checked 150 times per day

- Coverage

- Everywhere people are located
 - 185 million smart phones in US
 - Urban, suburban, rural users



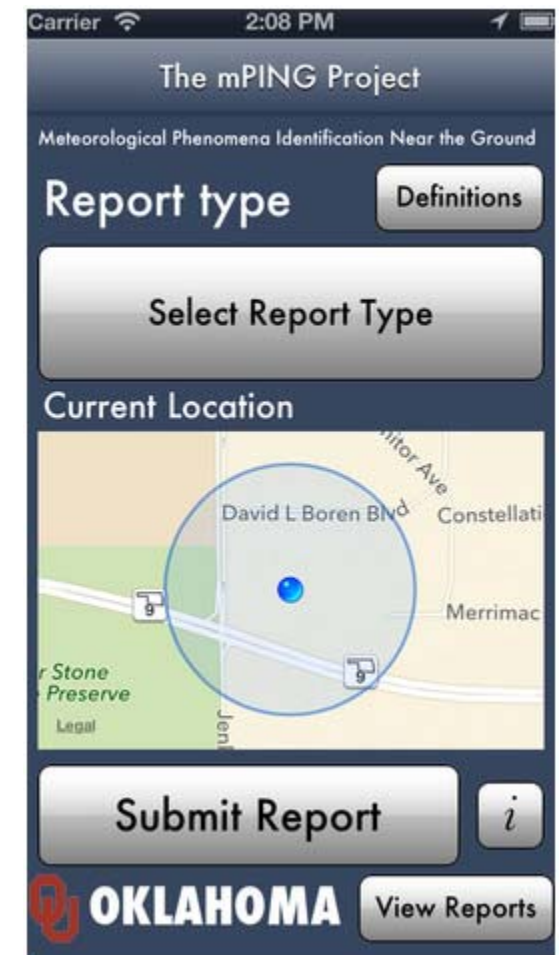
Weather Community is Taking Notice

Submit a Storm Report

<< [Go Back](#)

It's important for our forecasters to have ground truth during severe weather events. If you are in our [County Warning Area](#) and experience **hail (penny sized or larger), damaging wind or a tornado**, please let us know as soon as you safely can via one of the following options:

	Call our Severe Weather Reporting Hotline at 1-866-763-4466.
	Submit your report through our online form . (Presentar su informe utilizando la versión en Español .)
	Tweet your severe weather report with #gawx.
	Submit your report online via Spotter Network . (Test required to submit a report.)



