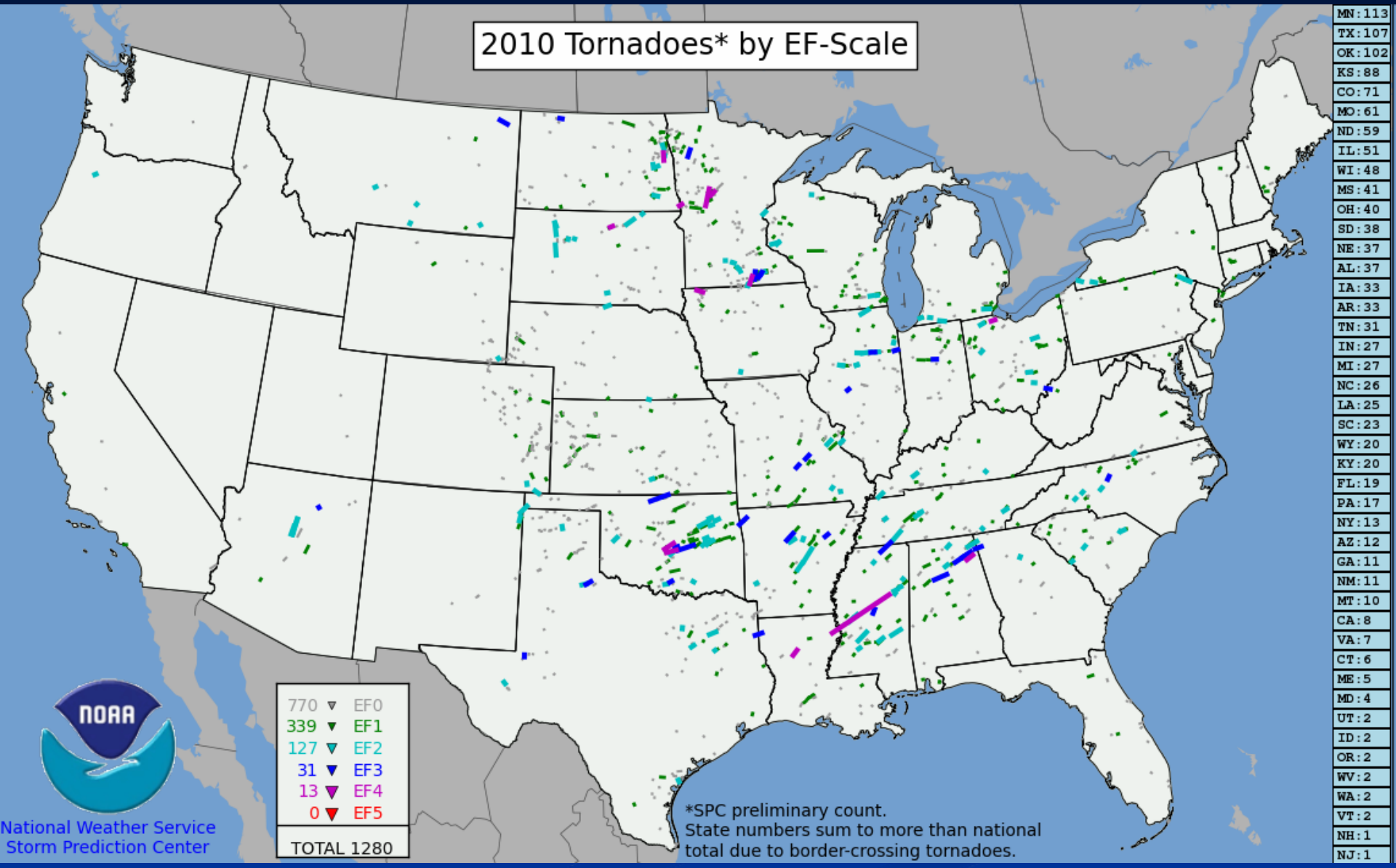
National Weather Service
Storm Prediction Center

