



# Partnerships and Innovation: Our Keys to Mutual Success

**Lynn P. Maximuk**  
National Weather Service  
Central Region Director

**National Severe Weather Workshop**  
March 8, 2008  
Norman, Oklahoma

# Sources of Weather Information

*Then...*



# Sources of Weather Information

Now...



# High Impact Events

- Can be human-made or natural
- Often hazardous
- Usually affect large numbers of people
- Generate media interest
- Garner the most attention



***NWS has or can quickly develop environmental expertise to help mitigate these hazards***

# Weather Impacts on Society

## Gary

- 35" of snow
- Cleanup: \$2M over two days
- No schoolchildren stranded



## Chestnut

- 25" of snow
- Cleanup: \$20M over four days
- 2,500 schoolchildren stranded



# Timing of this storm was **CRITICAL !!!**



**Chestnut Occurred on the  
FIRST DAY of the WORK  
WEEK at Rush Hour.**

**Gary Occurred During a  
WEEKEND**



# What We've Been Doing...

**Your National Weather Service forecast**  
**Clay County, MO**

Enter Your "City, ST" or zip code

Last Update: 122 PM CST WED FEB 20 2008

NWS Kansas City/Pleasant Hill, MO  
 Zone Forecast: Clay County

**Detailed 7-day Forecast**

Hazardous weather condition(s):  
**Hazardous Weather Outlook**

**Rest Of Today...**Sunny. Highs around 17. Very cold. Northeast winds around 15 mph. Wind chill readings 7 below to 4 above zero.

**Tonight...**Partly cloudy in the evening...then mostly cloudy with a 30 percent chance of snow after midnight. Lows around 10. Northeast winds 10 to 15 mph. Wind chill readings 7 below to 3 above zero.

**Thursday...**Snow and light sleet likely. Snow and sleet accumulation around 1 inch. Storm total snow accumulation around 1 inch. Highs in the mid 20s. East winds 5 to 15 mph. Chance of precipitation 70 percent. Lowest wind chill readings 7 below to 3 above zero in the morning.

**Thursday Night...**Cloudy with a 30 percent chance of snow. Lows around 19. Northeast winds up to 10 mph.

**Friday...**Mostly cloudy in the morning then becoming partly cloudy. Highs in the lower 30s. Northeast winds up to 5 mph.

**Friday Night...**Partly cloudy. Lows around 16.

**Saturday...**Partly cloudy. Highs in the upper 30s.

**Saturday Night...**Partly cloudy. Lows in the lower 20s.

**Sunday...**Partly cloudy. Highs in the mid 40s.

**Sunday Night...**Partly cloudy. Lows in the lower 30s.

**Monday...**Mostly cloudy. Chance of rain and snow in the morning... Then a chance of rain in the afternoon. Highs in the mid 40s. Chance of precipitation 30 percent.

**Current Conditions**

**Charles B Wheeler Downtown Airport**  
 Lat 39.12 Lon: -94.6 Elev: 758  
 Last Update on Feb 20, 2:54 pm CST

Fair

Humidity:	43%
Wind Speed:	E 10 G 20 MPH
Barometer:	30.35" (1028.7 mb)
Dewpoint:	-2°F (-19°C)
Wind Chill:	5°F (-15°C)
Visibility:	10.00 mi.
More Local Wx:	3 Day History

**Radar and Satellite Images**



**Detailed Point Forecast**



**National Weather Service**  
**Watches, Warnings & Advisories**

Local weather forecast by "City, St" or zip code

**Hazardous Weather Outlook**

**HAZARDOUS WEATHER OUTLOOK**  
 NATIONAL WEATHER SERVICE KANSAS CITY/PLEASANT HILL MO  
 PM CST WED FEB 20 2008

5-057-060-102>105-MOZ001>008-011>017-020>025-028>033-037>040-  
 6-053-054-211915-  
 V KS-MIAMI-LINN KS-DONIPHAN-LEAVENWORTH-WYANDOTTE-  
 KS-ATCHISON MO-NODAWAY-WORTH-GENTRY-HARRISON-MERCER-  
 HUYLER-HOLT-ANDREW-DE KALB-DAVISS-GRUNDY-SULLIVAN-ADAIR-  
 LINTON-CALDWELL-LIVINGSTON-LINN MO-MACON-PLATTE-CLAY-  
 CHARITON-RANDOLPH-JACKSON-LINN MO-MACON-PLATTE-CLAY-  
 MO-PETTIS-COOPER-BATES-HENRY-  
 FEB 20 2008

WEATHER OUTLOOK IS FOR NORTHWEST...NORTH CENTRAL MISSOURI...AS WELL AS EXTREME EASTERN KANSAS.