<http://www.nssl.noaa.gov/projects/ping/>

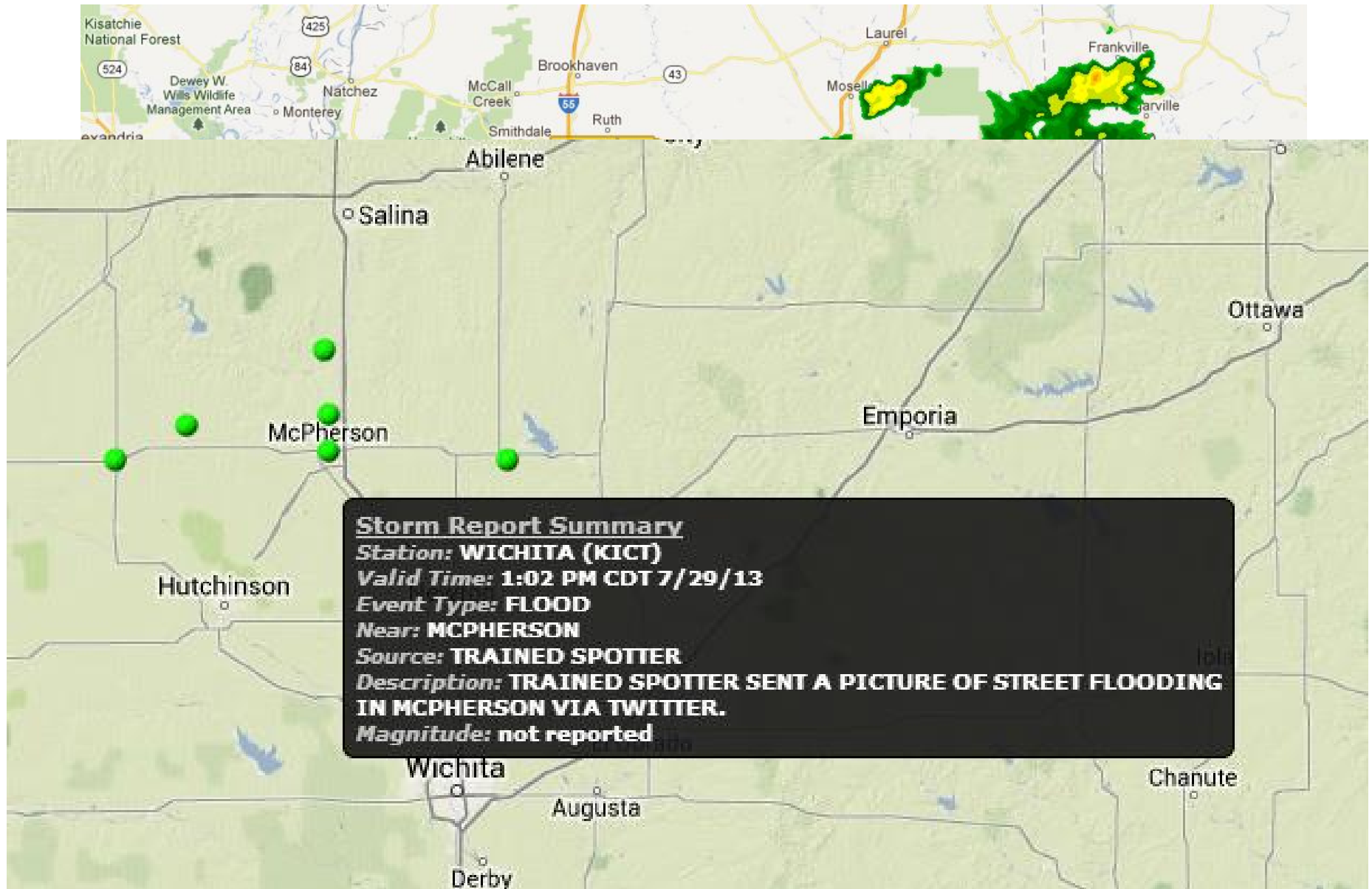
Weather's Impact: Local Storm Reports

Attribute	Traditional Observations	Local Storm Reports	
Update Frequency	5-60 minutes	Event-driven	
Parameters	•Air Temperature •Wind Speed •Cloud Cover •Pavement Temperature •Pavement Condition •Decibels (dBZ) •Cloud Presence	•Avalanche •Blizzard •Downburst •Drought •Excessive Cold •Excessive Heat •Flash Flood •Flood •Fog •Freezing Rain •Funnel Cloud •Hail •Heavy Rain •Ice	•Lightning •Marine Thunderstorm Wind •Non-Thunderstorm Wind •Damage •Non-Thunderstorm Wind Gust •Other •Sleet •Snow •Thunderstorm Wind Damage •Thunderstorm Wind Gust •Tropical Storm •Tornado •Waterspout •Wildfire
Sources	AWOS, ASOS, RWIS, Radar, Satellite	Storm spotters, law enforcement, media, public (via social media)	

