It Storms Here… A Lot. Let's Talk About It.

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Southern Climate Impacts Planning Program

- Established in 2008
- 1 of several NOAA Climate Adaptation Partnerships (CAP) teams
- Funded by NOAA, multi-institutional collaboration
- **Mission: To assist organizations with making decisions that build resilience by collaboratively producing research, tools, and knowledge that reduce weather and climate risks and impacts across the South-Central U.S.**

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Weather vs. Climate

What weather determines:

- Type of clothing we wear today.
- Infrastructure: Cooling centers open today or not?
- Operations

What climate determines:

- Type of clothing we buy and keep.
- Infrastructure: Do we operate cooling centers at all?
- Planning and design

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Oklahoma Weather Hazards

- Straight Line Winds
- Tornadoes
- Large Hail

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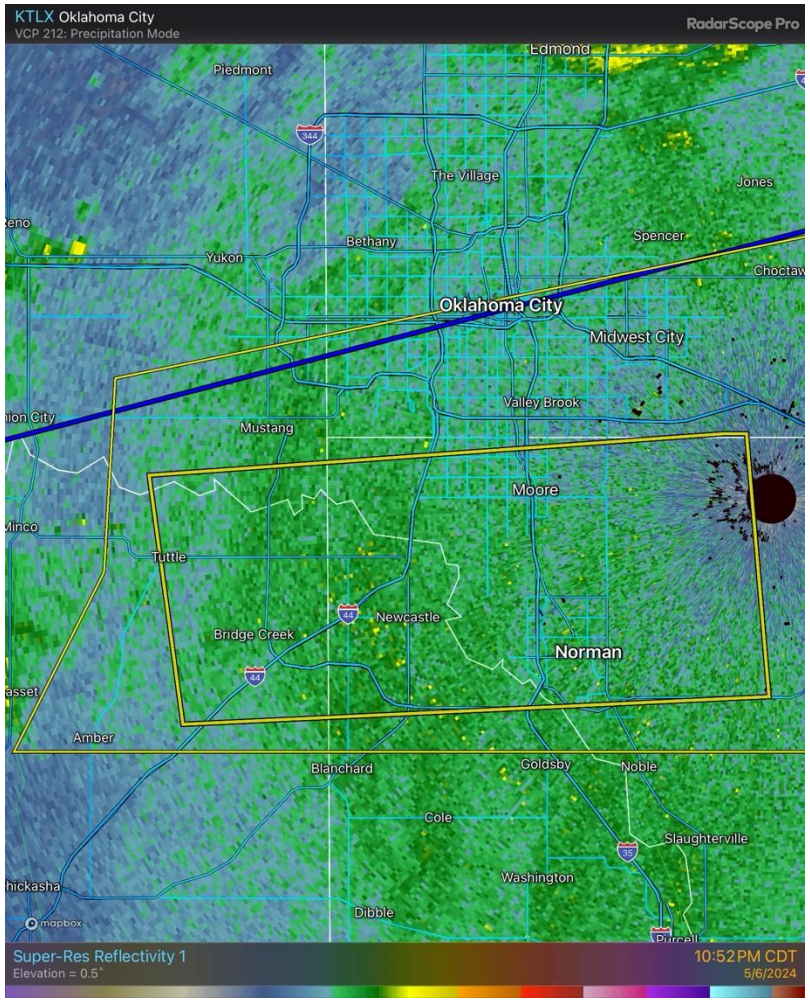
Image Source: KFOR

Damaging Winds – Moore, 05/06/24



- 105 mph non-tornadic wind gust
- Estimated $150,000 in property damage
- "…at least two residences had their garage doors fail/collapse inward, leading to the loss of shingles and decking material along portions of adjoining roofs. Additional residences along the path had minor roof damage/shingle loss along with trees uprooted."