2010 U.S. Tornado Year in Review
&
What's Coming in 2011?

Greg Carbin and Jared Guyer
NOAA/NWS Storm Prediction Center
Norman, Oklahoma

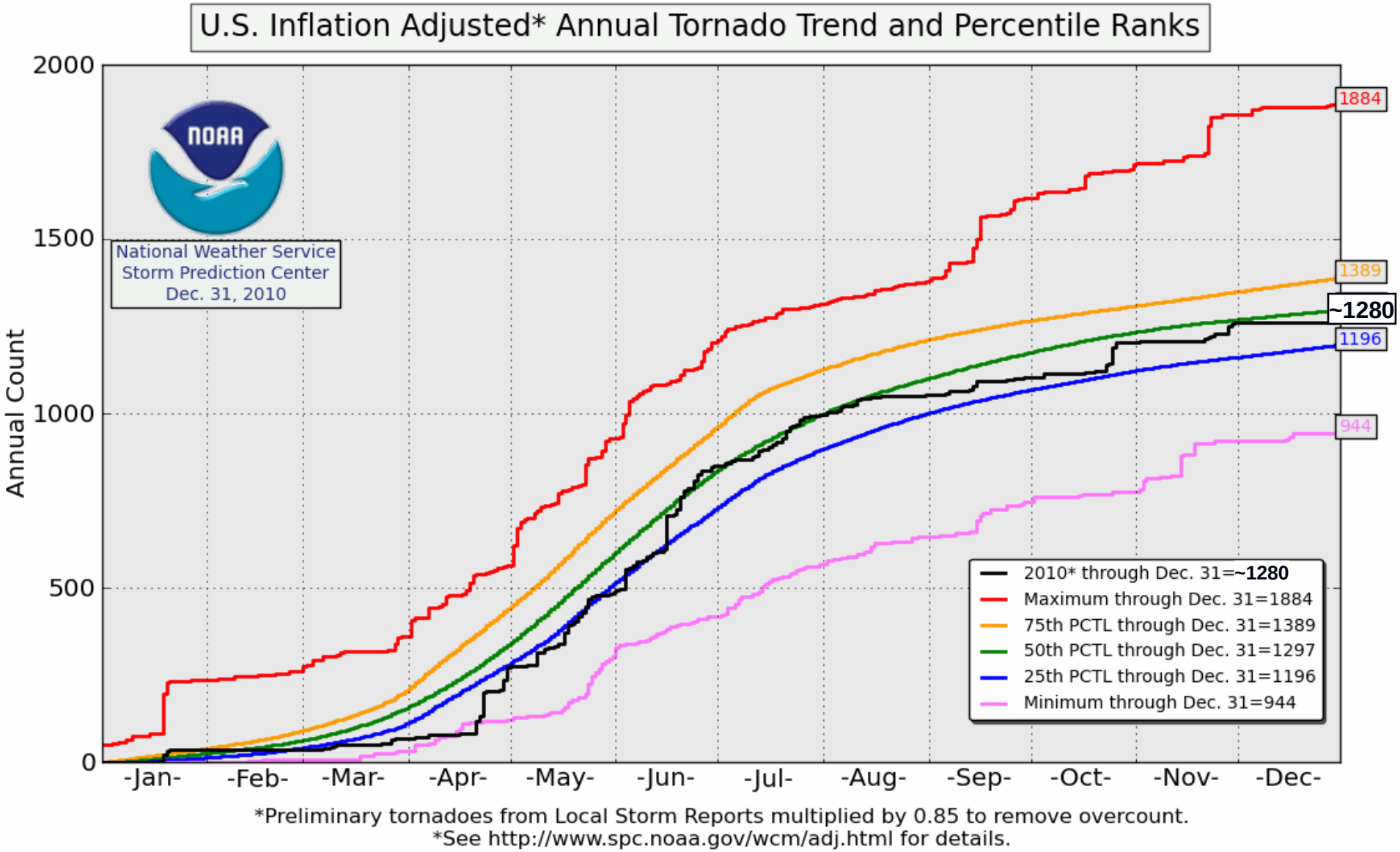
2011 National Severe Weather Workshop

2010 U.S. Tornado Tracks



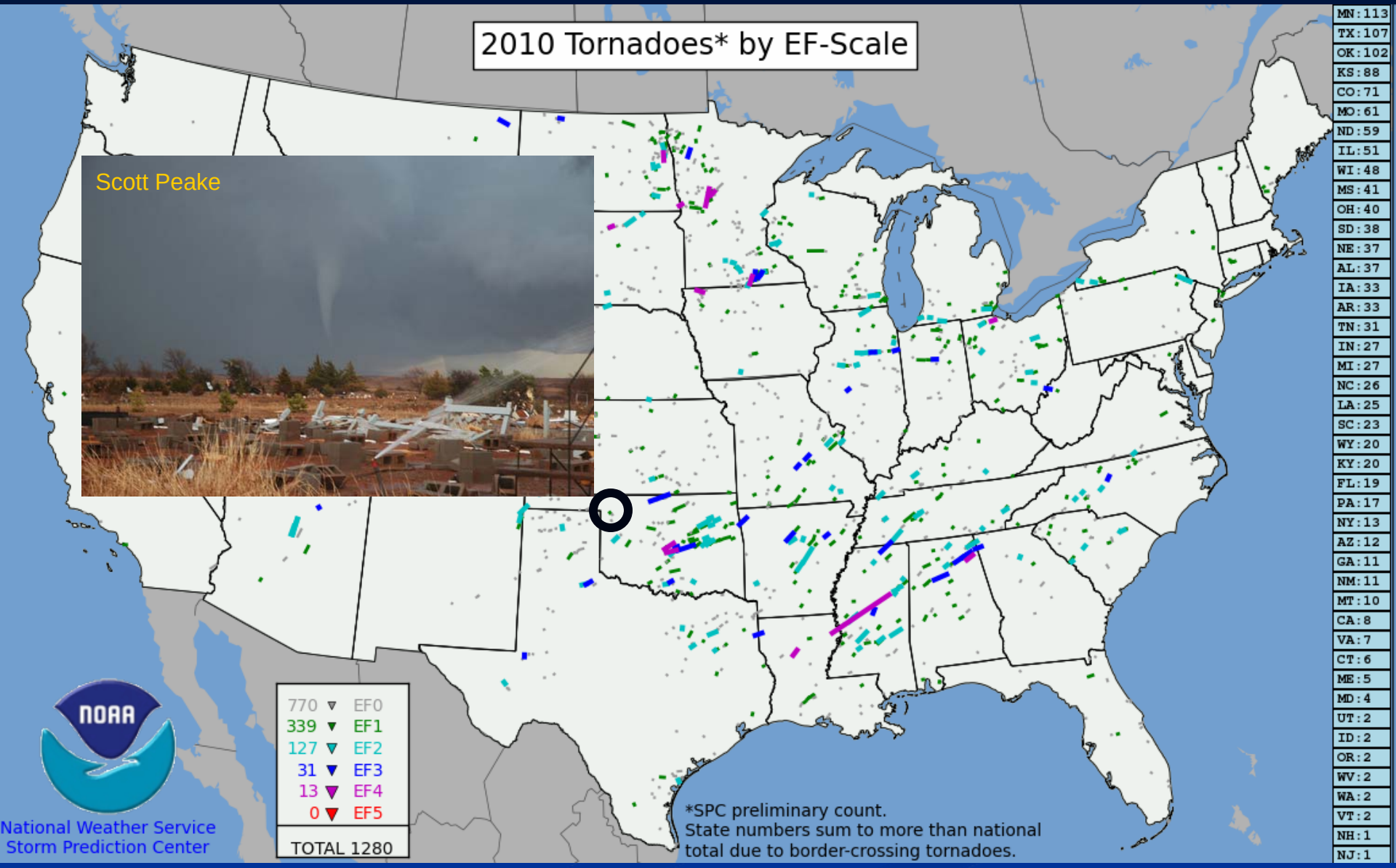
Map available at: http://www.spc.noaa.gov/wcm/

2010 Annual Cycle – A "Normal" Year?



2011 chart now available at: http://www.spc.noaa.gov/wcm/

March 8, 2010 – EF2 in OK



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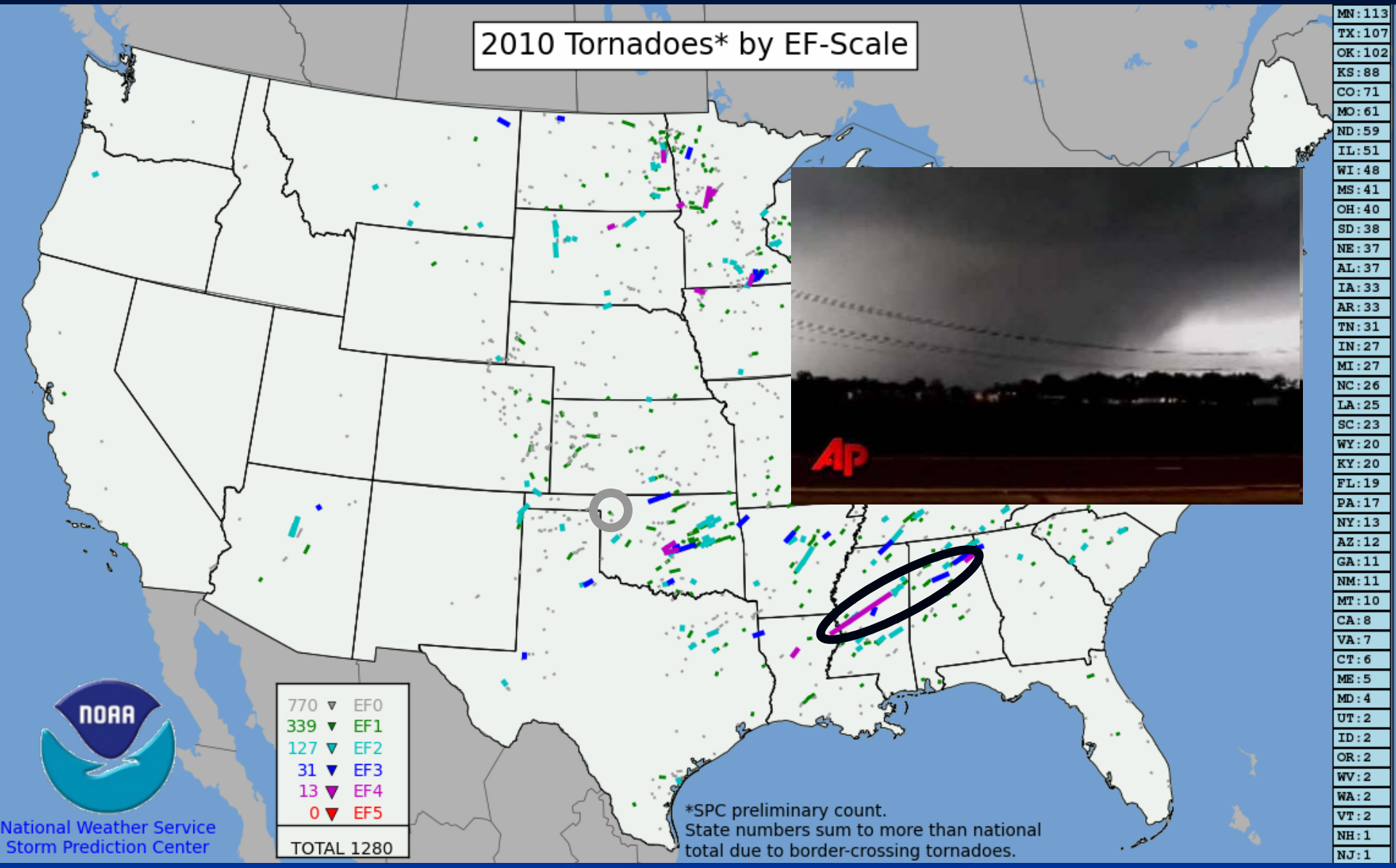
April 24, 2010 – Mississippi Long Track



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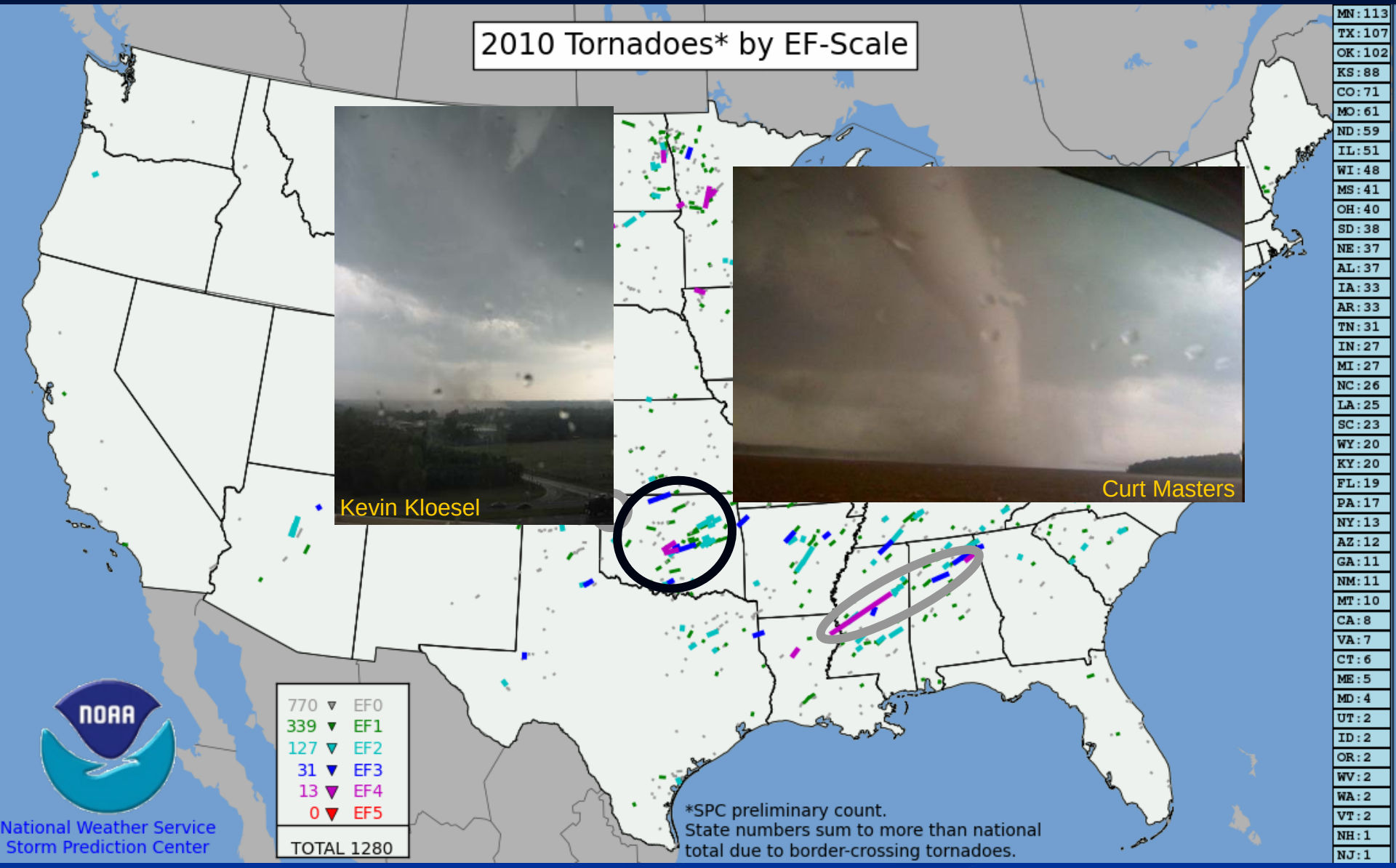
May 10, 2010 – Oklahoma Outbreak