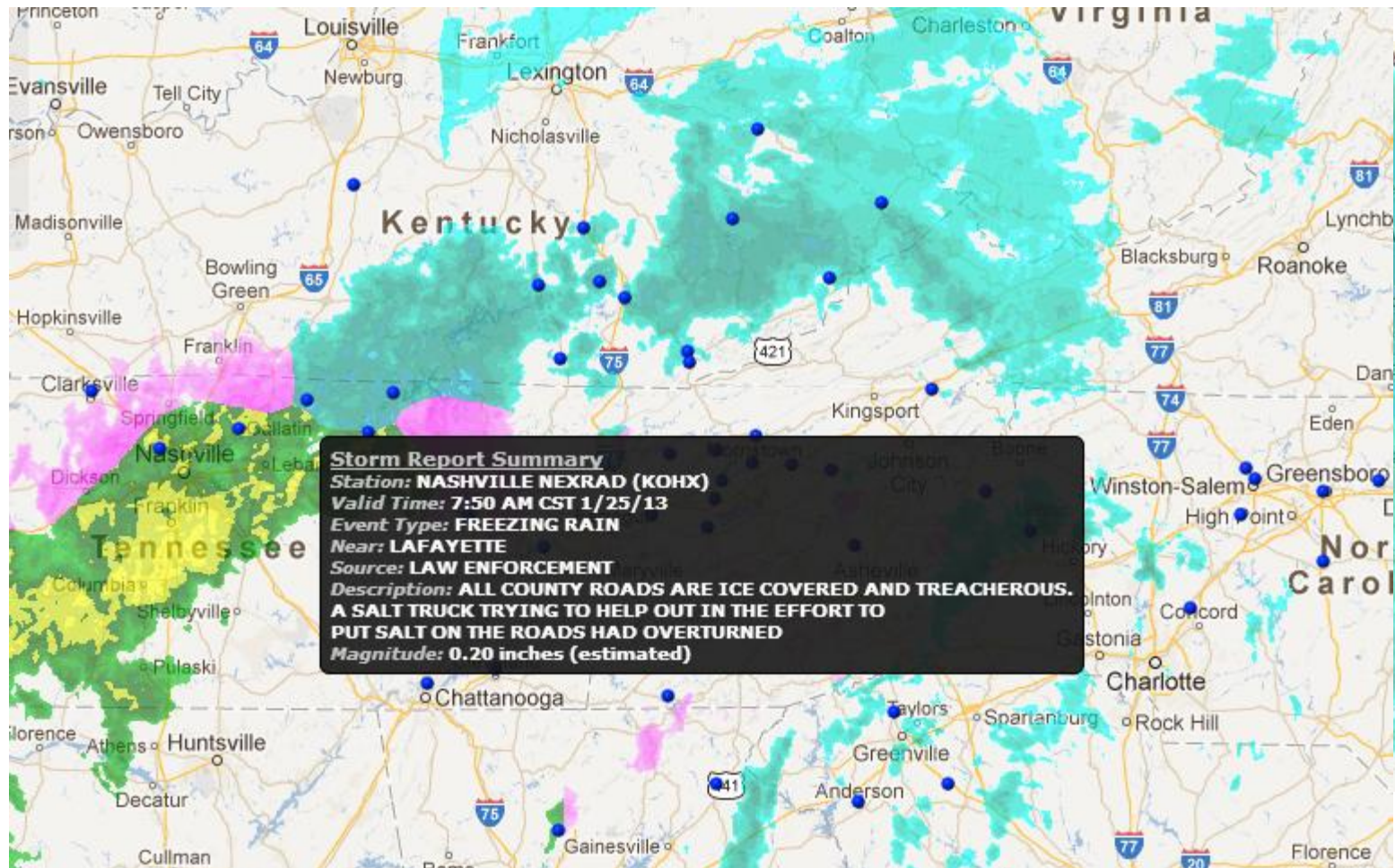
Local Storm Report - Tornadoes



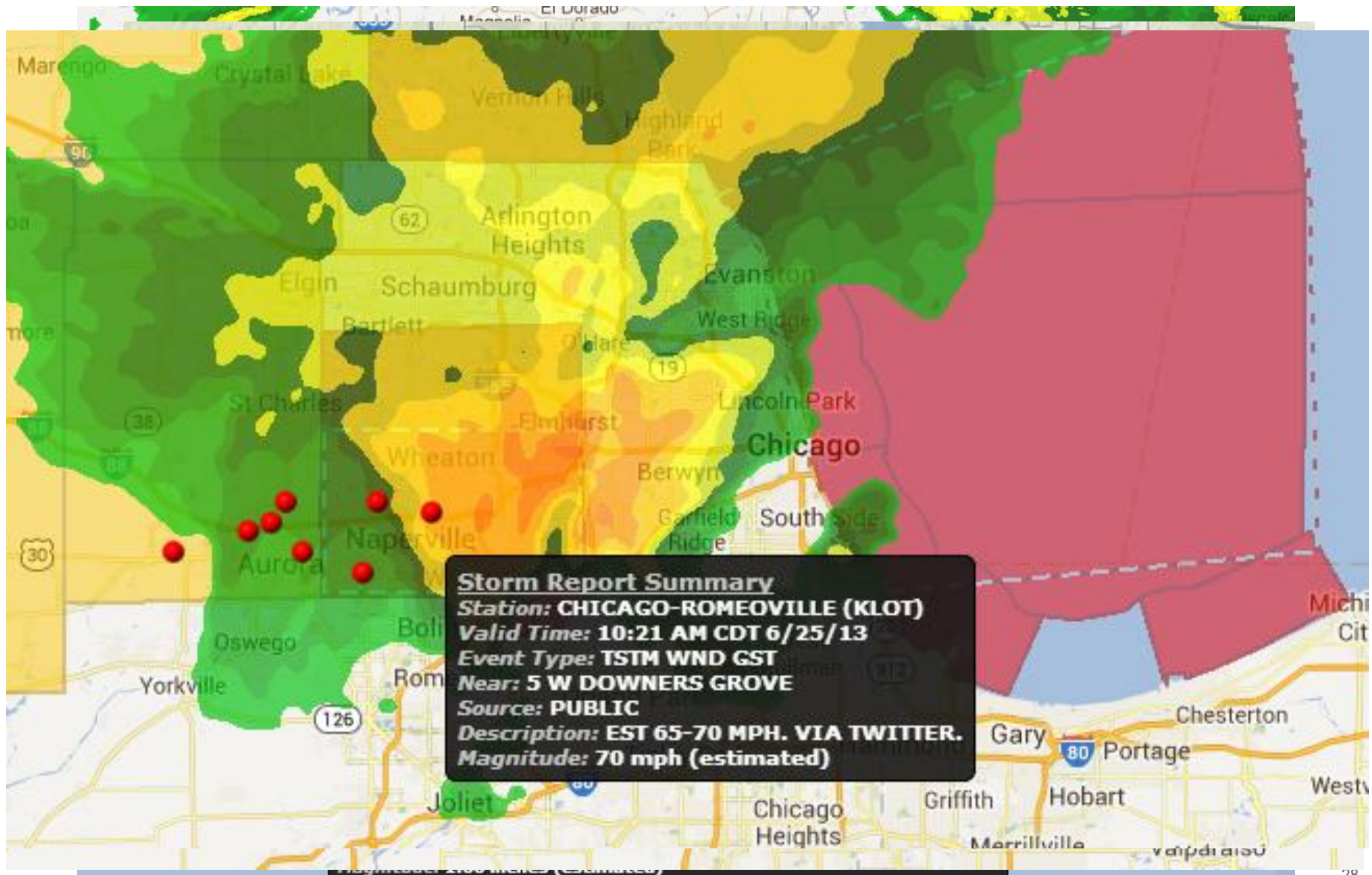
Local Storm Reports - Floods



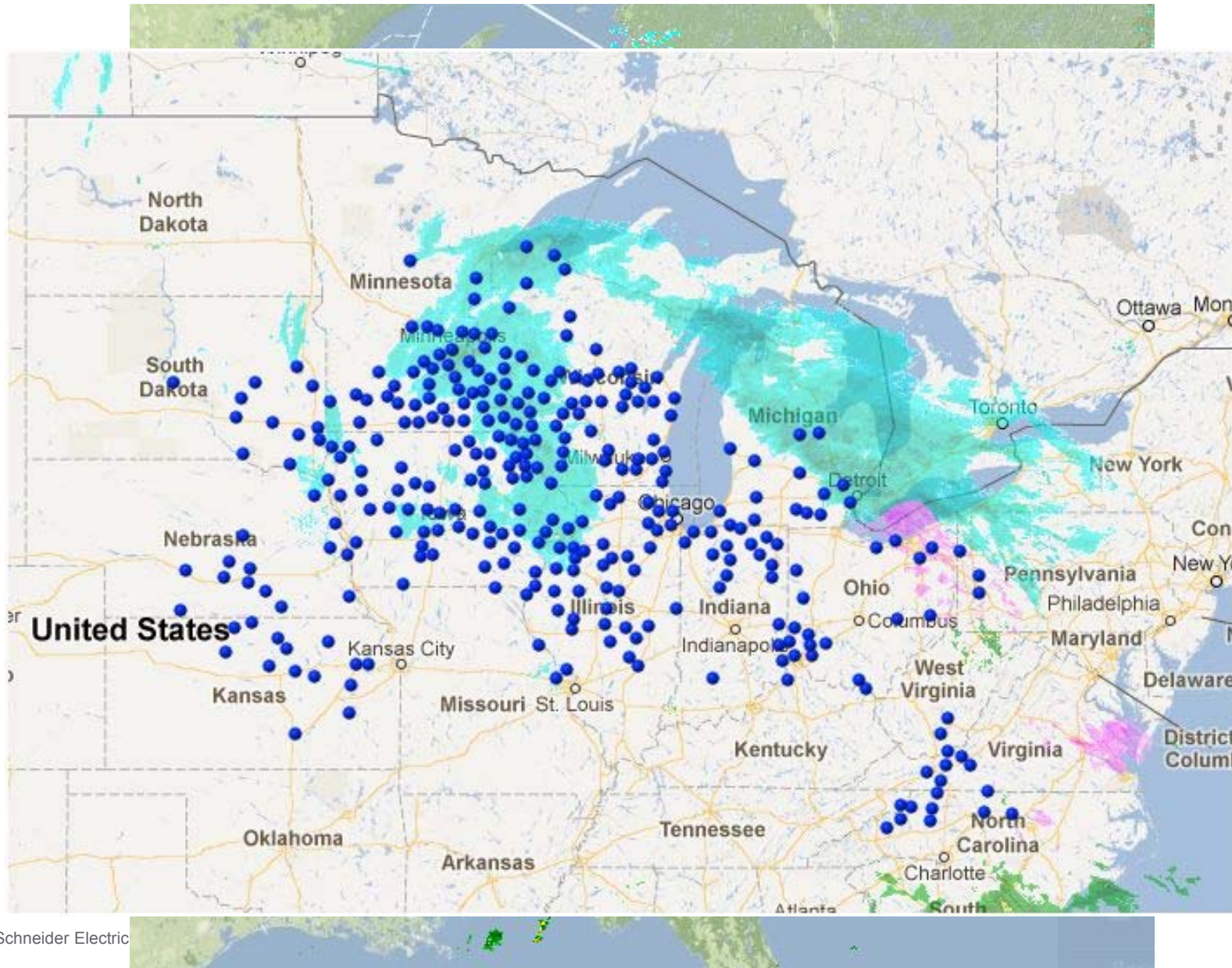