TERNOON AND TONIGHT

WILL RETURN TO THE SOUTHERN PORTIONS OF THE NIGHT TONIGHT. LIGHT SNOW PERHAPS MIXING WITH OF A PAOLA TO SEDALIA LINE...WILL BEGIN TO Y ON THURSDAY AND LIFT NORTHEAST. LIGHT SNOW A HALF INCH ARE EXPECTED SOUTH OF A LINE FROM THURSDAY MORNING.

# What Can Be Done With The Same Data



National Weather Service Forecast Office  
**Tulsa, Oklahoma**



Local News
Tulsa Home
Organization
Search

### Entire Area Risk Analysis

Through Tonight	Threat
Tornado	<span style="color: green;">■</span>
Svr T-Storm	<span style="color: green;">■</span>
Flash Flood	<span style="color: green;">■</span>
Heavy Rain	<span style="color: green;">■</span>
Lightning	<span style="color: green;">■</span>
Dense Fog	<span style="color: green;">■</span>
Strong Winds	<span style="color: green;">■</span>
Fire Danger	<span style="color: green;">■</span>
Wind Chill	<span style="color: green;">■</span>
Snow	<span style="color: green;">■</span>
Ice	<span style="color: green;">■</span>

Thu - Tue	Potential
Lightning	<span style="color: red;">■</span>
Svr T-Storm	<span style="color: yellow;">■</span>
Fog	<span style="color: green;">■</span>
Fire Danger	<span style="color: green;">■</span>
Strong Winds	<span style="color: green;">■</span>
Heavy Rain	<span style="color: green;">■</span>
Winter	<span style="color: green;">■</span>
Wind Chill	<span style="color: green;">■</span>

**Legend**

no ■ limited ■ elevated ■ significant

Date modified: Feb 3, 2006 [Disclaimer](#) [Privacy Policy](#)

**Spotter Activation Through Tonight**

**NOT EXPECTED**



Select County or [Entire Area](#)

**Spotter Activation Days 2-7**

**MONITOR FORECASTS**

**Detailed Hazardous Element Forecast for Entire Forecast Area**

Elements that are all "No Threat" (green) are not listed. Time periods include night, eg. Mon = Monday and Monday Night

Element	Wed	Thu	Fri	Sat	Sun	Mon	Tue
Svr Thunderstorm	<span style="color: green;">■</span>	<span style="color: green;">■</span>	<span style="color: green;">■</span>	<span style="color: green;">■</span>	<span style="color: yellow;">■</span>	<span style="color: green;">■</span>	<span style="color: green;">■</span>
Lightning	<span style="color: green;">■</span>	<span style="color: green;">■</span>	<span style="color: green;">■</span>	<span style="color: green;">■</span>	<span style="color: red;">■</span>	<span style="color: green;">■</span>	<span style="color: green;">■</span>

[Current Conditions](#)

[Radar](#)

[Satellite](#)

[Text Products](#)



National Weather Service Forecast Office  
**Tulsa, Oklahoma**



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**Entire Forecast Area Current Hazardous Weather Outlook**

- [Hazardous Weather Outlook](#)

**Graphical Hazardous Weather Outlook**



The chances of showers and thunderstorms will increase Sunday into Sunday night as a cold front sweeps through the area. Heavy rain will be possible Sunday night.