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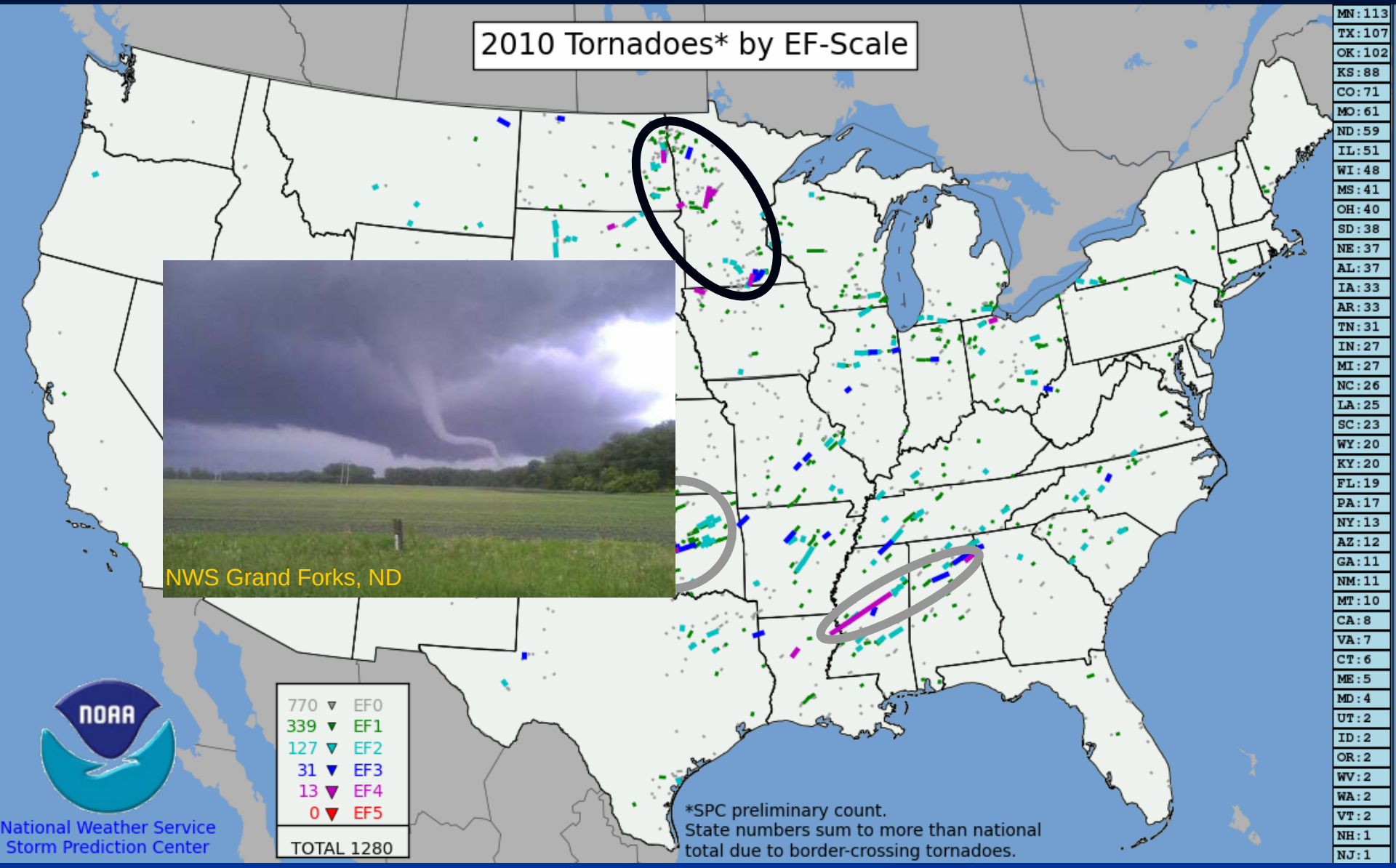
June 17, 2010 – Northern U.S. Outbreak



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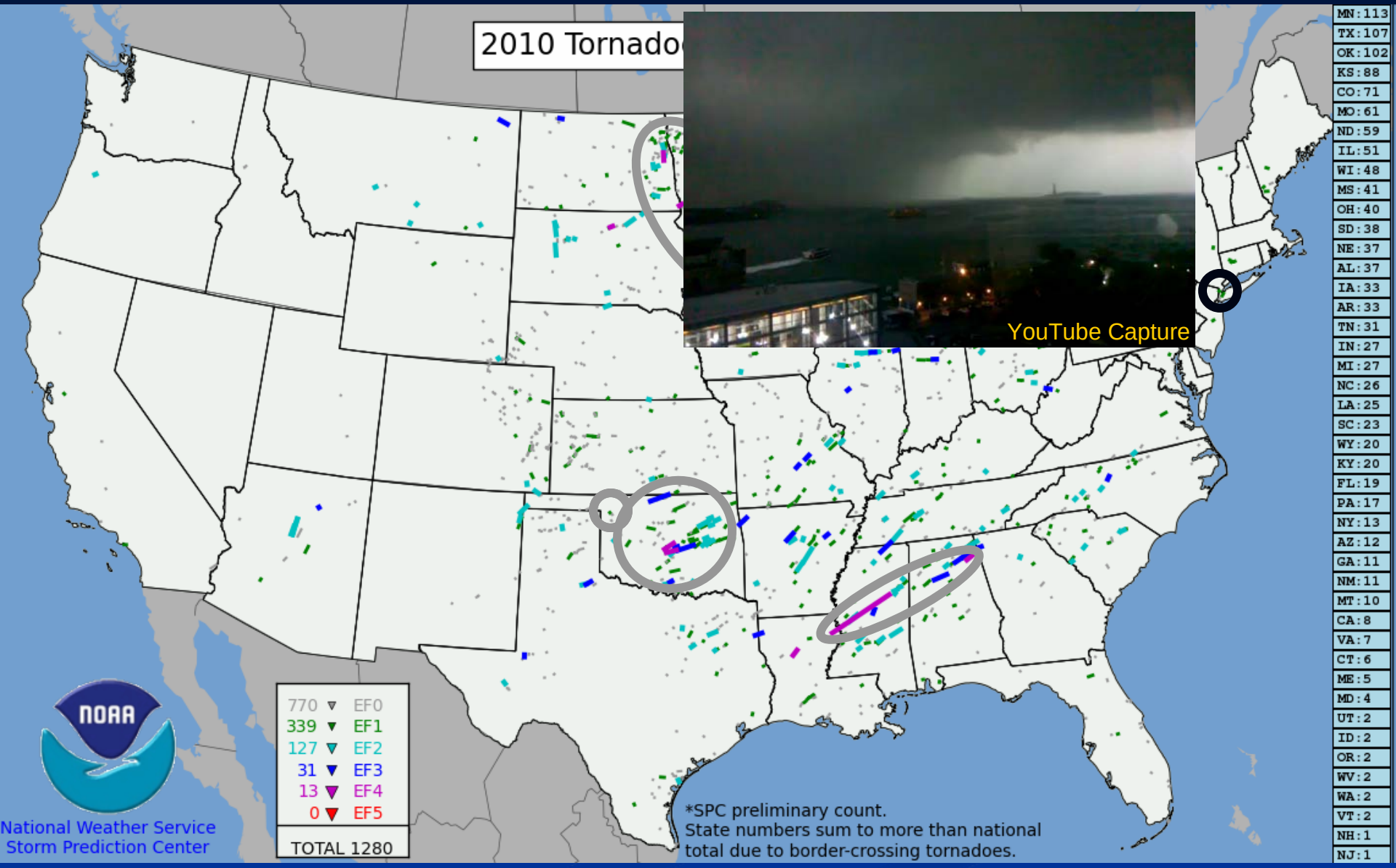
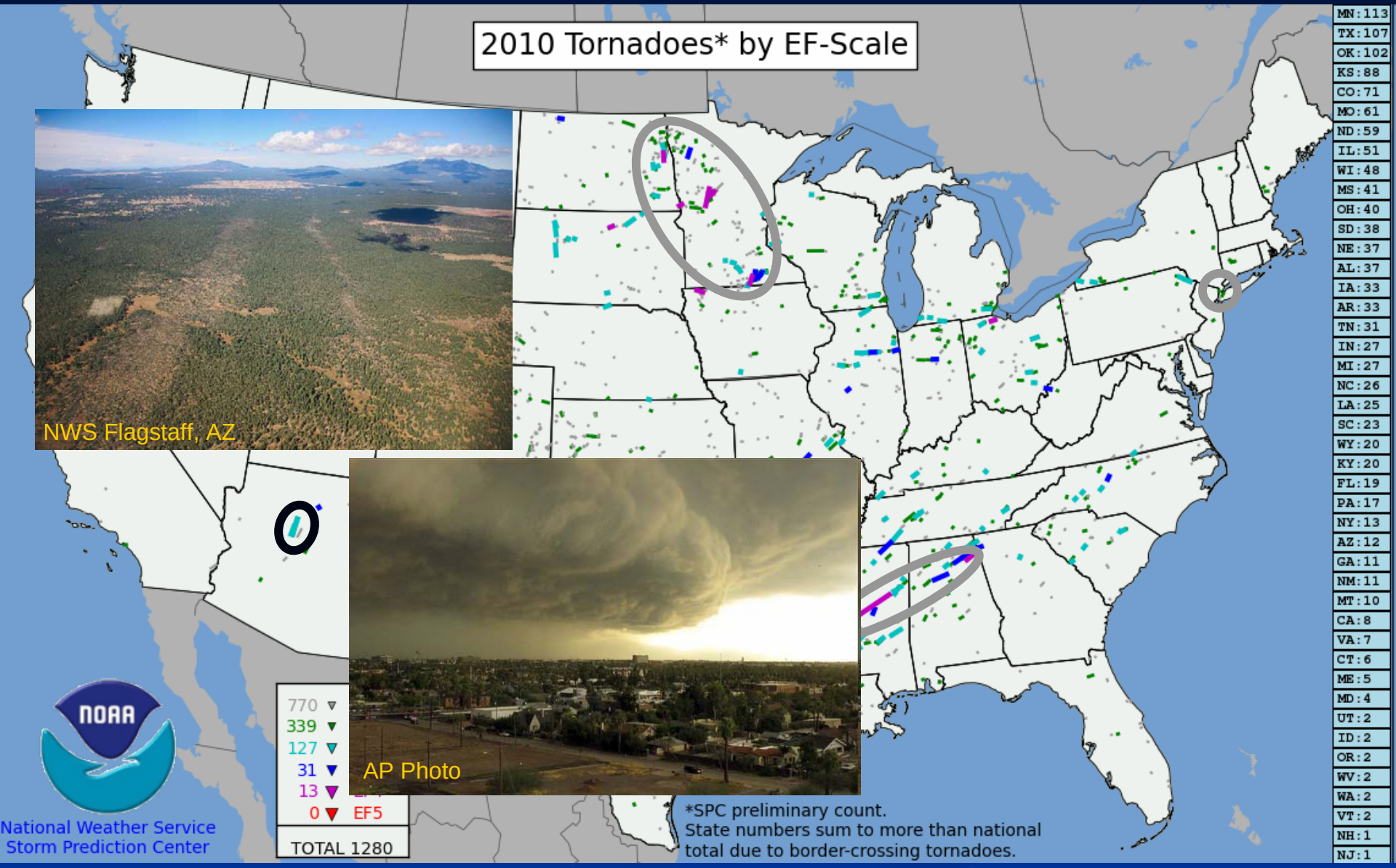
September 16, 2010 – New York City



