



NOAA

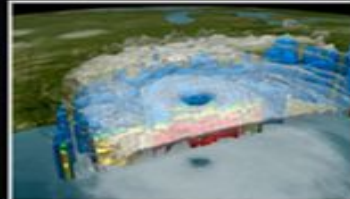
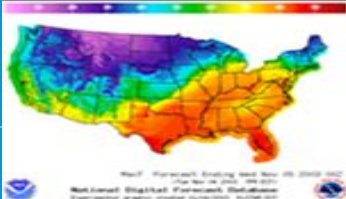
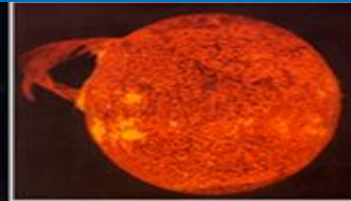
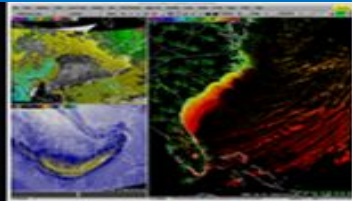
National
Weather
Service

National Weather Service Severe Weather Forecasting and Data Collection

Matthew Elliott

Warning Coordination Meteorologist

NOAA/NWS Storm Prediction Center





What is a Severe Thunderstorm?



Understanding
**SEVERE
 WEATHER
 HAZARDS**



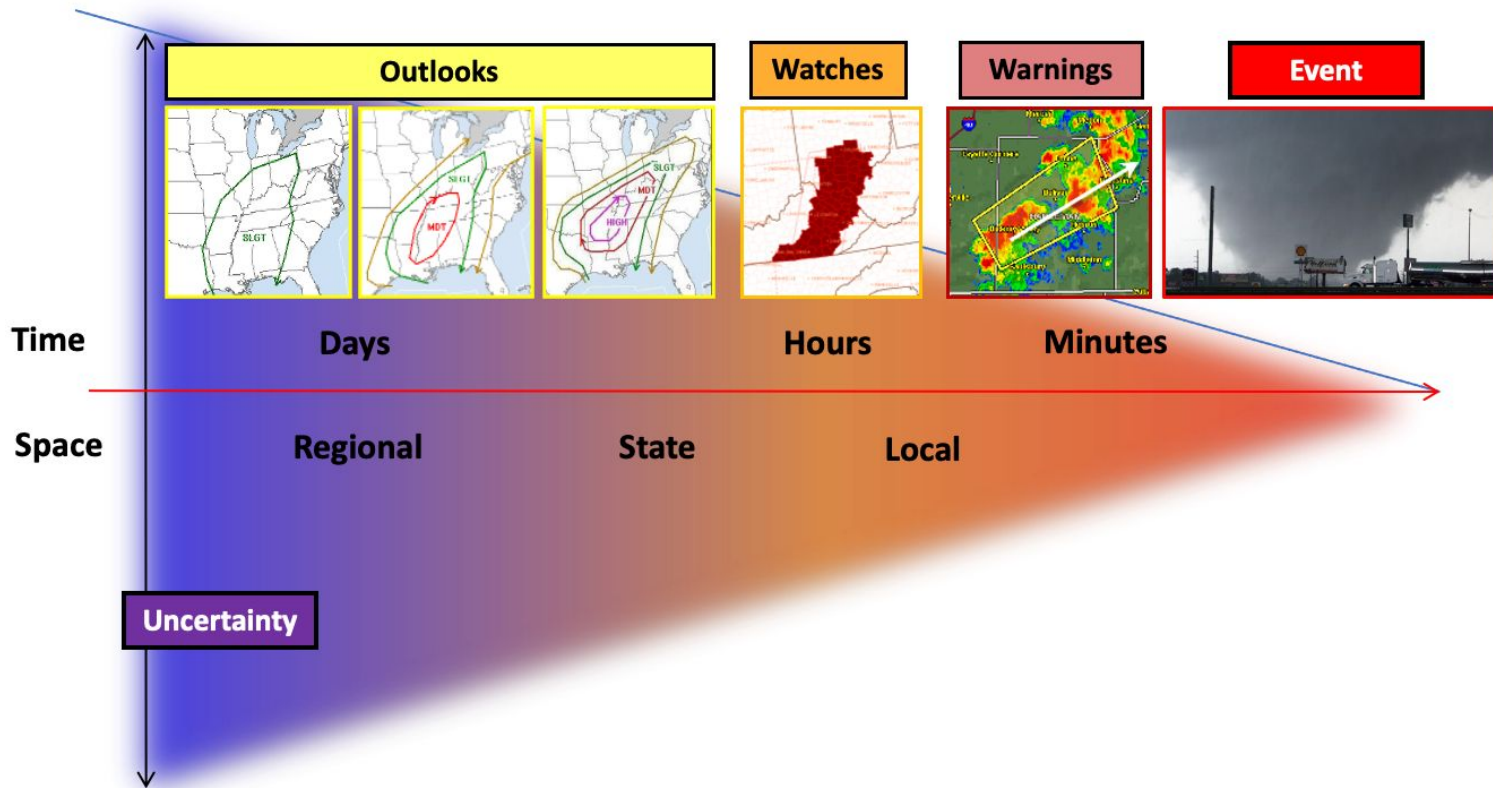


POLL

QUESTION

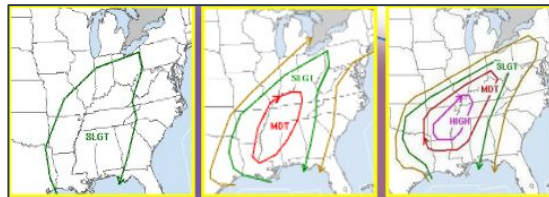








Severe Weather Product Continuum



Severe Products Across Time And Space

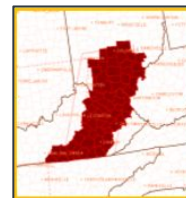
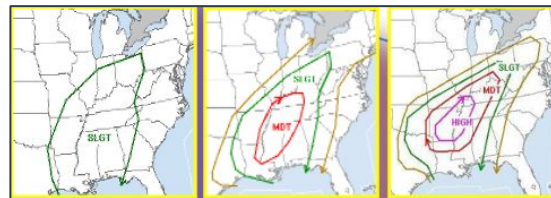
- Outlooks (Storm Prediction Center)
 - Forecasts begin “Day 8”
 - Coverage within 25 miles of a point