Heavy Rain	<span style="color: green;">■</span>
Lightning	<span style="color: green;">■</span>
Dense Fog	<span style="color: green;">■</span>
Strong Winds	<span style="color: green;">■</span>
Fire Danger	<span style="color: green;">■</span>
Wind Chill	<span style="color: green;">■</span>
Snow	<span style="color: green;">■</span>
Ice	<span style="color: green;">■</span>

Sat - Thu	Potential
Lightning	<span style="color: purple;">■</span>
Svr T-Storm	<span style="color: red;">■</span>
Fog	<span style="color: green;">■</span>
Fire Danger	<span style="color: green;">■</span>
Strong Winds	<span style="color: yellow;">■</span>
Heavy Rain	<span style="color: green;">■</span>
Winter	<span style="color: green;">■</span>
Wind Chill	<span style="color: green;">■</span>

**Legend**

no ■ limited ■ elevated ■ significant

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National Weather Service Forecast Office  
**Tulsa, Oklahoma**



Local News
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Heavy Rain	<span style="color: green;">■</span>
Lightning	<span style="color: green;">■</span>
Dense Fog	<span style="color: green;">■</span>
Strong Winds	<span style="color: green;">■</span>
Fire Danger	<span style="color: green;">■</span>
Wind Chill	<span style="color: green;">■</span>
Snow	<span style="color: green;">■</span>
Ice	<span style="color: green;">■</span>

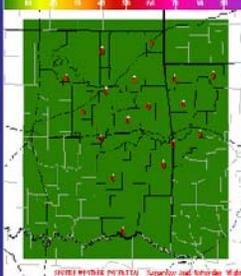
Sat - Thu	Potential
Lightning	<span style="color: purple;">■</span>
Svr T-Storm	<span style="color: red;">■</span>
Fog	<span style="color: green;">■</span>
Fire Danger	<span style="color: green;">■</span>
Strong Winds	<span style="color: yellow;">■</span>
Heavy Rain	<span style="color: green;">■</span>
Winter	<span style="color: green;">■</span>
Wind Chill	<span style="color: green;">■</span>

**Legend**

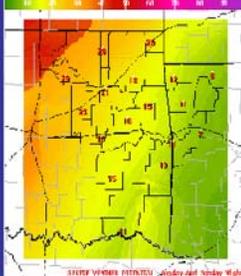
no ■ limited ■ elevated ■ significant

Date modified: Feb 3, 2006 [Disclaimer](#) [Privacy Policy](#)

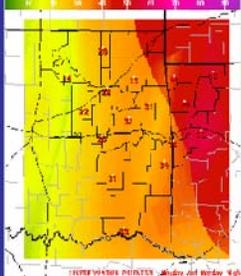
**Tuesday**



**Wednesday**



**Thursday**



[Current Conditions](#)

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[Text Products](#)

[SPC Products](#)

[Hydrology](#)

# Tactical Decision Aids

## Graphical Hazardous Weather Outlook

2 Additional Elements

Risk Analysis	
Through Tonight	Threat
Tornado	
Svr T-Storm	
Flash Flood	
Heavy Rain	
Lightning	
Dense Fog	
Strong Winds	
Fire Danger	
Wind Chill	
Snow	
Ice	

Comes from base grids and other data

# Innovation in working together

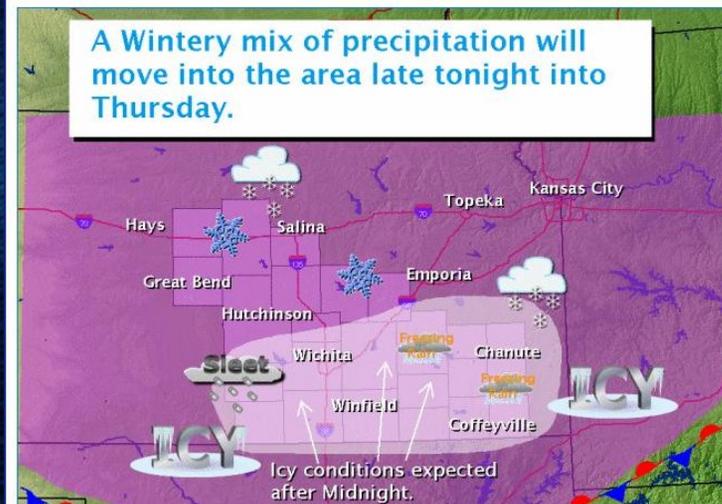
## NWS Products and Services

- Graphical Weather Story and Graphical Nowcasts (GNOW)
  - *Central Region initiative*
  - *Could expand in 2008*

### Weather Story

NWS Wichita, KS

A Wintery mix of precipitation will move into the area late tonight into Thursday.