Map available at: http://www.spc.noaa.gov/wcm/

October 5-6, 2010 – Rare Arizona Tornadoes



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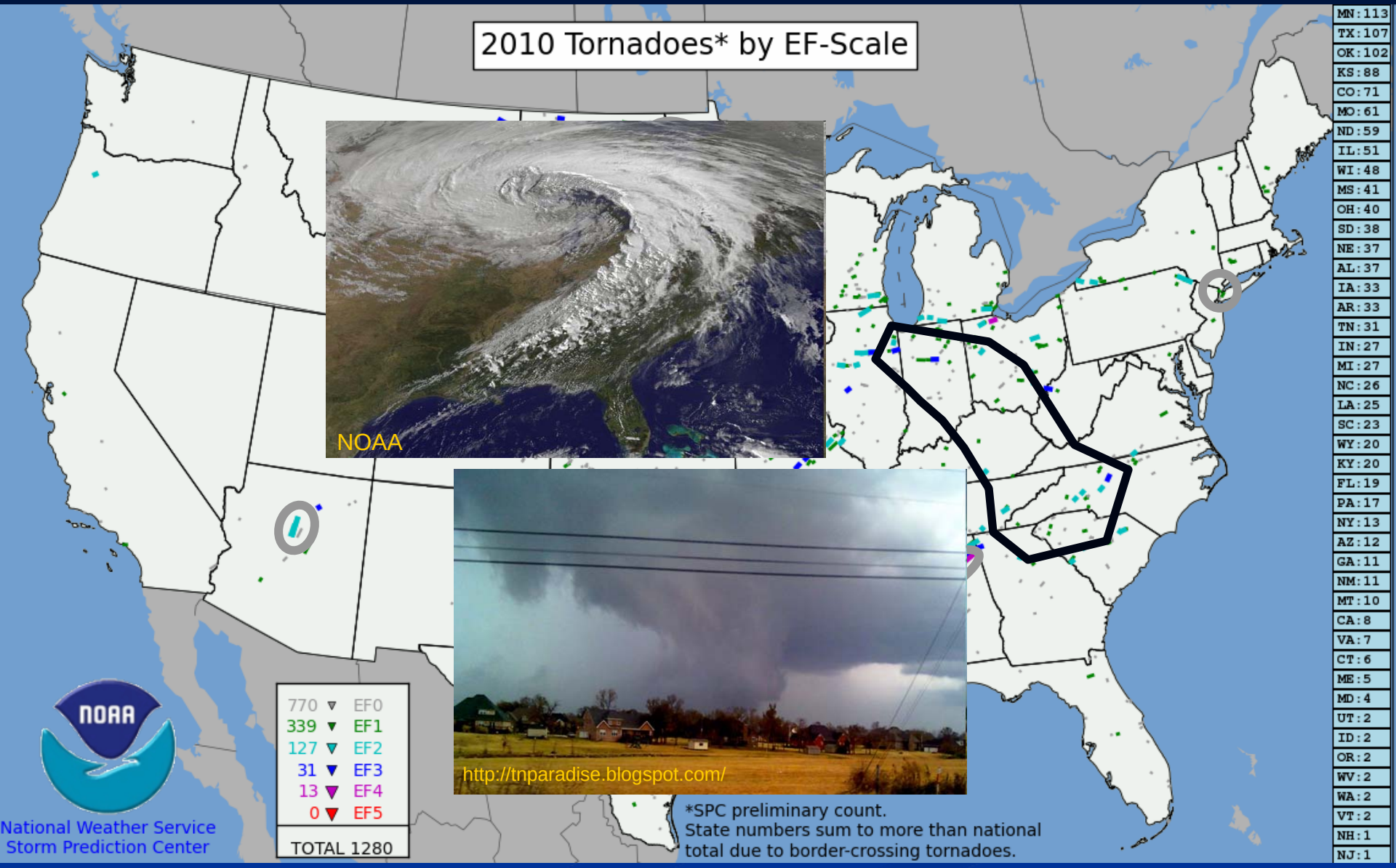
October 26, 2010 – Inland Bomb



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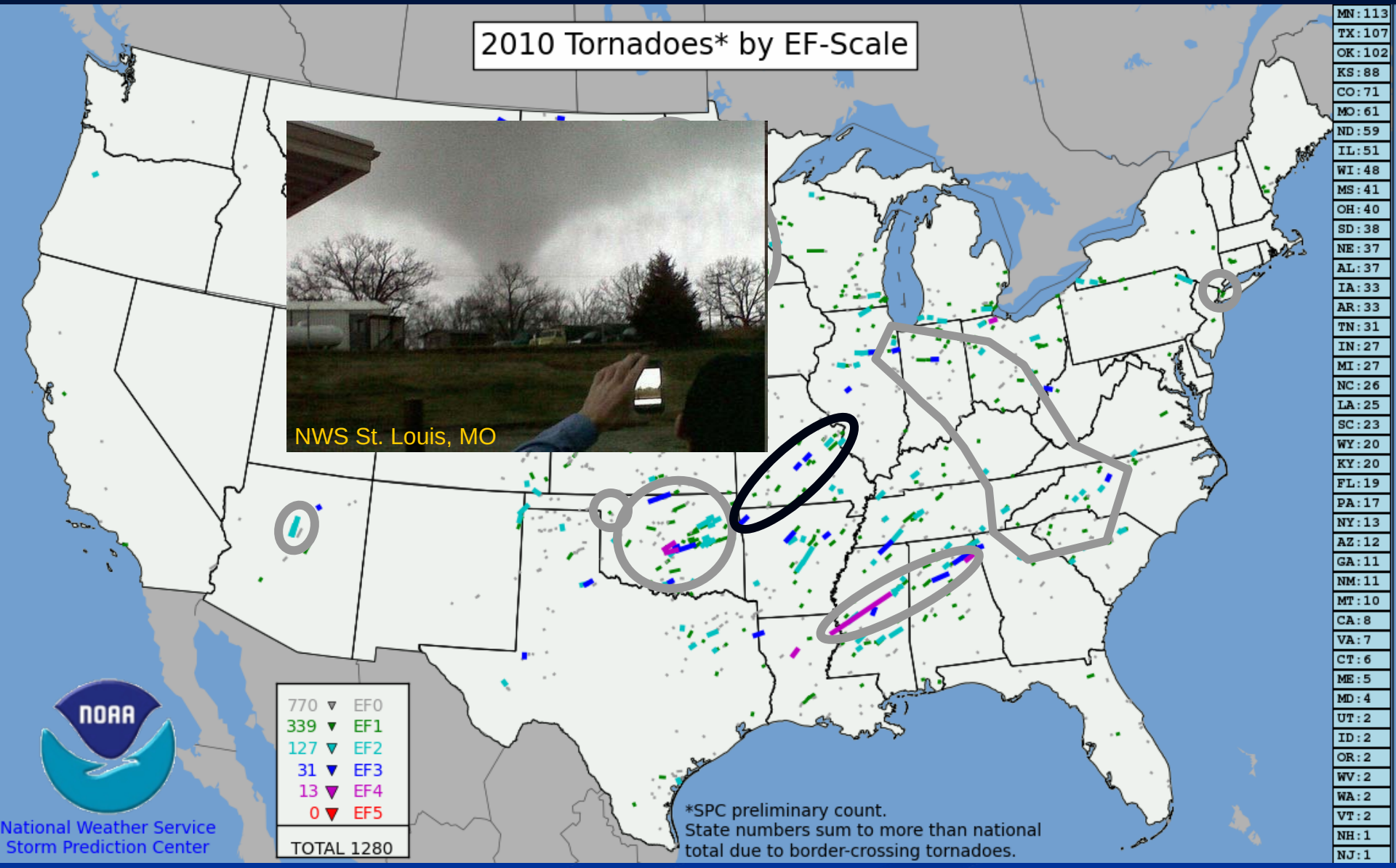
December 31, 2010 – Ozarks to Mississippi