Local Storm Reports – Snow & Ice



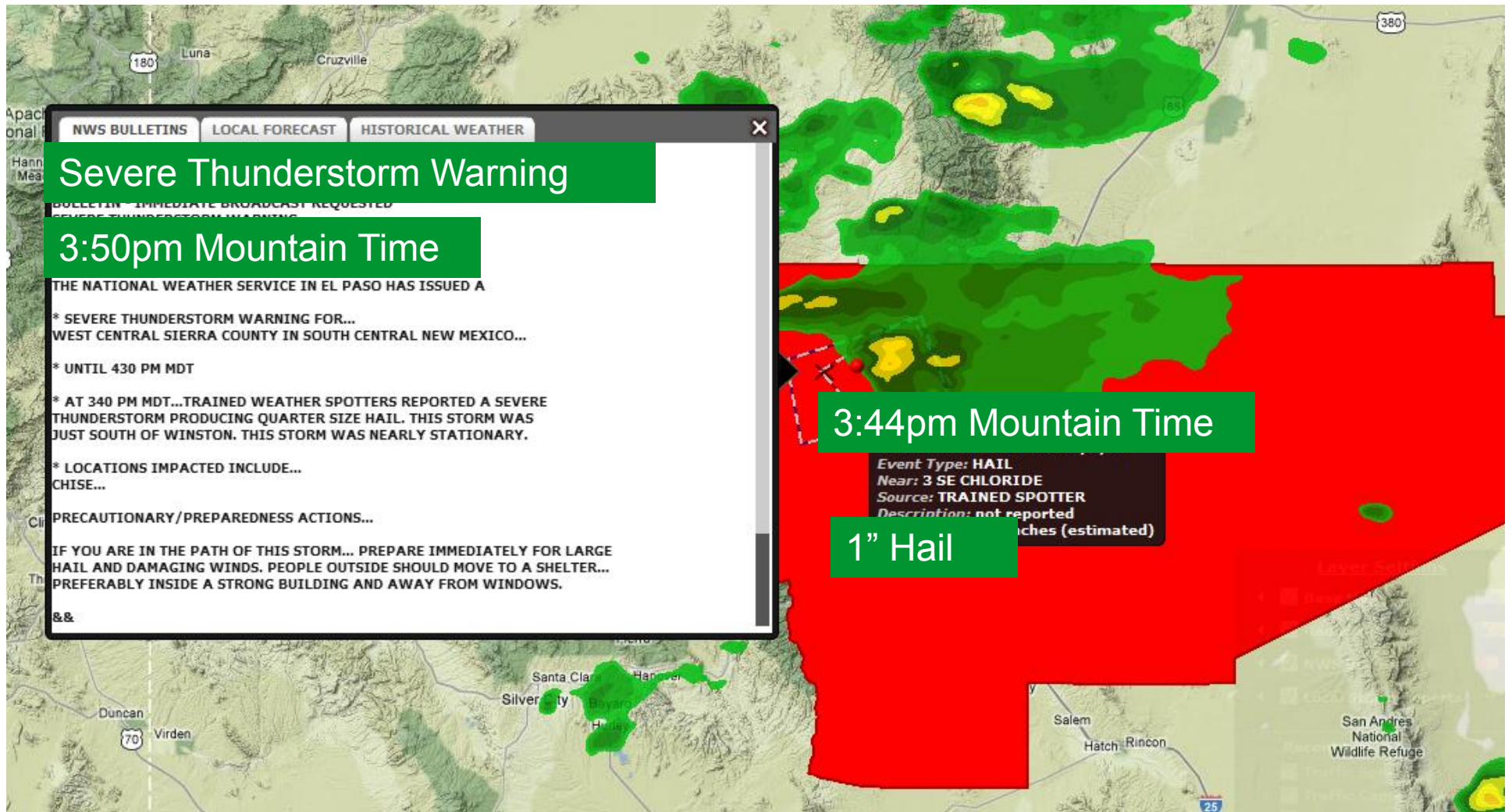
Local Storm Reports - Hail & High Winds



Local Storm Report Coverage & Density



Local Storm Report Timeliness





Storm Report Summary

Station: MEMPHIS-GERMANTOWN (KMEG)

Valid Time: 1:18 PM CDT 3/18/13

Event Type: TSTM WND DMG

Near: TUPELO

Source: TRAINED SPOTTER

**Description: OUT BUILDING BLOWN OVER AT HOME DEPOT IN TUPELO.
ESTIMATED 50-60 MPH GUSTS.**

Magnitude: not reported

Station: MEMPHIS-GERMANTOWN (KMEG)