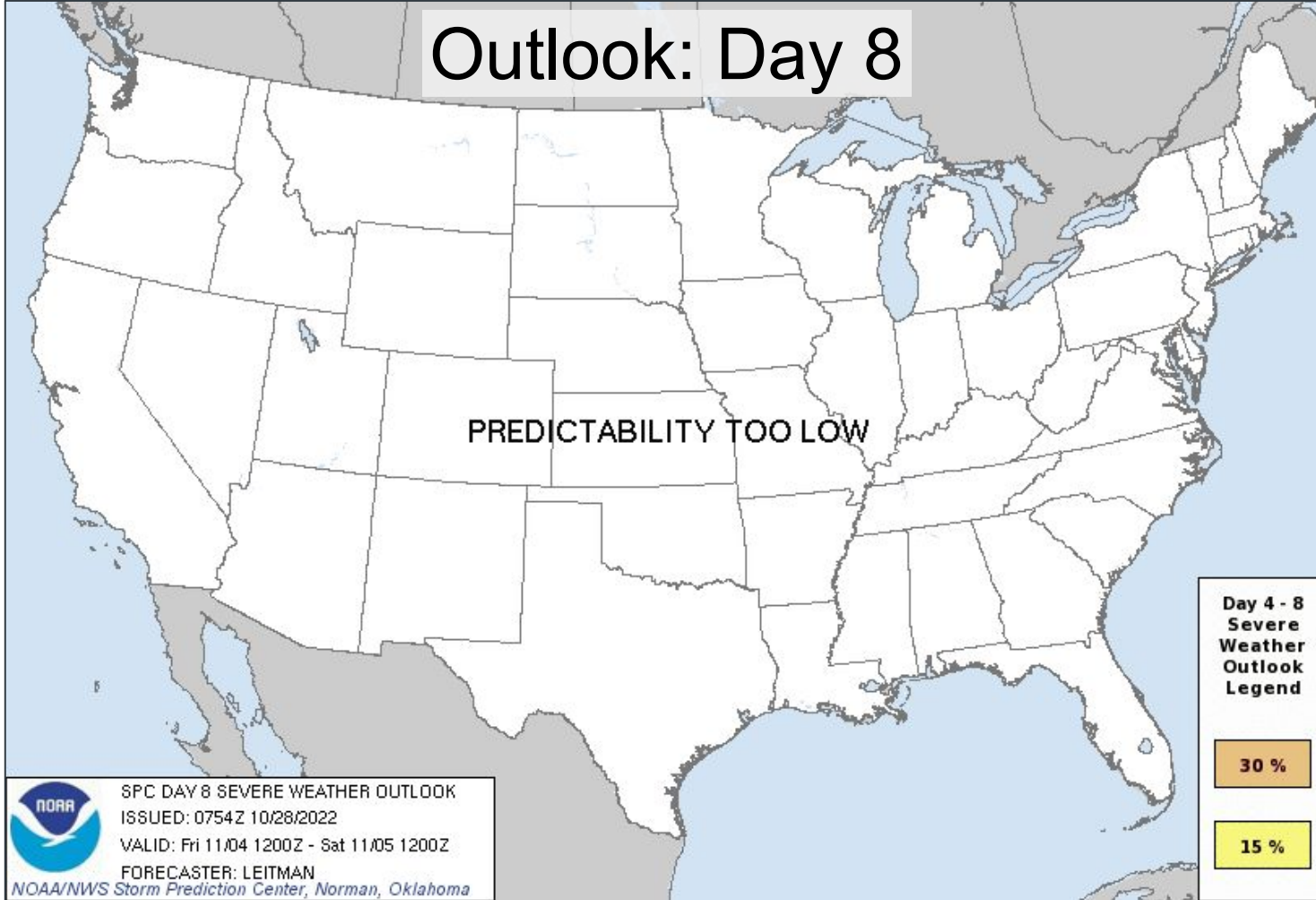
THUNDERSTORMS (no label)	1 - MARGINAL (MRGL)	2 - SLIGHT (SLGT)	3 - ENHANCED (ENH)	4 - MODERATE (MDT)	5 - HIGH (HIGH)
No severe* thunderstorms expected	Isolated severe thunderstorms possible	Scattered severe storms possible	Numerous severe storms possible	Widespread severe storms likely	Widespread severe storms expected
Lightning/flooding threats exist with <u>all</u> thunderstorms	Limited in duration and/or coverage and/or intensity	Short-lived and/or not widespread, isolated intense storms possible	More persistent and/or widespread, a few intense	Long-lived, widespread and intense	Long-lived, very widespread and particularly intense
					


Severe Products Across Time And Space

- Outlooks (Storm Prediction Center)
 - Forecasts begin “Day 8”
 - Coverage within 25 miles of a point
- Watches (Storm Prediction Center)
 - Conditions favorable within an area
 - ~State-sized, 6 hours
- Warnings (Local Forecast Office)
 - Storm is severe (or will be)
 - ~300 sq mi., 45 minutes
- Reports/Verification (Local Forecast Office)



Outlook: Day 8



 SPC DAY 8 SEVERE WEATHER OUTLOOK
ISSUED: 0754Z 10/28/2022
VALID: Fri 11/04 1200Z - Sat 11/05 1200Z
FORECASTER: LEITMAN
NOAA/NWS Storm Prediction Center, Norman, Oklahoma

**Day 4 - 8
Severe
Weather
Outlook
Legend**

 30 %

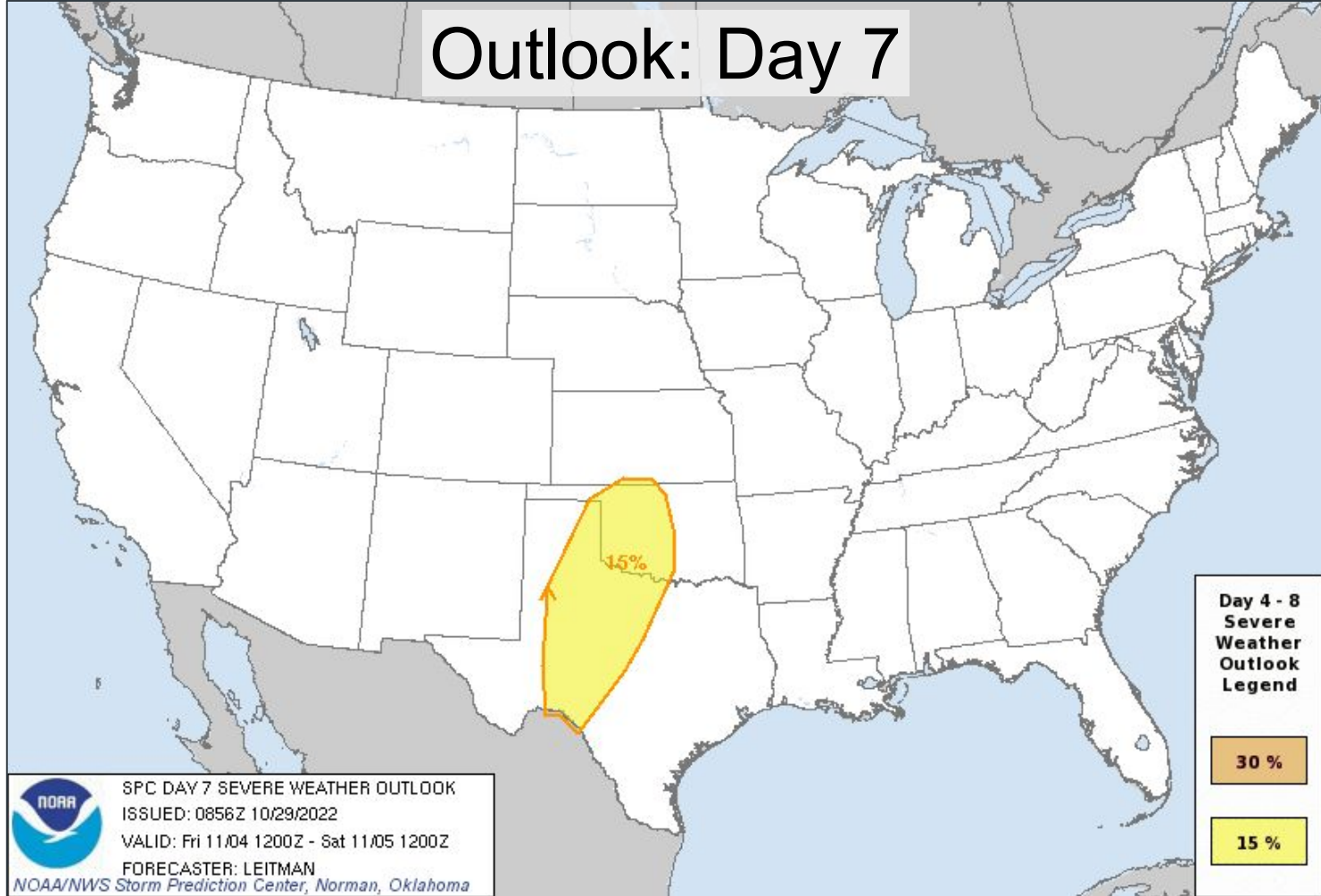
 15 %




www.spc.noaa.gov



Outlook: Day 7



 SPC DAY 7 SEVERE WEATHER OUTLOOK
ISSUED: 0856Z 10/29/2022
VALID: Fri 11/04 1200Z - Sat 11/05 1200Z
FORECASTER: LEITMAN
NOAA/NWS Storm Prediction Center, Norman, Oklahoma