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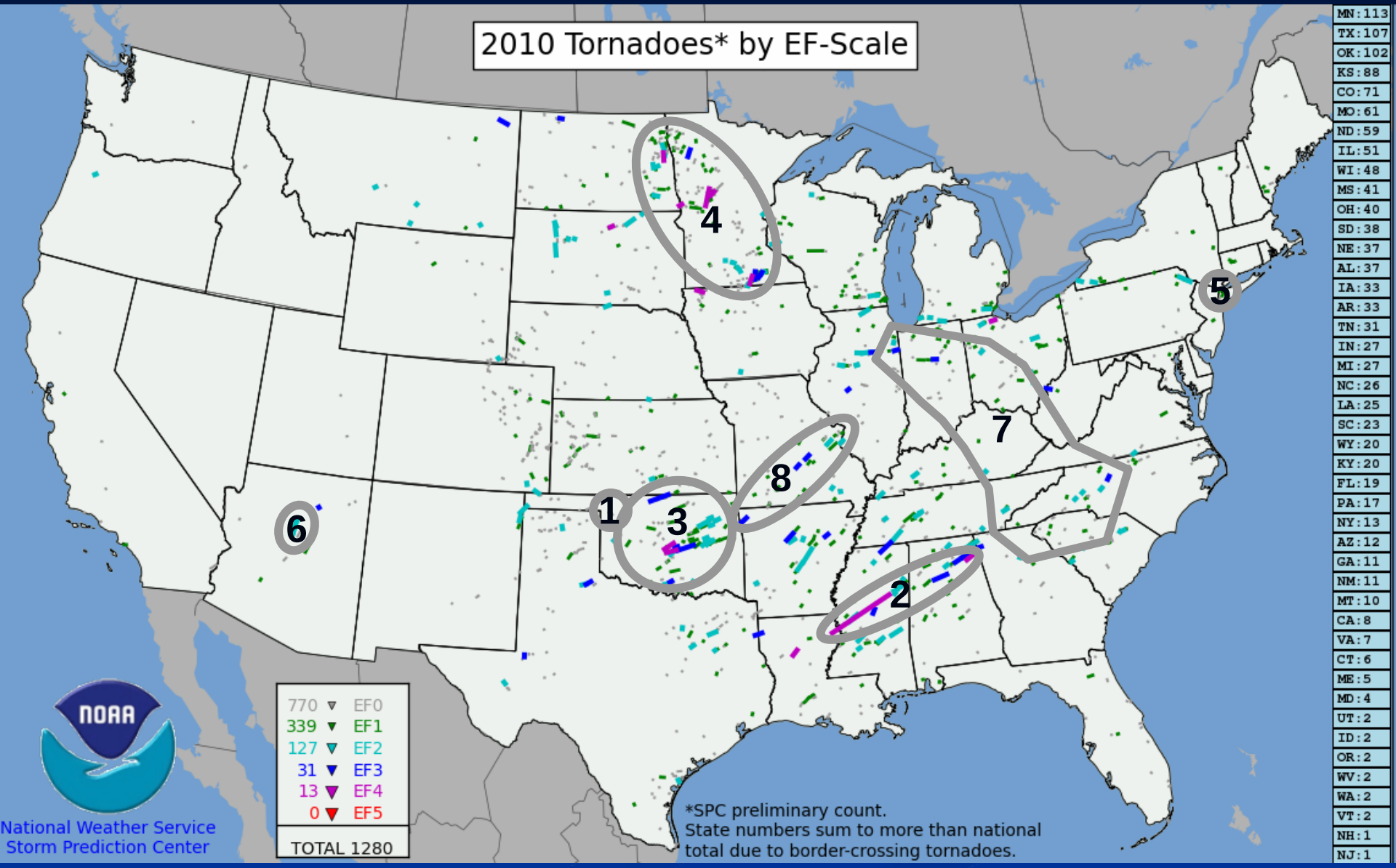
2010 U.S. Tornado Tracks



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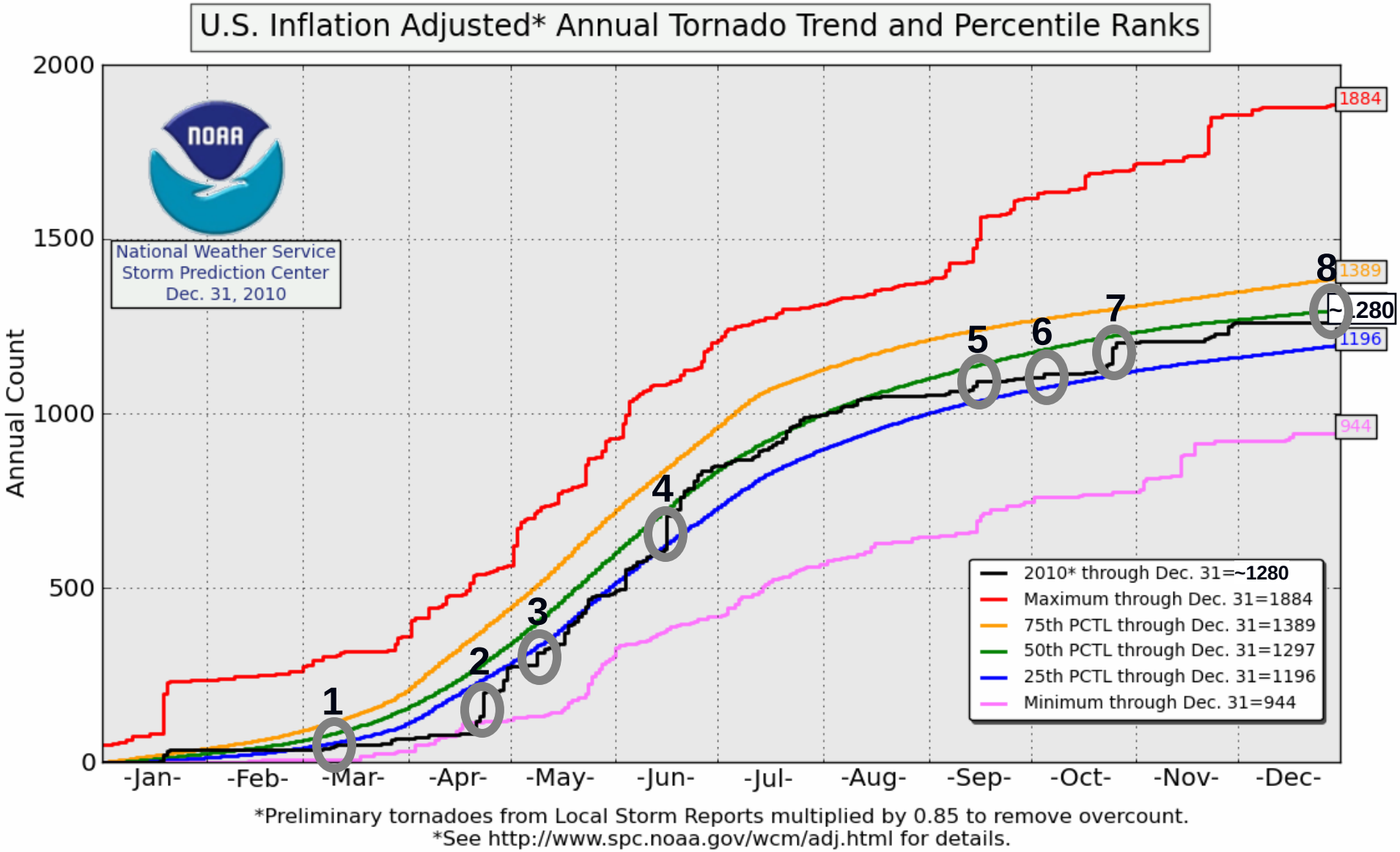


2011 chart now available at: http://www.spc.noaa.gov/wcm/

2010 Monthly Numbers, Days, Fatalities

Month	2010 Tornadoes	2000-2009 Average	2010 Tornado Days	10y Average Tornado Days	2010 Fatalities	10y Average Fatalities
Jan	30	22	7	5	0	1
Feb	1	37	1	6	0	12
Mar	33	90	7	12	1	6
Apr	139	163	16	18	11	8
May	304	291	24	25	7	12
Jun	324	217	28	27	12	2
Jul	146	112	26	25	2	0
Aug	55	87	15	21	1	1
Sep	57	91	14	16	2	2
Oct	108	61	9	11	0	2
Nov	53	67	9	8	0	10
Dec	~30*	35	4	6	9	2
Annual	1280*	1273	160	180	45	58

*Preliminary ABOVE/BELOW 10-year Average. December count incomplete.