### Major Winter Storm Approaching

Heaviest Snow Expected  
Tonight Through Wednesday Morning



February 20, 2008

Wichita, Kansas



# Innovative ways to work together

## FEMA use of Graphical Weather Story

FEMA Region VII Watch Operations Alert - Winter Storms - Message (HTML)

Message

Reply Reply Forward Delete Move to Create Other Block Safe Lists Categorize Follow Mark as Related  
to All to All Respond Folder Rule Actions Junk E-mail Options Up Unread Select Find

From: Morgan, Thomas [thomas.morgan1@dhs.gov] Sent: Mon 2/4/2008 3:54 PM  
To: Al Berndt; Alan Horn; Alan Prenger; alfred.judd@sba.gov; Alice Lippert; Barry Fowler; Bloom, Daniel (E-mail); Bob Hartlove; Bob Jackson; Brian Allison; carl.gaspari@sba.gov; Catherine Murphy; Charles Fairbanks; Chuck May; Cindy Hillman (GSA); Cindy Newsham; Claire Holmes; Colin Kennedy (E-mail); Dan Robeson; Dana Hall; Danny Hay; Dave Clement; Dave Miller; Dave Williams; David Cudmore; Dena Goble; Denton MOC; Don Lining; donna.gross@sba.gov; Duane Nichols; FEMA OPERATIONS CENTER; FEMA-NRCC; FEMA-R7-ROC-DCO; Greg Gardner; Greg Hollingsead@dhs.gov; Greg Smith; Iowa Action Officer; Janice Kroone;  
Cc:  
Subject: FEMA Region VII Watch Operations Alert - Winter Storms

**Watch Operations Alert**

Time: 1545 CST 02/04/2008

Winter storms / severe weather forecast:

Another winter storm system is expected to move into the region starting tomorrow, Feb 5<sup>th</sup>.

An energetic upper level storm system will move from south central Kansas through Missouri, and into Illinois Tuesday afternoon through Wednesday morning. Portions of southeast NE and southern IA will also be affected. A cold front will slide into southern Missouri by Tuesday morning, however the air mass south of this front will remain unseasonably moist, and will be pulled over top of the cooler air to the north as the upper level system approaches. All indications point to conditions becoming increasingly favorable for a significant winter storm across a large portion of eastern Kansas and northern Missouri, with periods of heavy snow accumulating in excess of 6 inches. In addition, the initial burst of moisture Tuesday afternoon and evening may come in the form of light freezing rain and sleet, which will only exacerbate travel problems. A winter storm watch has been issued for much of eastern Kansas and northern Missouri, though some uncertainty still exists regarding the exact areas which would experience the heaviest snowfall.



Monday, February 4, 2008  
National Weather Service - Kansas City/Pleasant Hill, Missouri

FEMA Region VII Watch Operations Alert

# Innovative ways to work together

## On-site support for Government operations



- **Greensburg, KS  
May 2007**
  - ***Incident Support Meteorologist (IMET) on-site***
  - ***Compliment to WFO Dodge City support***

Photo by Tim Marshall  
(courtesy WFO Dodge City, KS)

# Innovative ways to work together

## StormReady/TsunamiReady programs

- As of February 2008:
  - *1,313 StormReady counties/communities*
  - *52 TsunamiReady sites*
- Programs are a key component of NOAA's Hazard Resiliency goal!



# Innovative ways to work together

It's all about formats...

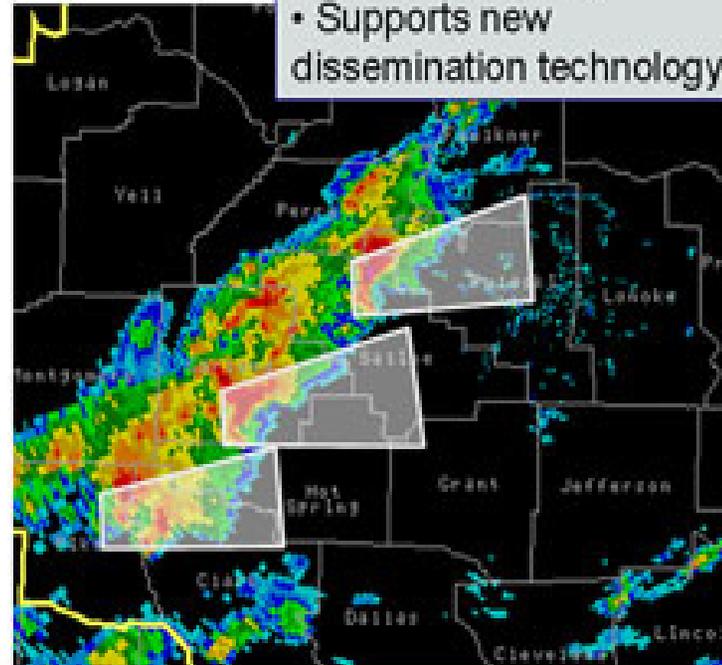
- By working to provide data in industry standards, it makes it easier for you to ingest into operations
  - *GIS, CAP, XML are all examples*
- Private sector partners also find it easier to take and add value to basic NWS services