**Day 4 - 8
Severe
Weather
Outlook
Legend**

 30 %

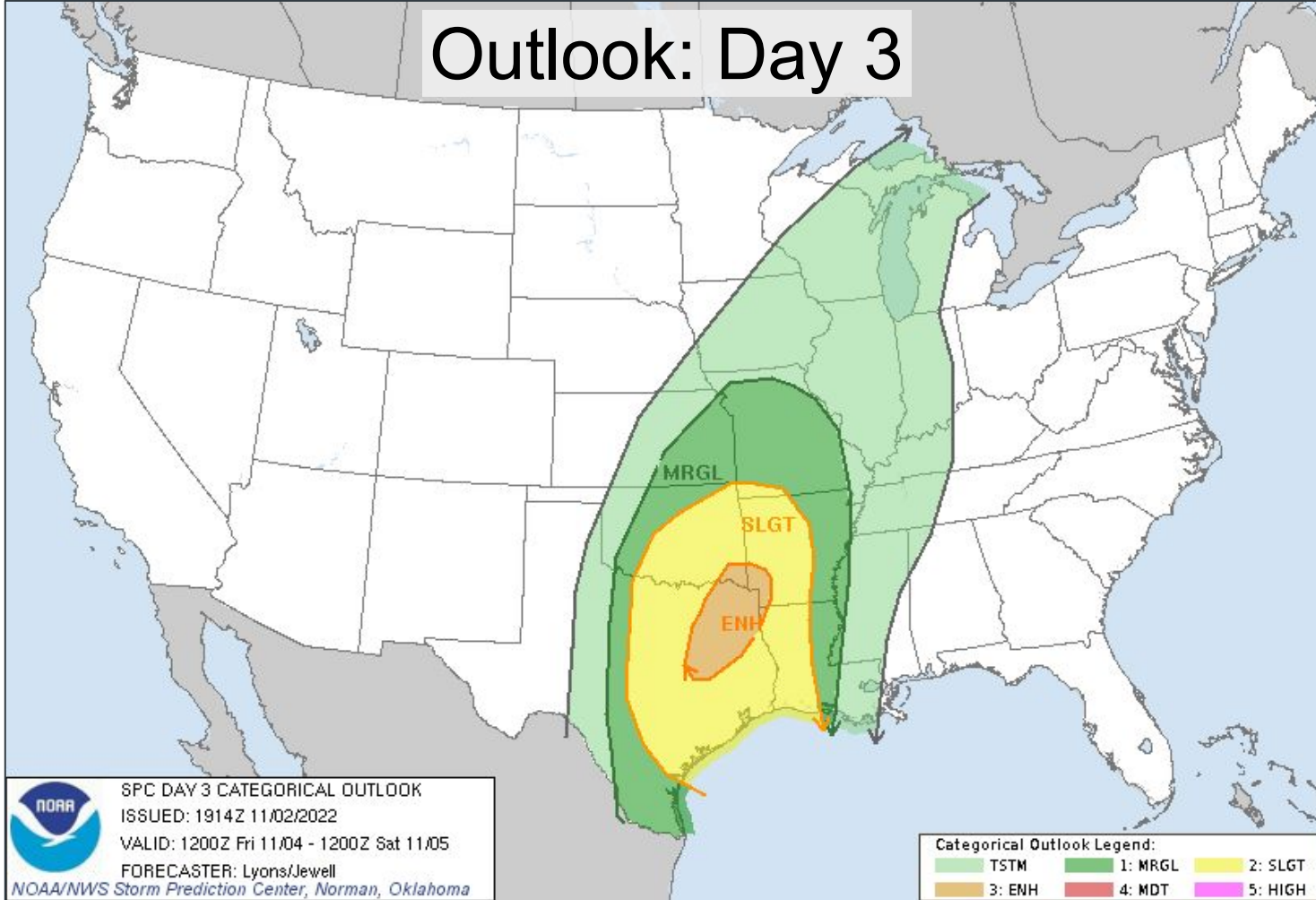
 15 %



www.spc.noaa.gov



Outlook: Day 3



SPC DAY 3 CATEGORICAL OUTLOOK

ISSUED: 1914Z 11/02/2022

VALID: 1200Z Fri 11/04 - 1200Z Sat 11/05

FORECASTER: Lyons/Jewell

NOAA/NWS Storm Prediction Center, Norman, Oklahoma

Categorical Outlook Legend:

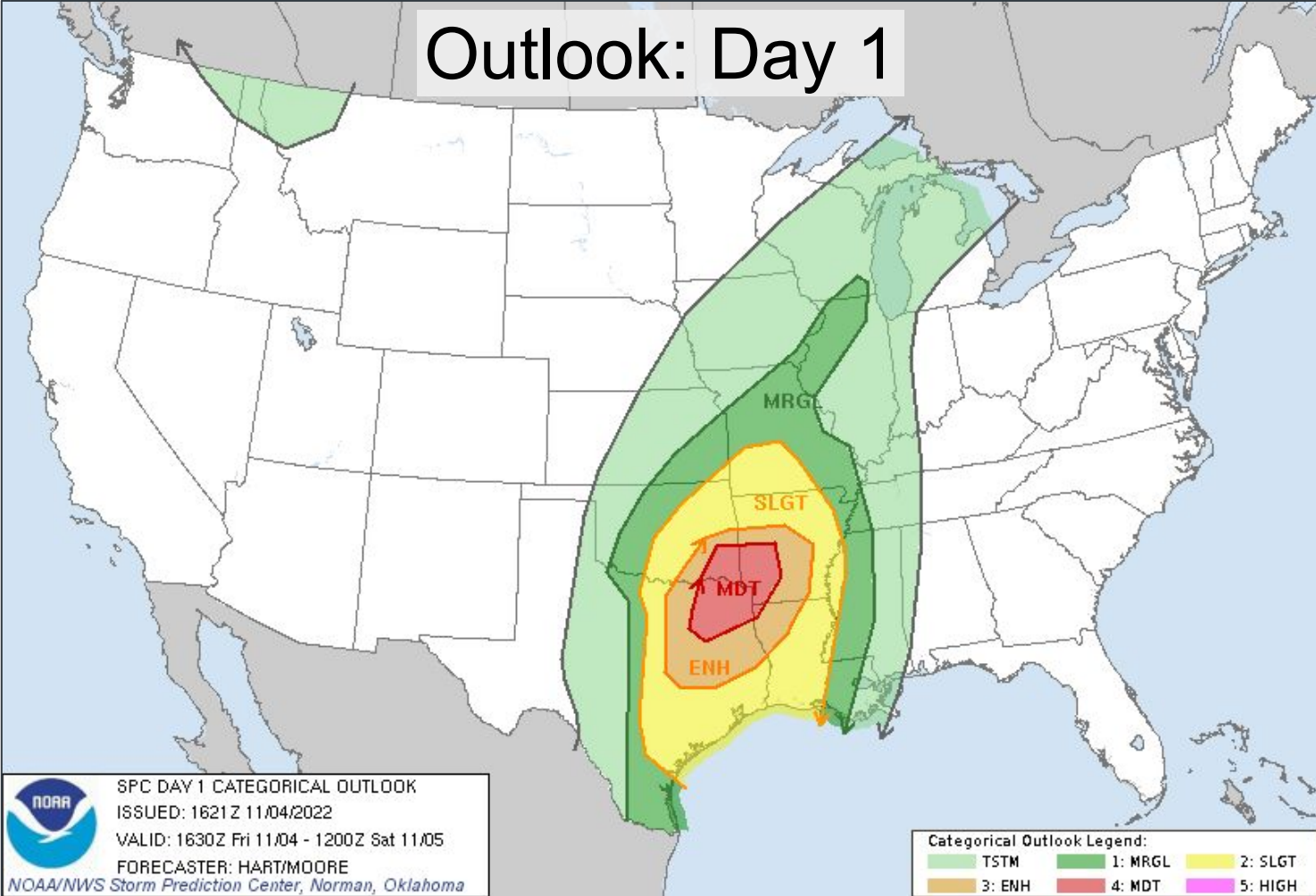
- | | | |
|--------|---------|---------|
| TSTM | 1: MRGL | 2: SLGT |
| 3: ENH | 4: MDT | 5: HIGH |




www.spc.noaa.gov



Outlook: Day 1



 SPC DAY 1 CATEGORICAL OUTLOOK
ISSUED: 1621 Z 11/04/2022
VALID: 1630Z Fri 11/04 - 1200Z Sat 11/05
FORECASTER: HART/MOORE
NOAA/NWS Storm Prediction Center, Norman, Oklahoma