2010 Tornadoes – In Summary

Tornado activity in 2010 was about average*

* When adjusted to tornado reports over recent decades

21 Killer Tornadoes claimed 45 lives*

* U.S. 10-year annual average is 58 fatalities

Slow start then active from late April thru July

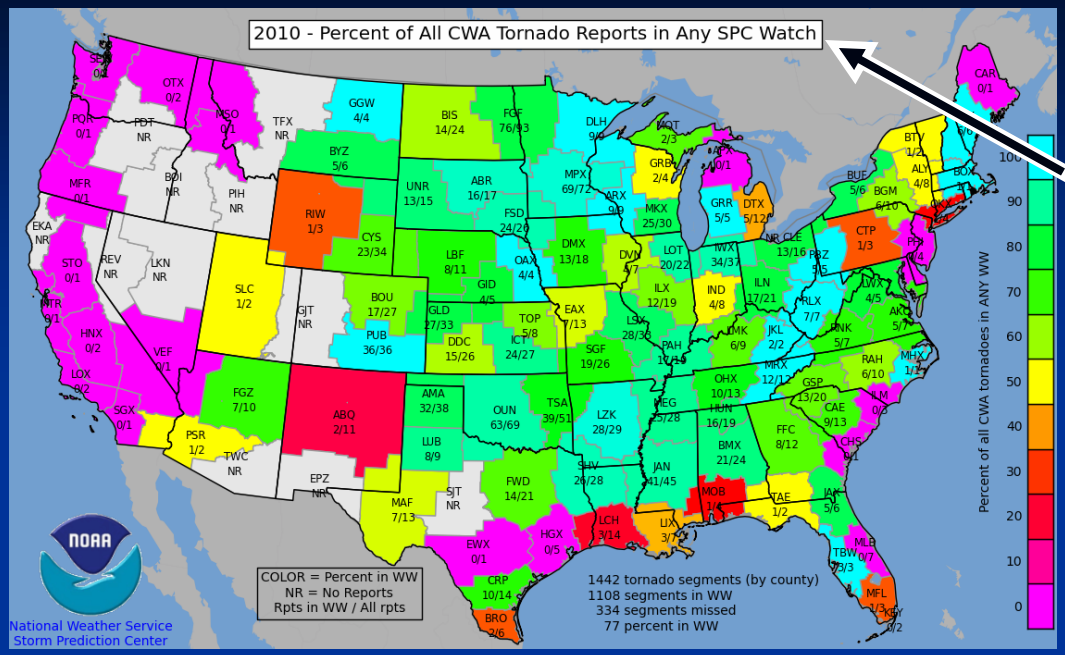
* May, June, July all above 10-year averages

Episodic major “off season” outbreaks

* Rare Arizona & Utah local outbreak in October

* Unusual New Year’s Eve Outbreak in AR/MO/MS

2010 Tornadoes in SPC Watches by CWA

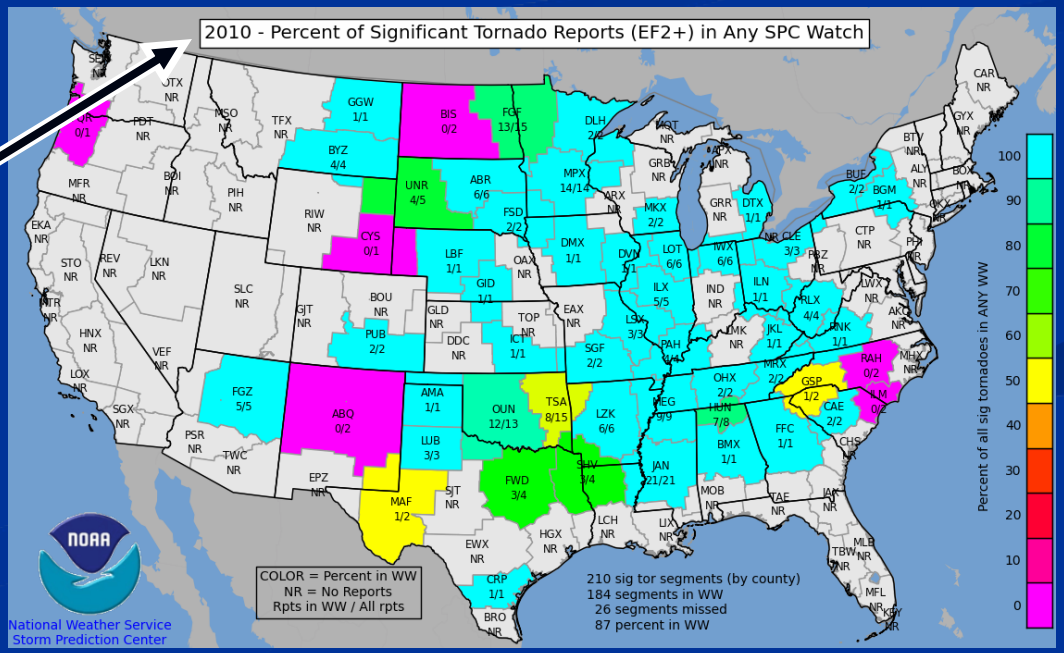


EF0 to EF5 in Watch

77 percent of <u>ALL tornado reports</u> were contained within watches.

EF2 to EF5 in Watch

87 percent of <u>SIG tornado reports</u> were contained within watches.



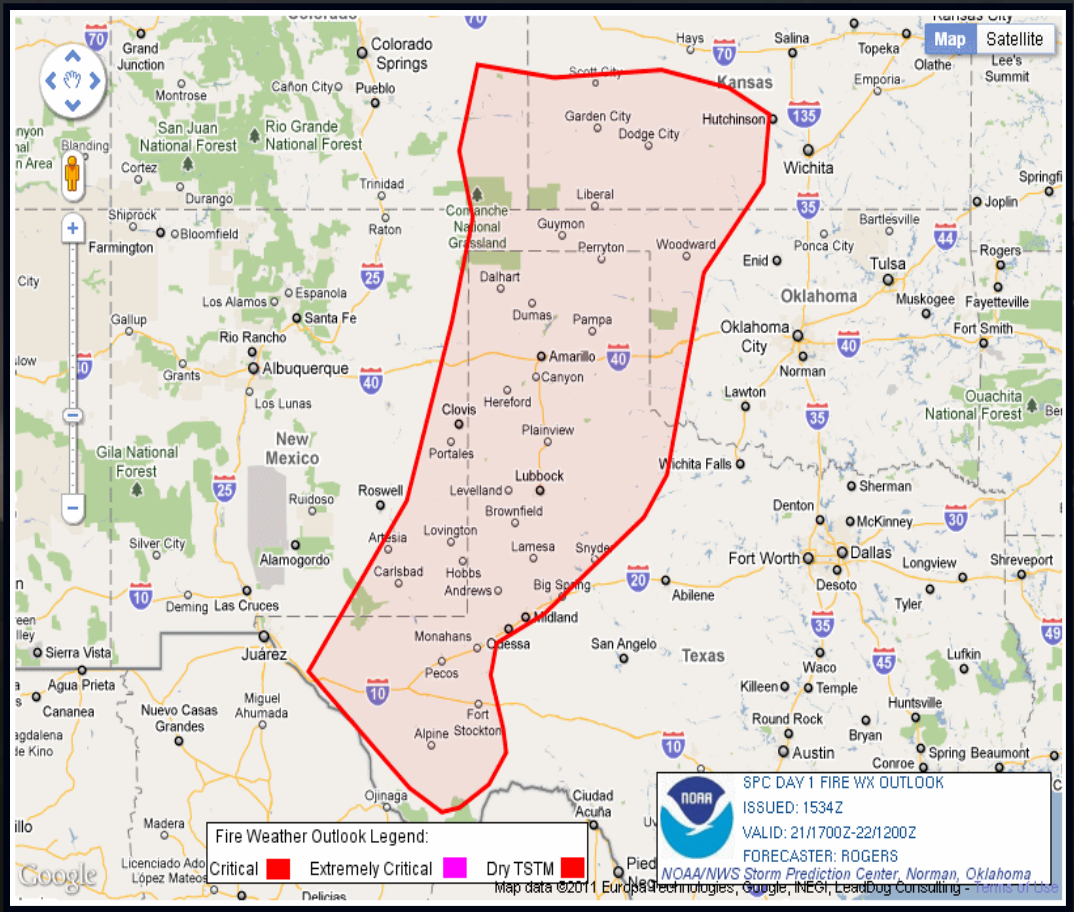
Storm Prediction Center

Improvements and New Features in 2011

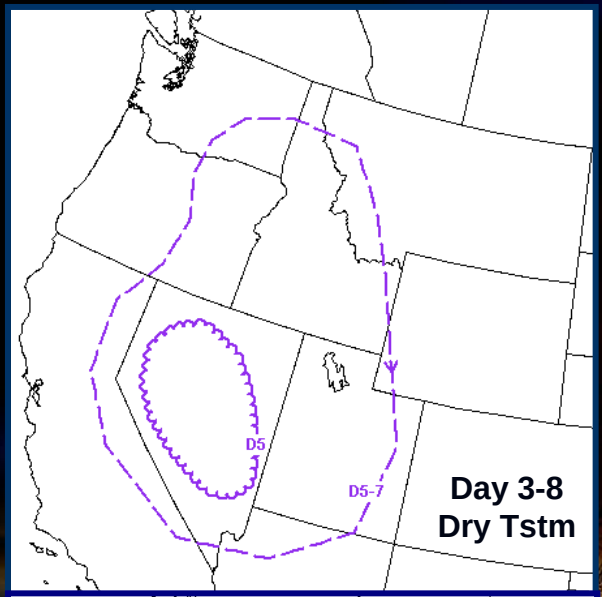
* New Outlook Graphics
* New Fire Weather Probabilities
* Multimedia Web Briefings on SPC Website
* Social Science Involvement