Valid Time: 1:33 PM CDT 3/18/13

Event Type: TSTM WND DMG

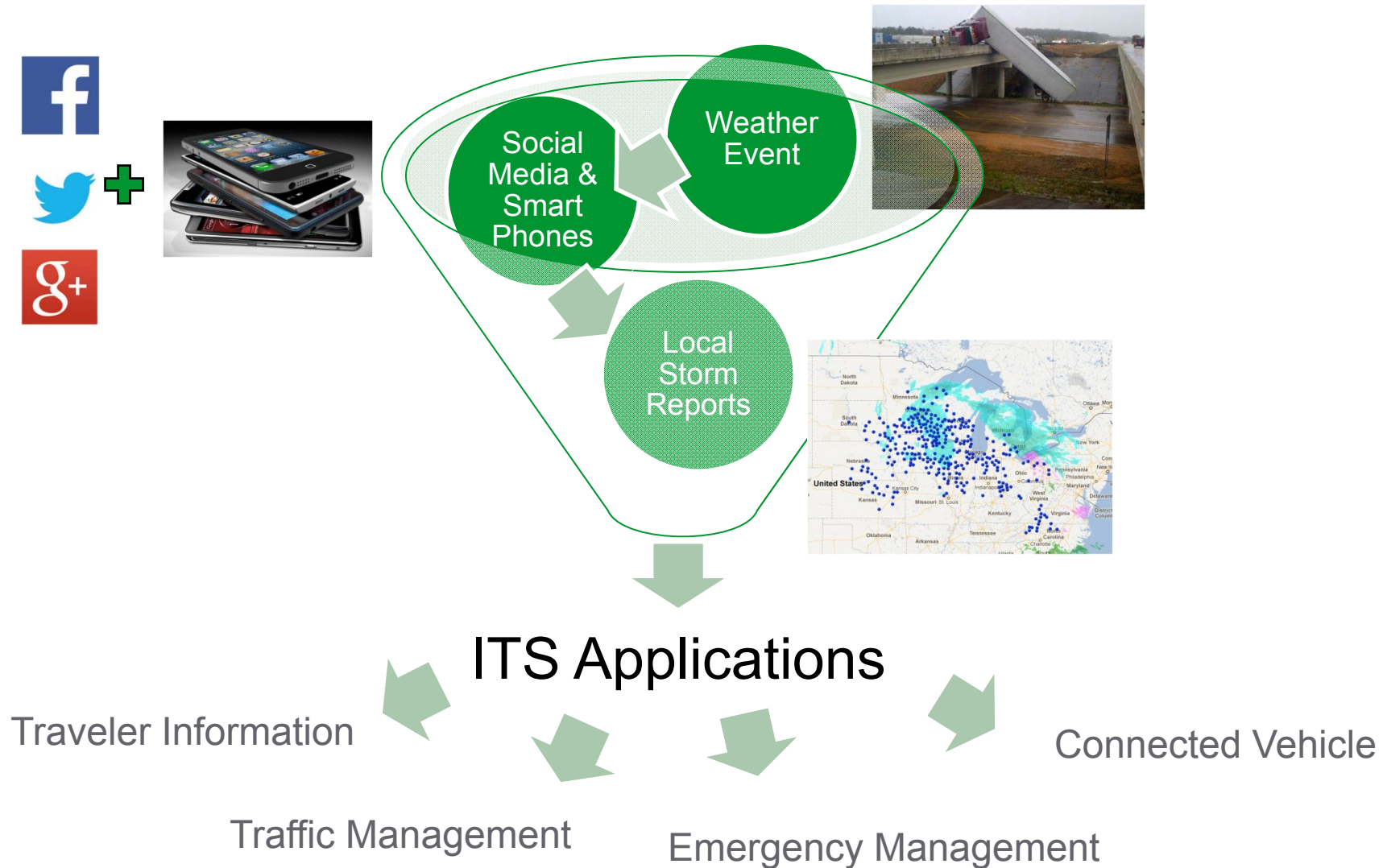
Near: TUPELO

Source: LAW ENFORCEMENT

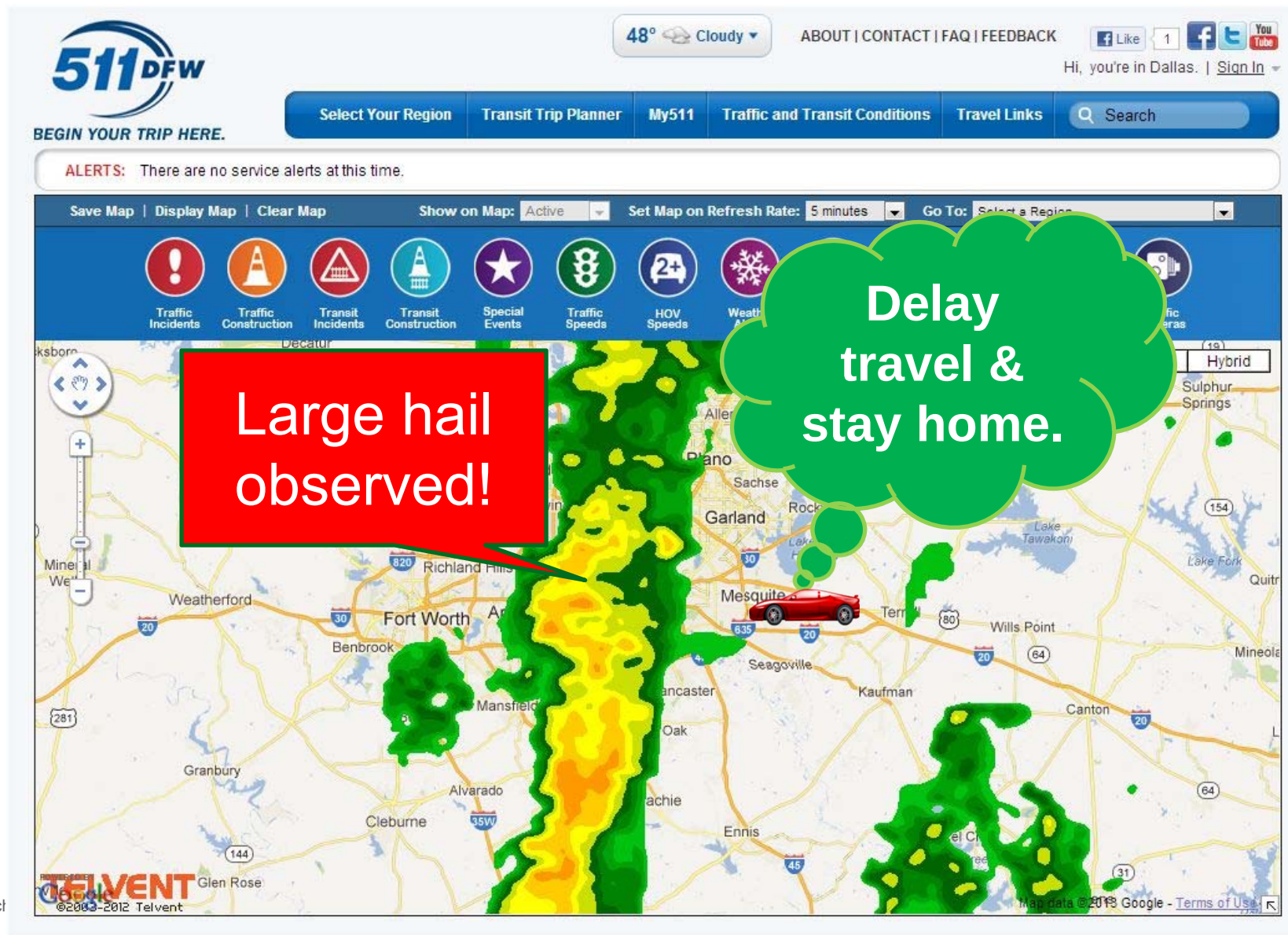
**Description: MULTIPLE STRUCTURE DAMAGED. 18 WHEELERS BLOWN
FROM HIGHWAY.**

Magnitude: not reported

Local Storm Report Uses in ITS



Traveler Information



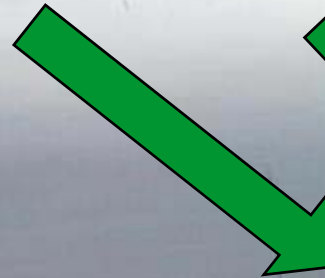
Traffic & Emergency Management



Connected V



Would at least 1 out of the 4 of these trucks not been in the ditch with this weather intelligence?



Take next
exit & pull
over!

High winds
reported 8 miles
west!

Questions?

Jeremy Duensing

Transportation Product Manager

jeremy.duensing@telventdtn.com

952-882-4554

Thank You!