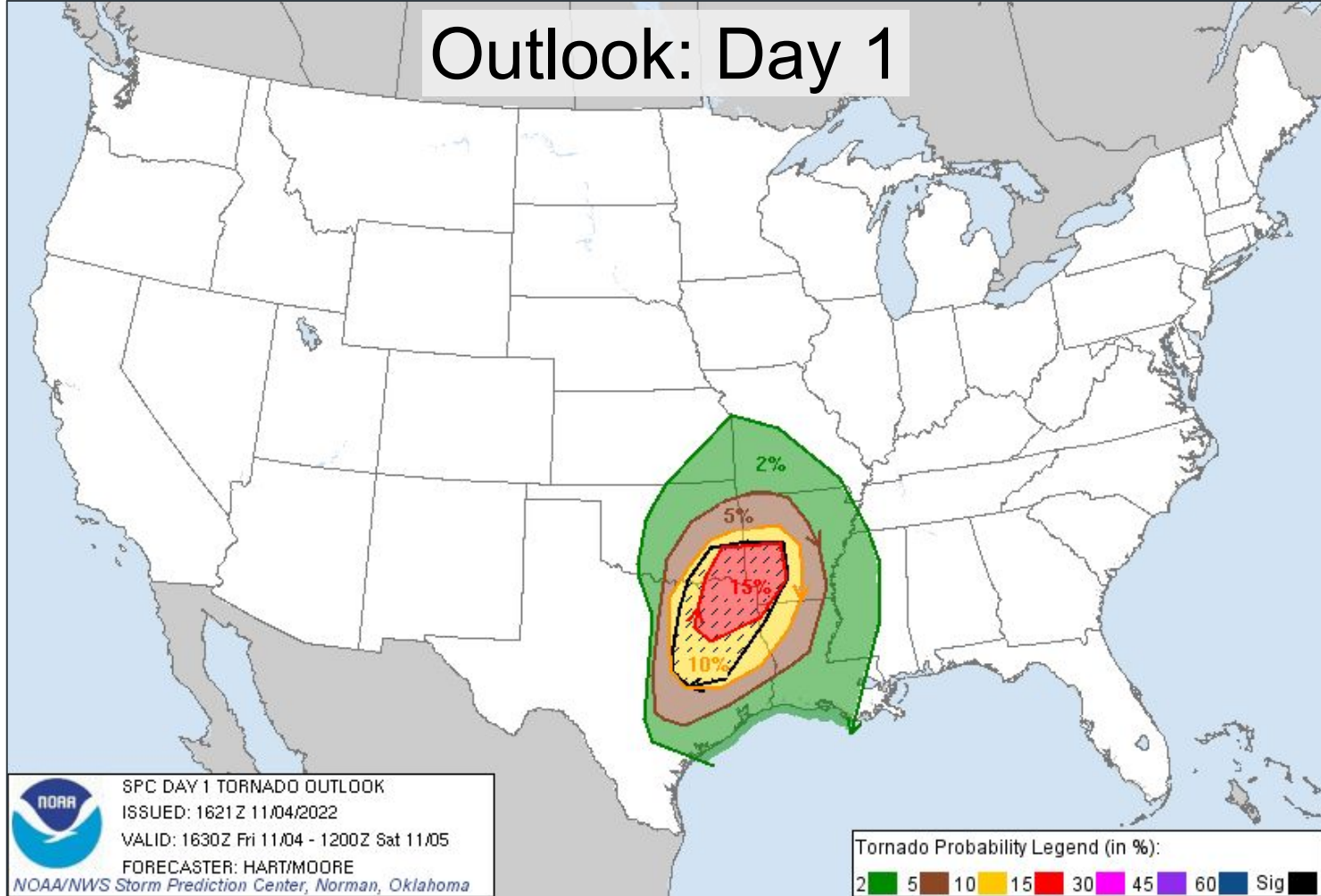
Categorical Outlook Legend:
TSTM 1: MRGL 2: SLGT
3: ENH 4: MDT 5: HIGH




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Outlook: Day 1



 SPC DAY 1 TORNADO OUTLOOK
ISSUED: 1621 Z 11/04/2022
VALID: 1630Z Fri 11/04 - 1200Z Sat 11/05
FORECASTER: HART/MOORE
NOAA/NWS Storm Prediction Center, Norman, Oklahoma

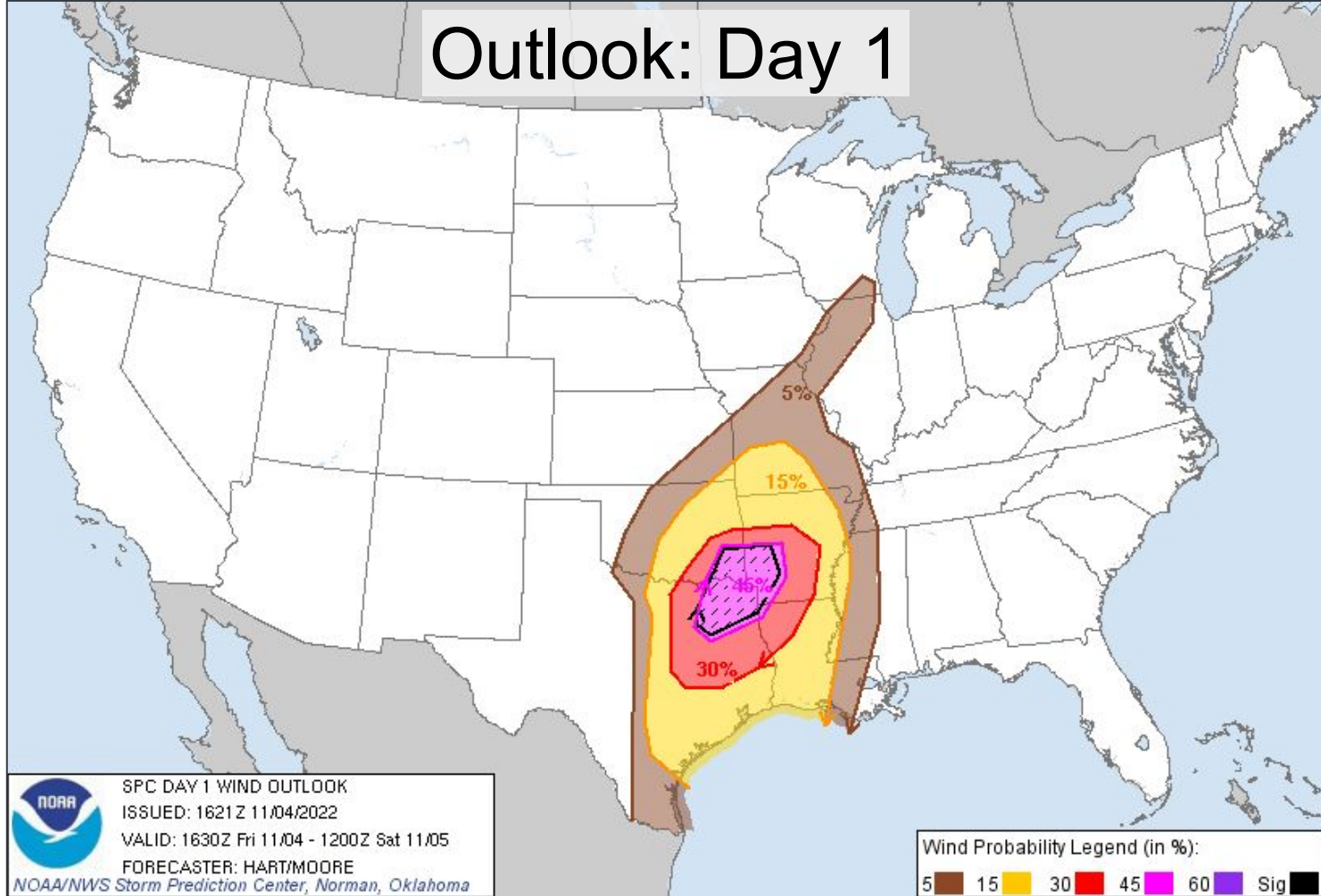
Tornado Probability Legend (in %):
2 5 10 15 30 45 60 Sig




www.spc.noaa.gov



Outlook: Day 1



 SPC DAY 1 WIND OUTLOOK
ISSUED: 1621 Z 11/04/2022
VALID: 1630Z Fri 11/04 - 1200Z Sat 11/05
FORECASTER: HART/MOORE
NOAA/NWS Storm Prediction Center, Norman, Oklahoma