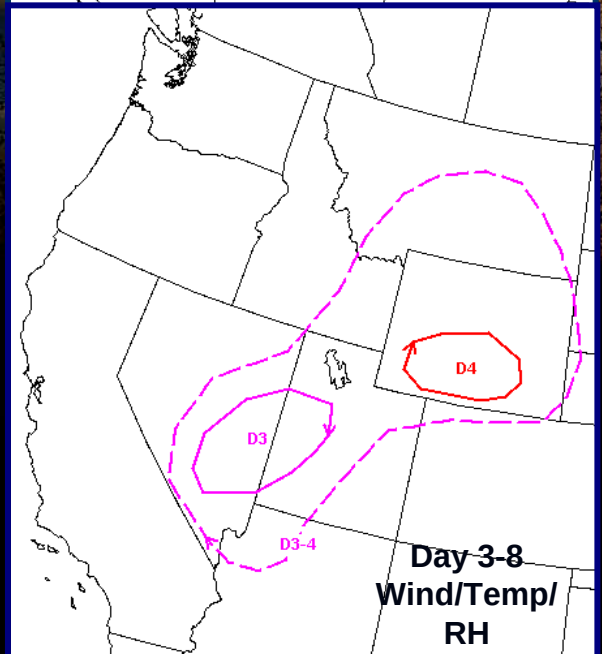
SPC Website Graphic Enhancements

- **New Outlook graphics** coming to the SPC website this spring
  - Convective and Fire
- **Toggle on/off underlays** such as cities/towns, population, and NWS CWAs
- **Google Maps** as well
  - Zoom and pan functionality



Day 3-8 Fire Weather Probabilities





- Begin **April 2011**
- **Two experimental graphics**
  1) Prob. of dry tstms over dry fuels
     - Scalloped is a Critical Area – 40%
     - Dashed is a Marginal Area – 10%
  2) Prob. of strong winds, low RH, and warm temps with dry fuels
     - Solid is a Critical Area – 70%
     - Dashed is a Marginal Area – 40%
- **What's new for users**
  - **Dry tstms depicted beyond Day 3**
  - **Marginal Areas highlighted (*dashed*) when predictability is too low** to depict a Critical Area
    - More resolution that current "See Text"

SPC Multimedia Web Briefings

- Experimental communication format
  - Viewable/downloadable movie file (MP4) from the SPC website
  - 2-3 minutes in length
- Available for **Moderate/High Risk** Severe Weather Days
  - Supplement to the Public Severe Weather Outlook (PWO)
  - Recorded once per day and available during the early morning hours
- **Begin Tuesday, March 15**

File Edit View Window Help

NOAA Storm Prediction Center Web Briefing

Sunday February 27, 2011
Recorded at 10:16 AM CST

00:00:04

SPC Societal Impact Program

"Engaging users to understand their needs and priorities…and to help determine potential product changes or improvements for communicating uncertainty of high impact weather events."

- In 2010, **partnered** with **S**ocial **S**cience **W**oven **I**n **M**eteorology **(SSWIM)** - Training for SPC staff and collaborating on research.

- **Building relationships** with SPC's first order users (NWS-WFO Forecasters, Broadcast Meteorologists, Emergency Managers, Private Sector)

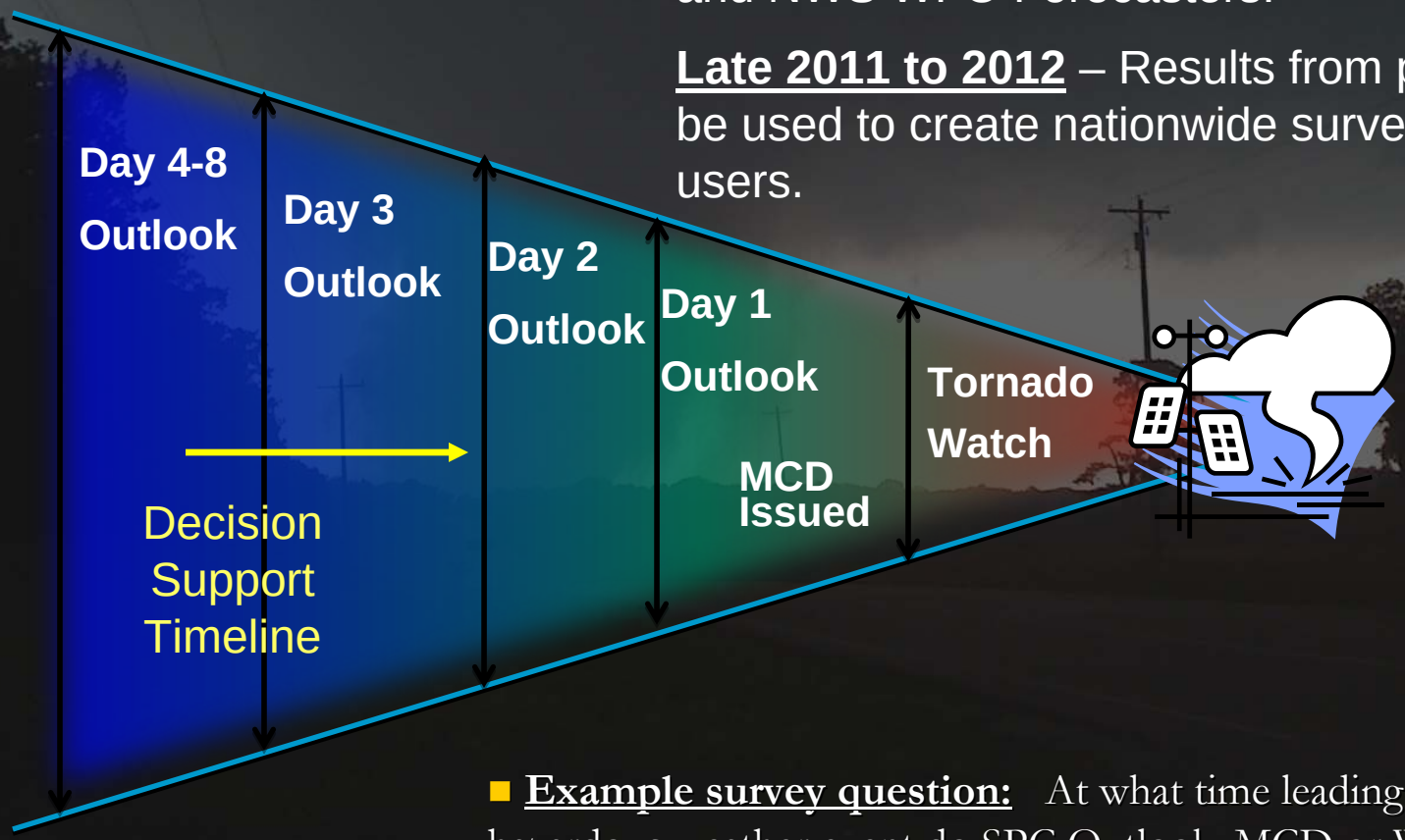
- Short term goal – **Survey SPC user community** (decision makers) to **understand their needs and priorities**.

- **Key question: Does SPC provide a clear depiction of forecast uncertainty and confidence for high impact weather events?**

SPC Societal Impact Program

<u>Summer 2011 Pilot Project</u> – Survey a subset of SPC's first order decision support users: Broadcast Meteorologists, Emergency Managers, and NWS WFO Forecasters.

<u>Late 2011 to 2012</u> – Results from pilot project will be used to create nationwide survey of first order users.



- **<u>Example survey question:</u>** At what time leading up to a hazardous weather event do SPC Outlook, MCD or Watch products become most important to your operations?