# The Bottom Line

- **Technology offers new opportunities to work together**
- **NWS efforts to utilize technology will help partnerships grow**
- **Focus on impacts vs. phenomenon**

**Currently**

- More specific
- Increased clarity
- Supports new dissemination technology



**Storm-Based Tornado Warnings  
70% less area covered  
~600,000 fewer people warned**

# Looking Ahead

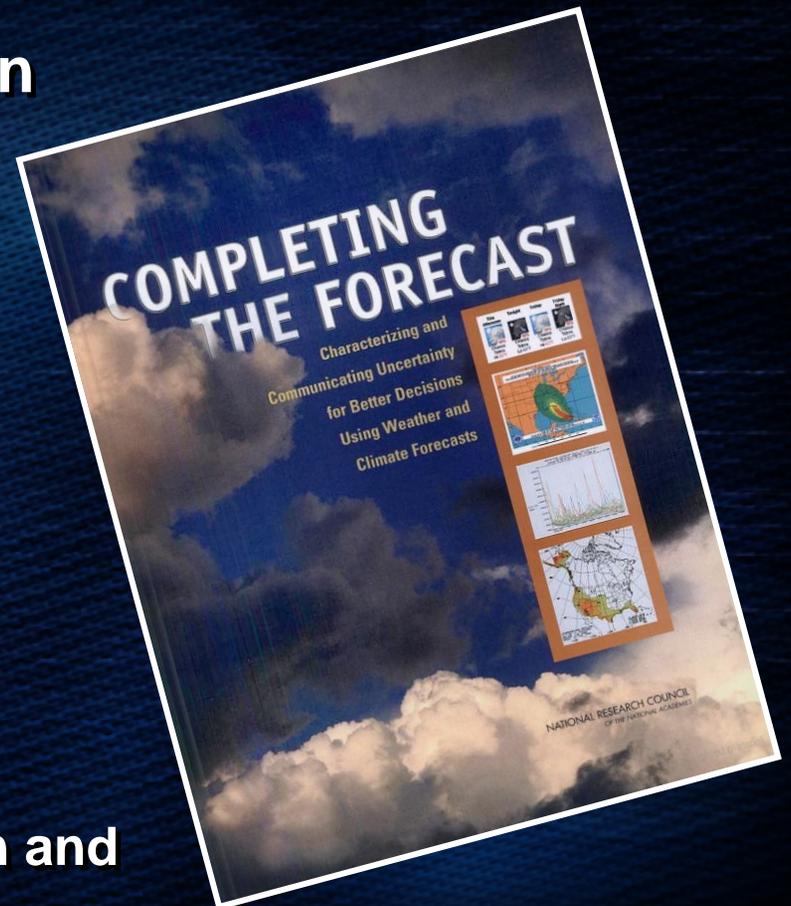
- **Improve extended predictions for severe weather outbreaks a week in advance**
- **Warn-On Forecasts: Tornado warning lead up to 1 hour**
- **Severe thunderstorm warning lead times up to 2 hours**
- **Tropical cyclone warning lead times for landfall up to 3 days**
- **Winter storm warning lead times days in advance**
- **Reduce National Air Space delays through improved aviation weather service collaboration with FAA**



# Looking Ahead

## Forecast Uncertainty Information

- Integral and essential part of all forecasts
- Enterprise-wide partnership to generate and communicate forecast uncertainty to decision makers and public
- Expressed in terms of probabilities
- Users decide whether to take action and appropriate level of response
- Thresholds unique to decision maker – based on mission risk



# Working Together *...toward a common future*