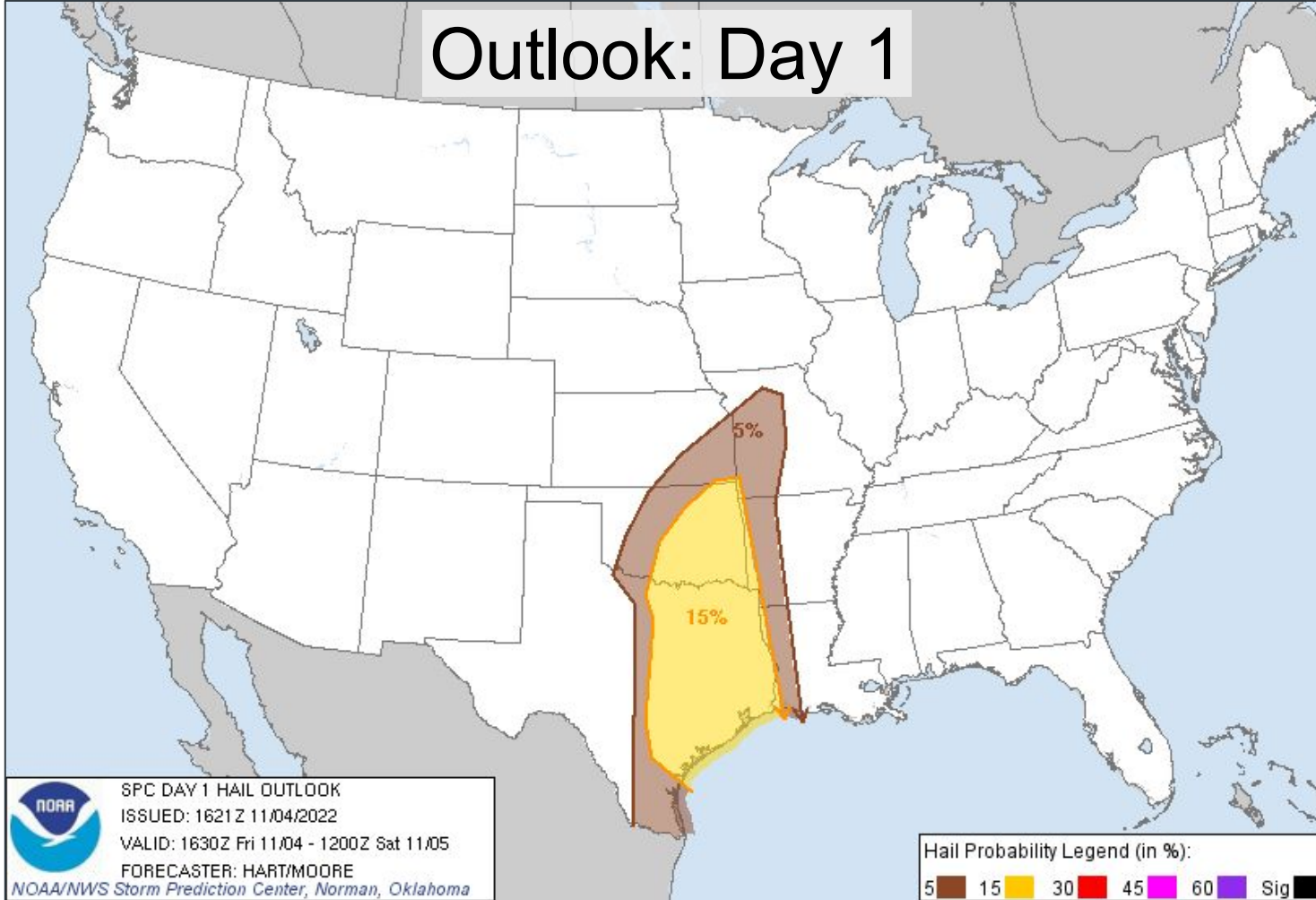
Wind Probability Legend (in %):
5 15 30 45 60 Sig



www.spc.noaa.gov



Outlook: Day 1



SPC DAY 1 HAIL OUTLOOK

ISSUED: 1621 Z 11/04/2022

VALID: 1630Z Fri 11/04 - 1200Z Sat 11/05

FORECASTER: HART/MOORE

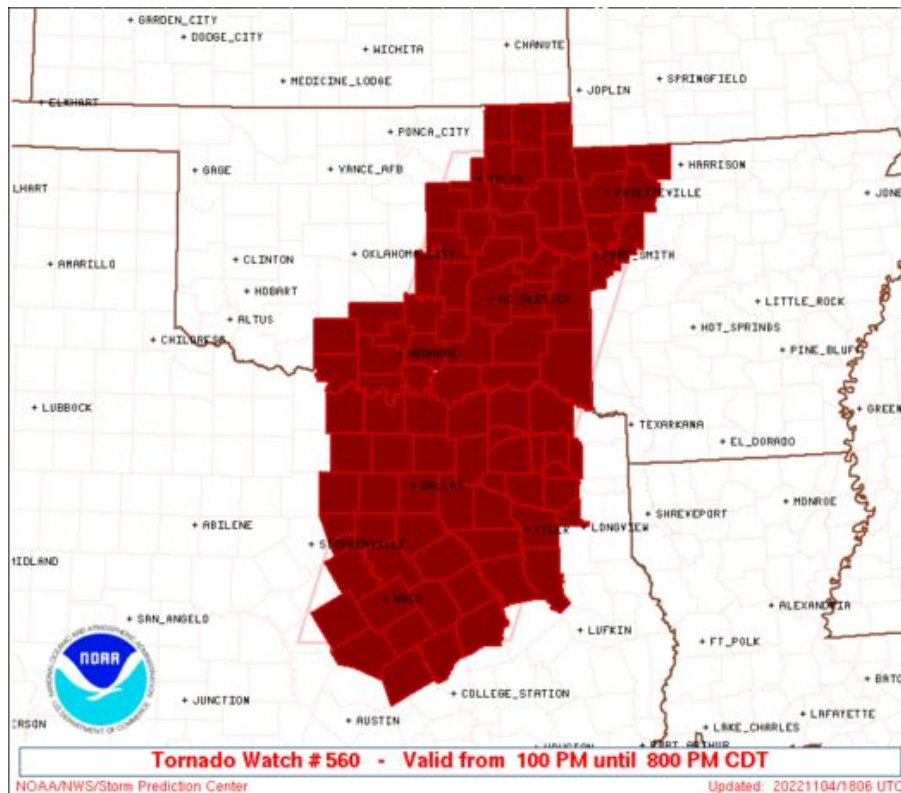
NOAA/NWS Storm Prediction Center, Norman, Oklahoma