***Graphic adapted from SSWIM 2010.**

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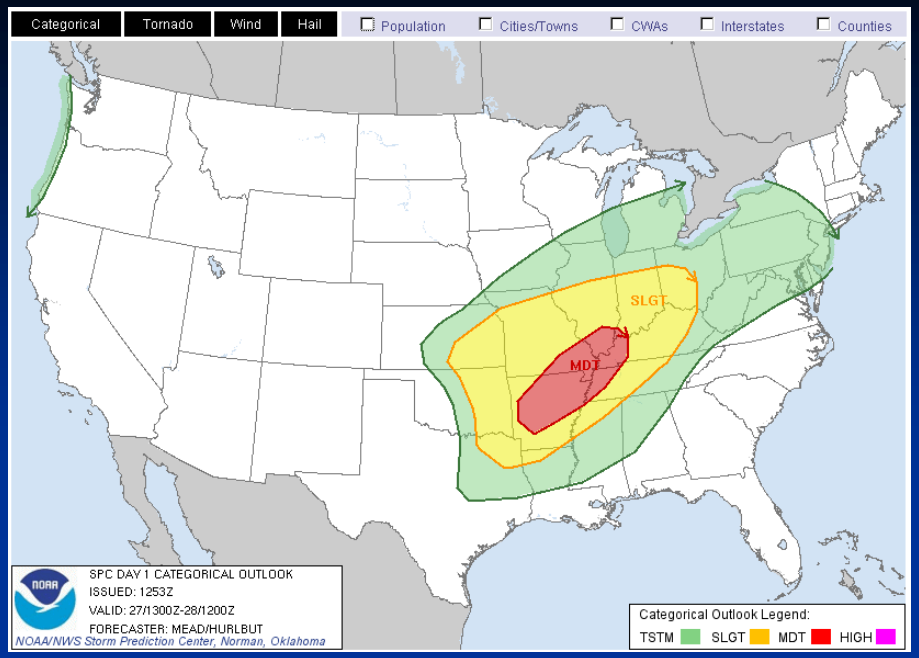
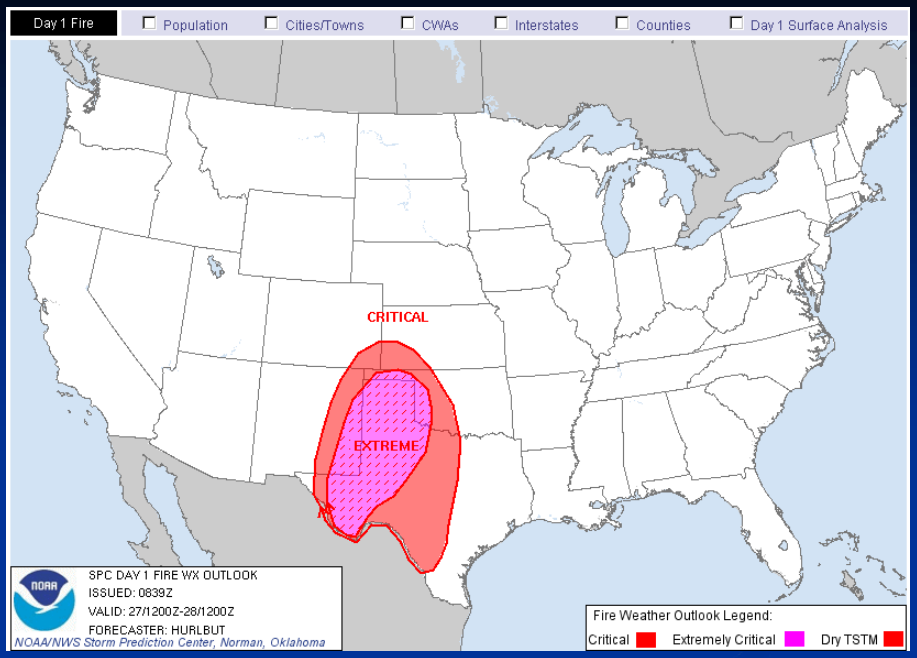
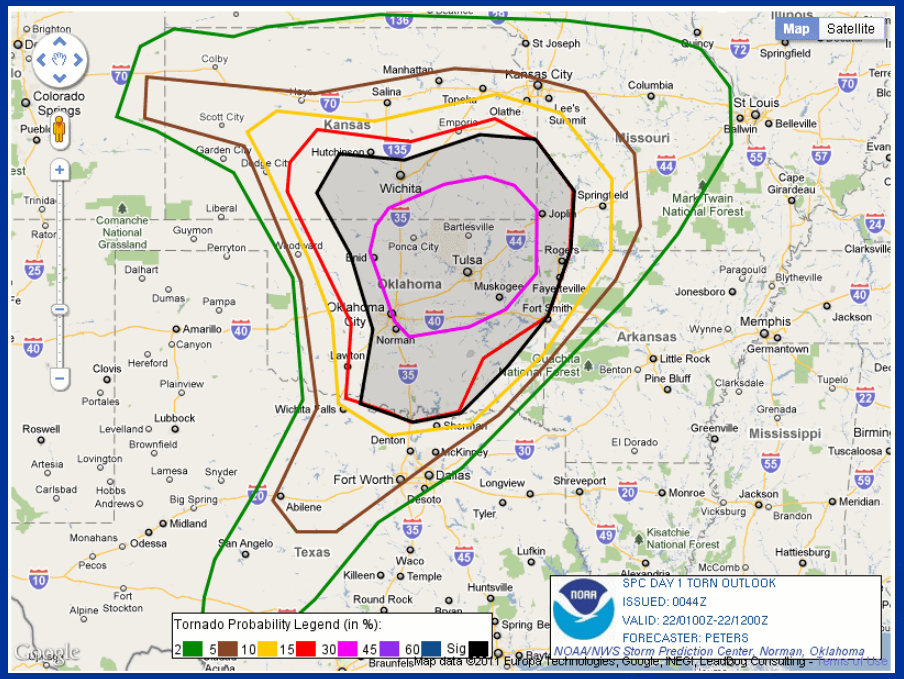
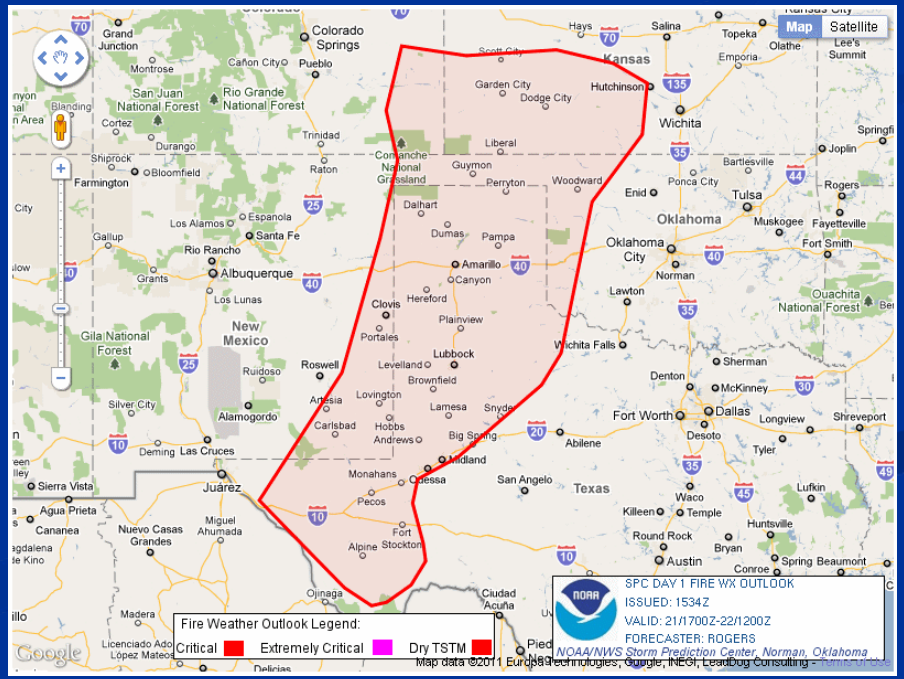

Categorical
Tornado
Wind
Hail
Population
Cities/Towns
CWAs
Interstates
Counties
SLGT
MDT
SPC DAY 1 CATEGORICAL OUTLOOK
ISSUED: 1253Z
VALID: 27/1300Z-28/1200Z
FORECASTER: MEAD/HURLBUT
NOAA/NWS Storm Prediction Center, Norman, Oklahoma
Categorical Outlook Legend:
TSTM SLGT MDT HIGH


Day 1 Fire
Population
Cities/Towns
CWAs
Interstates
Counties
Day 1 Surface Analysis
CRITICAL
EXTREME
SPC DAY 1 FIRE WX OUTLOOK
ISSUED: 0839Z
VALID: 27/1200Z-28/1200Z
FORECASTER: HURLBUT
NOAA/NWS Storm Prediction Center, Norman, Oklahoma
Fire Weather Outlook Legend:
Critical Extremely Critical Dry TSTM


Map
Satellite
Kansas
Missouri
Oklahoma
Arkansas
Texas
Mississippi
Wichita
Tulsa
Oklahoma City
Fort Worth
Dallas
SPC DAY 1 TORN OUTLOOK
ISSUED: 0044Z
VALID: 22/0100Z-22/1200Z
FORECASTER: PETERS
NOAA/NWS Storm Prediction Center, Norman, Oklahoma
Tornado Probability Legend (in %):
2 5 10 15 30 45 60 Sig
Map data ©2011 Europa Technologies, Google, INEGI, LeadDog Consulting


Map
Satellite
Kansas
Oklahoma
Texas
New Mexico
Wichita
Tulsa
Oklahoma City
Fort Worth
Dallas
SPC DAY 1 FIRE WX OUTLOOK
ISSUED: 1534Z
VALID: 21/1700Z-22/1200Z
FORECASTER: ROGERS
NOAA/NWS Storm Prediction Center, Norman, Oklahoma
Fire Weather Outlook Legend:
Critical Extremely Critical Dry TSTM
Map data ©2011 Europa Technologies, Google, INEGI, LeadDog Consulting