Hail Probability Legend (in %):



www.spc.noaa.gov





Hazard	Tornadoes	EF2+ Tornadoes	Severe Wind	65 kt+ Wind	Severe Hail	2"+ Hail
Likelihood	High	Moderate	High	Moderate	Moderate	Moderate



www.spc.noaa.gov



Tornado Emergency

Valid Until
7:15 PM CDT Friday
November 4, 2022

Threat Information



TORNADO

Damaging Tornado



HAIL

Two Inch
Sized Possible

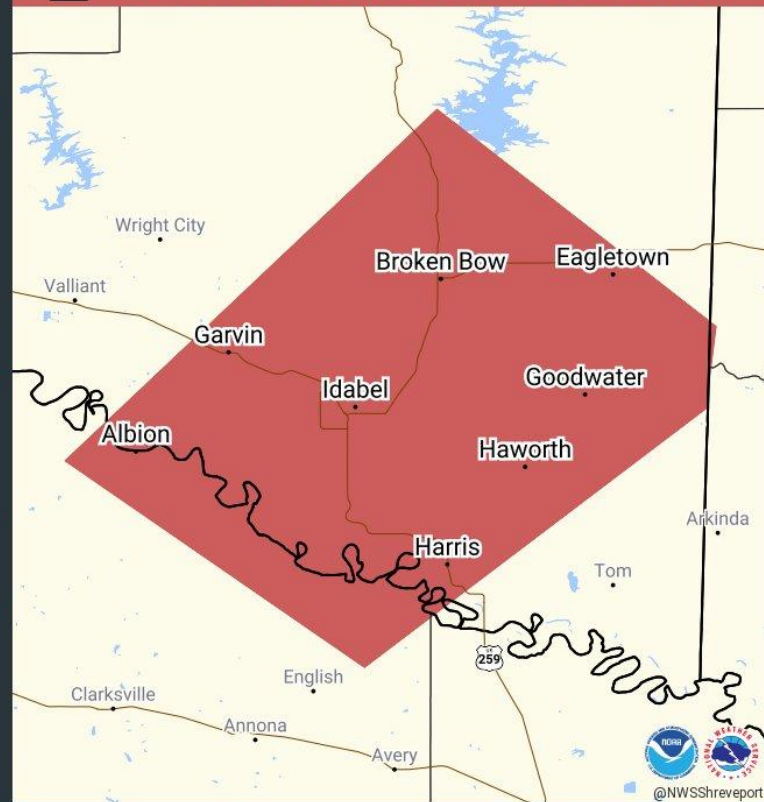
Potential Exposure



Population: 23,972
Schools: 19
Hospitals: 1



This is a life threatening situation. Seek shelter now!




www.weather.gov

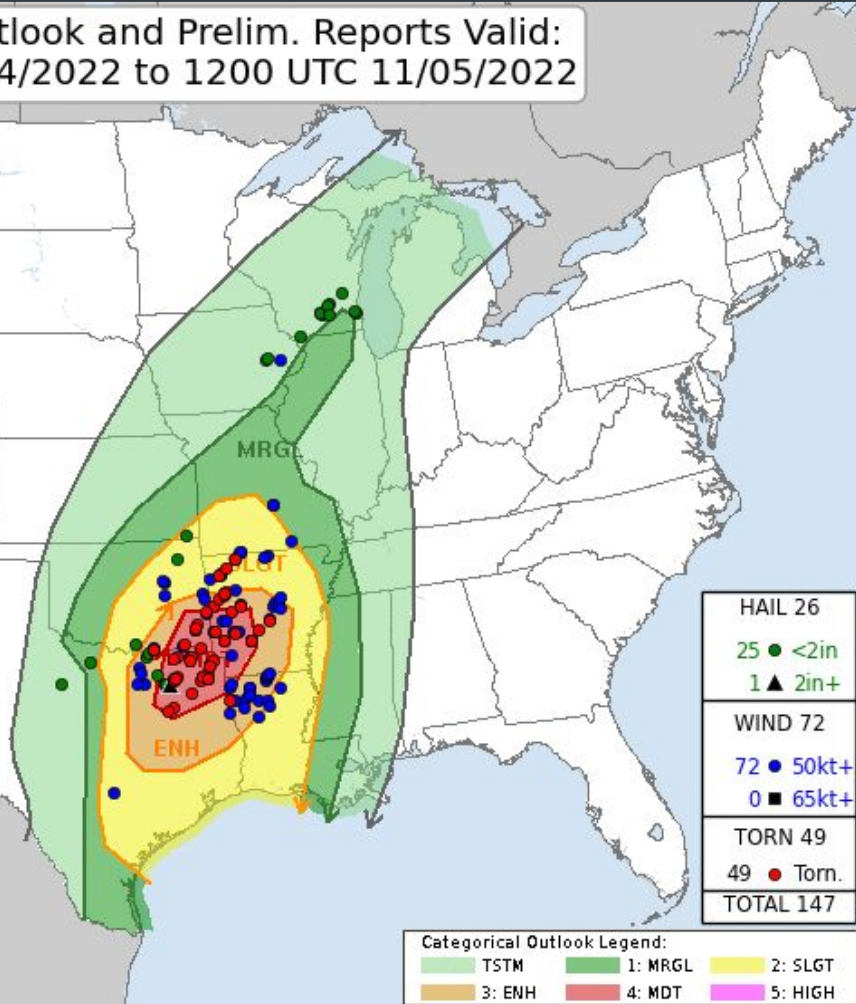


SPC Day 1 Outlook and Prelim. Reports Valid:
1630 UTC 11/04/2022 to 1200 UTC 11/05/2022



Tornado Near Sulphur Springs, TX
Video from Brayden Siau

 SPC DAY 1 CATEGORICAL OUTLOOK
ISSUED: 1621 Z 11/04/2022
VALID: 1630Z Fri 11/04 - 1200Z Sat 11/05
Preliminary Subjective Verification
NOAA/NWS Storm Prediction Center, Norman, Oklahoma



HAIL 26	
25 ●	<2in
1 ▲	2in+
WIND 72	
72 ●	50kt+
0 ■	65kt+
TORN 49	
49 ●	Torn.
TOTAL 147	

Categorical Outlook Legend:

	TSTM		1: MRGL		2: SLGT
	3: ENH		4: MDT		5: HIGH



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POLL

QUESTION



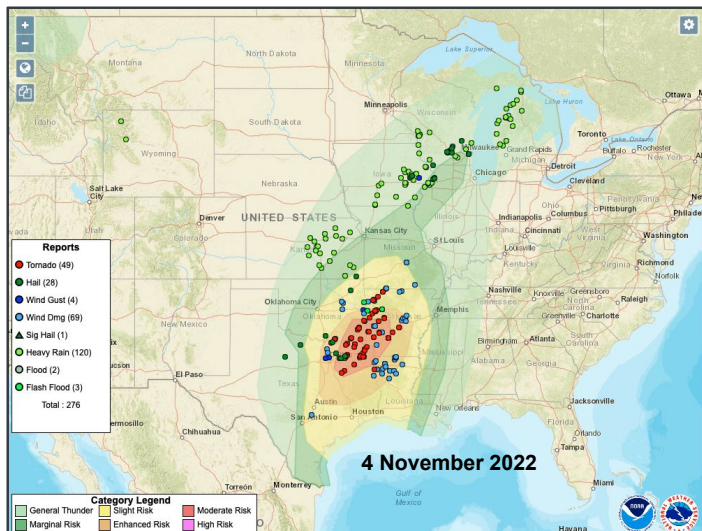


Episode vs Event



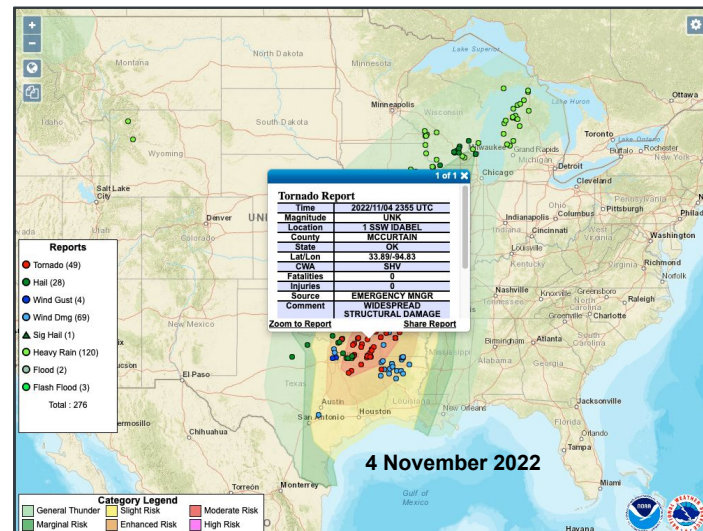
Episode

- Entire storm system
- Can contain many events



Event

- Individual type of storm event (e.g., hail, tornado)



Preliminary LSR vs Final Reports

Preliminary



- Available in real-time
- Little QC

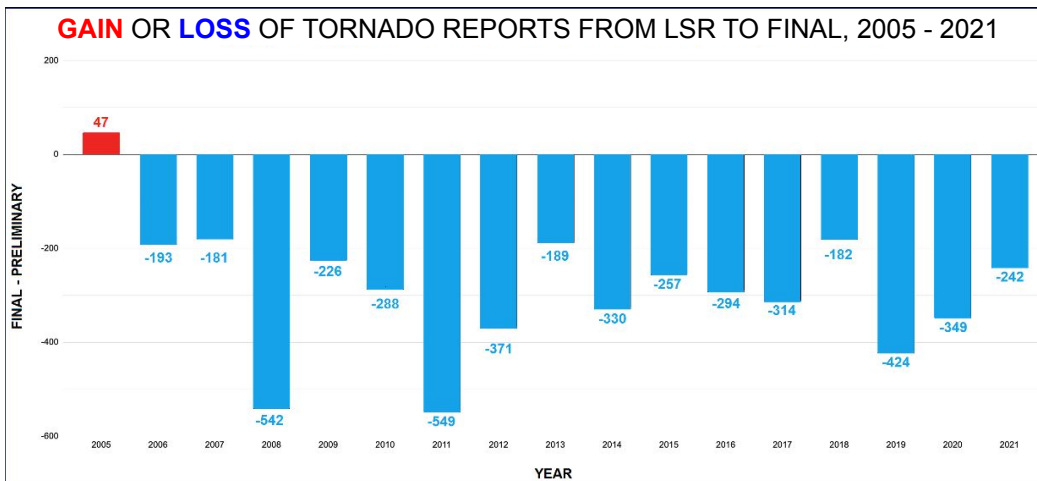
<https://www.spc.noaa.gov/climo/online/>

Final (Storm Data)



- ~75 days after end of month
- QC'ed

<https://www.ncdc.noaa.gov/stormevents/>



***Please use Final Data
instead of the
Preliminary Reports
for scientific papers!***

Storm Data Tornadoes vs SPC OneTor Data

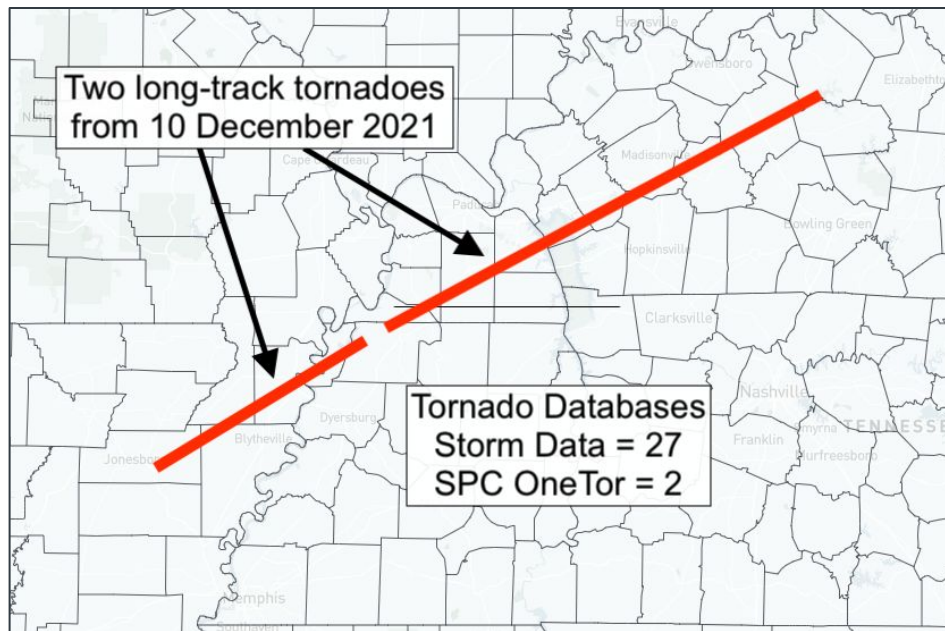
Storm Data tornadoes
are segmented by county



Storm Data overestimates
tornado count



Use SPC OneTor for
tornado counts



SPC OneTor Database

<https://www.spc.noaa.gov/wcm/#data>





NWS Damage Assessment Toolkit (DAT)

<https://apps.dat.noaa.gov/stormdamage/damageviewer/>



- Data collected in real-time during NWS Post-Event Damage Surveys



- Data is QC'ed...but is still preliminary



- Not standardized at all local forecast offices



- Not all tornadoes entered





Hail Reports



Which one of these hail sizes is reported the most?



1.00"



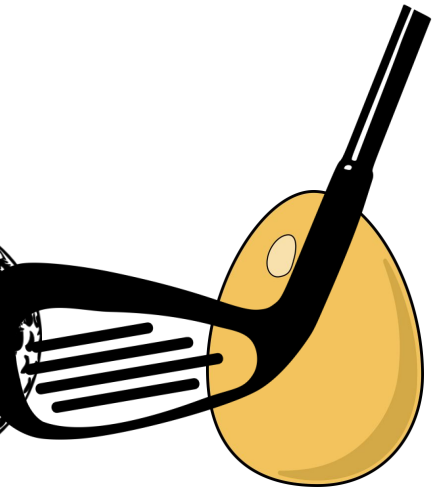
1.25"



1.50"



1.75"



2.00"

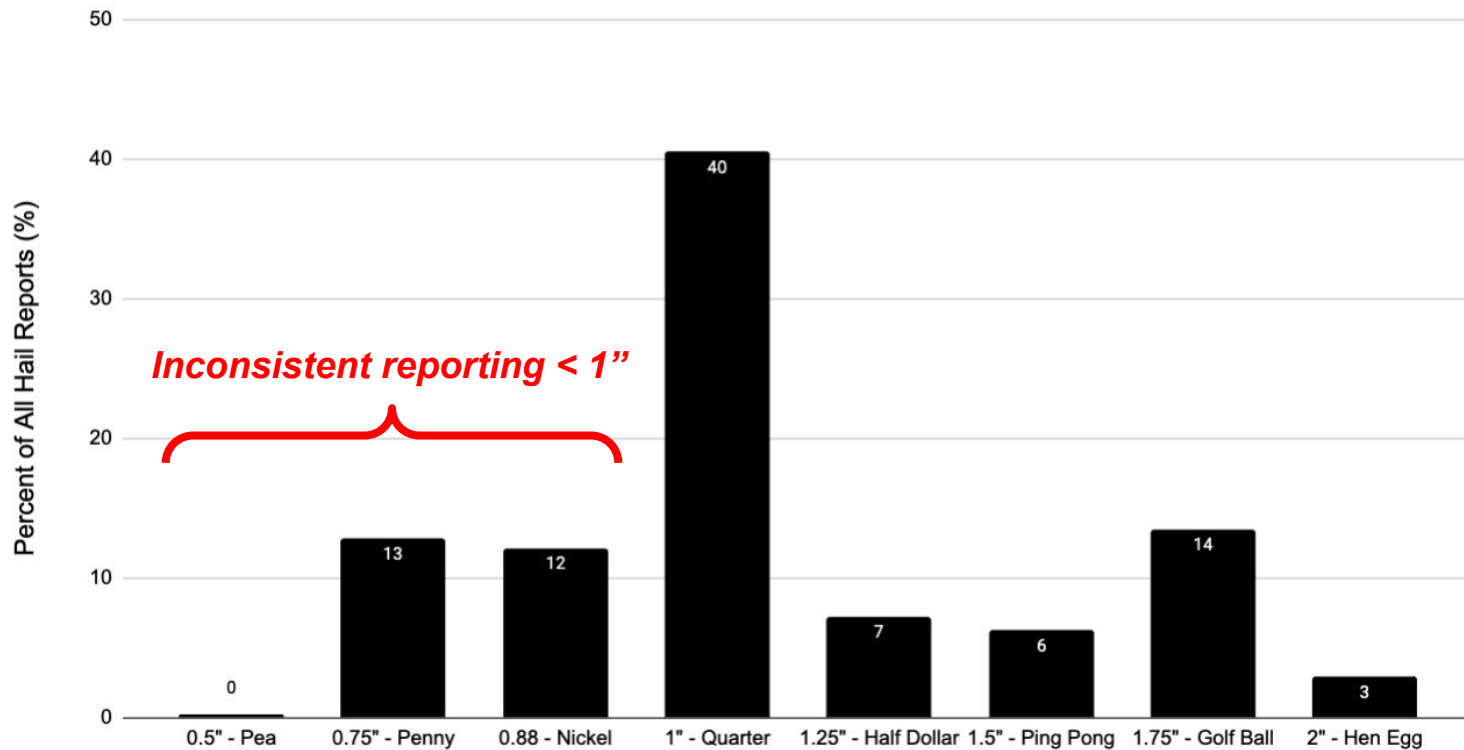




Hail Reports



Hail Reports \leq 2 Inches (2010 - 2021)





Severe Wind Reports



Plains

Measured > Damage



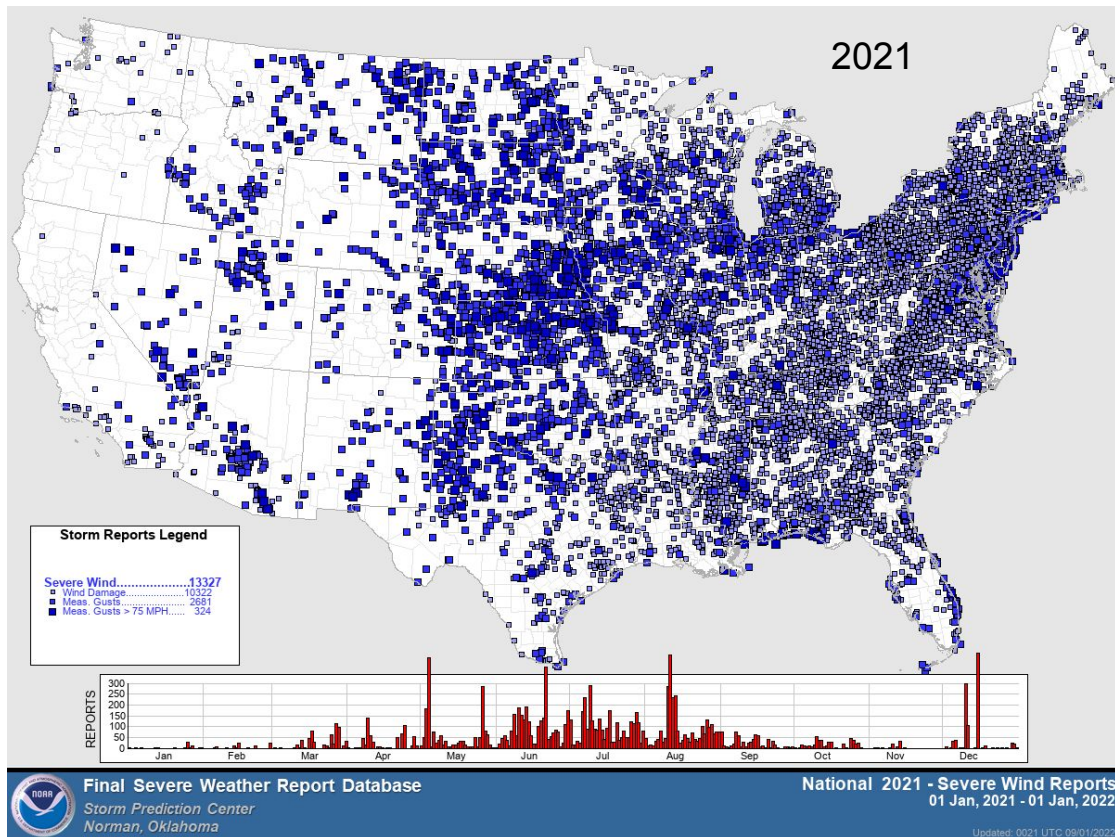
East

Damage > Measured

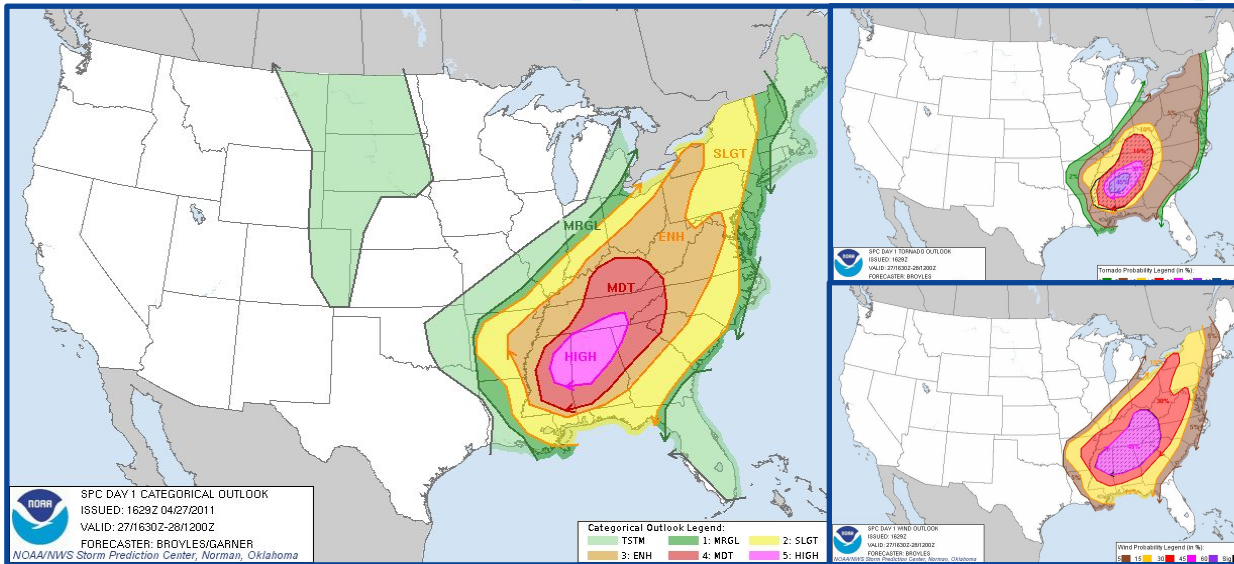


Important

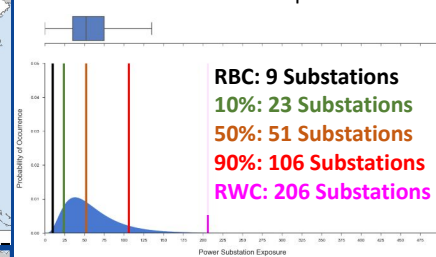
Some significant (≥ 74 mph) wind reports may only appear in the Final Data!



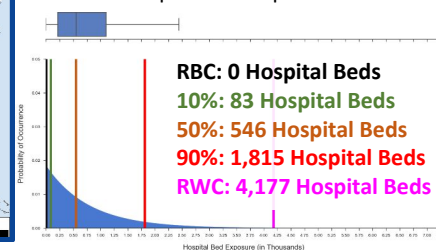
Quantitative Impact Decision Support Services



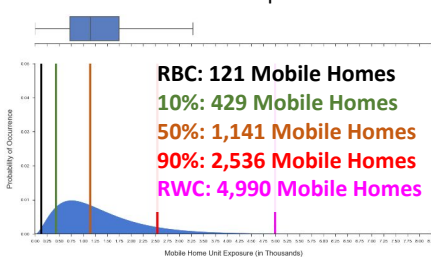
Power Substation Exposure



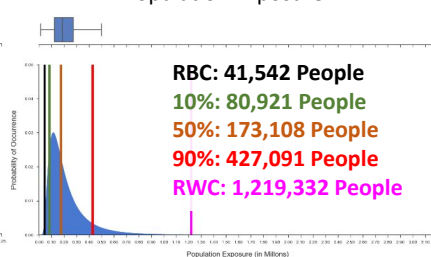
Hospital Bed Exposure



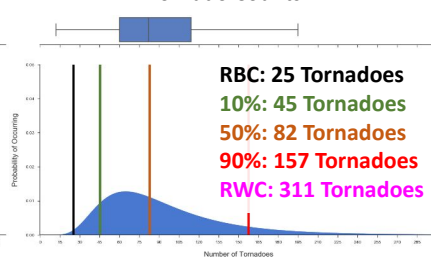
Mobile Home Exposure



Population Exposure



Tornado Counts



**Severe Weather
 27 April 2011**