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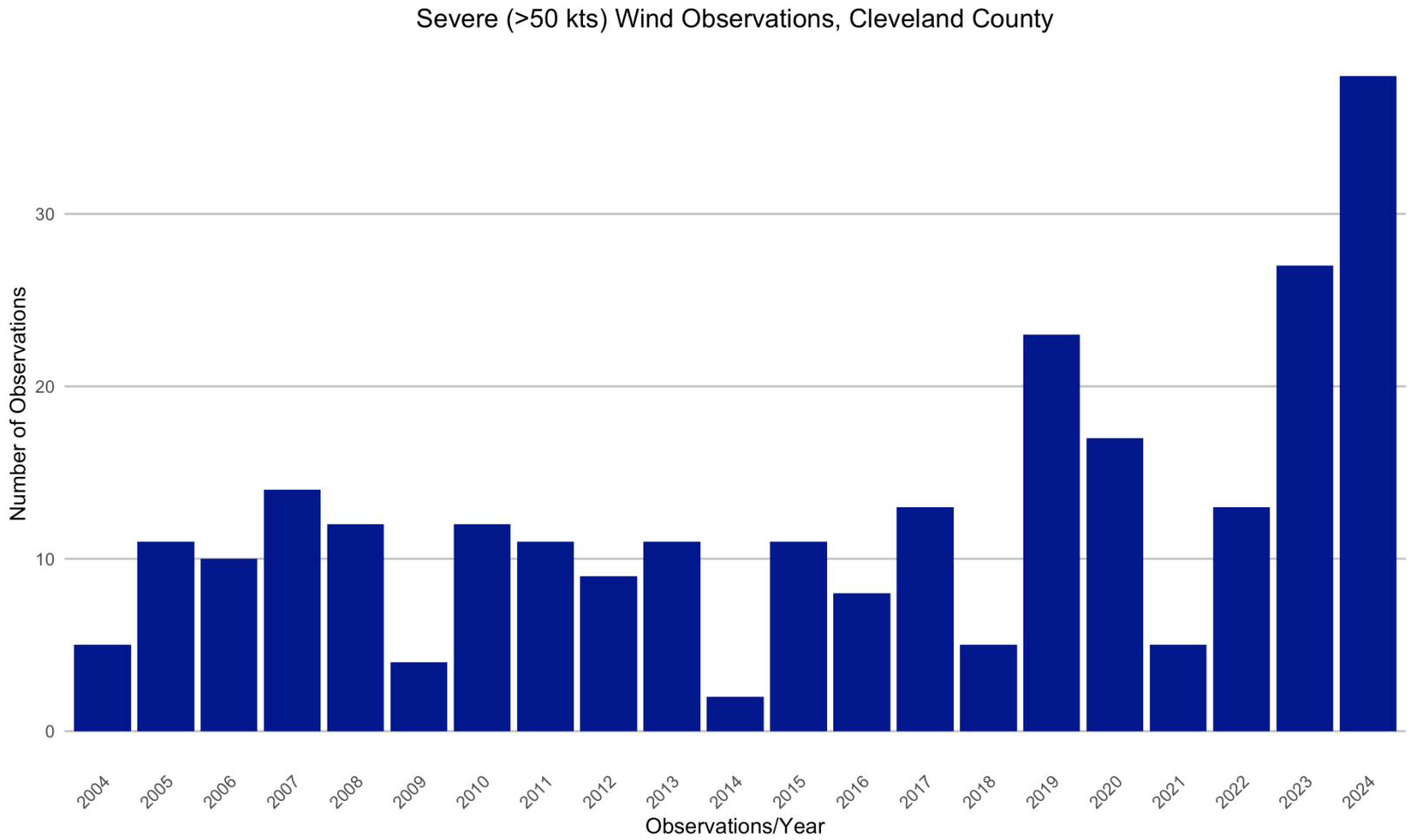
Severe Wind Observations



- Likely happens more frequently, these are only observations taken at particular locations across the county.

NCEI Storm Events Database, 2025

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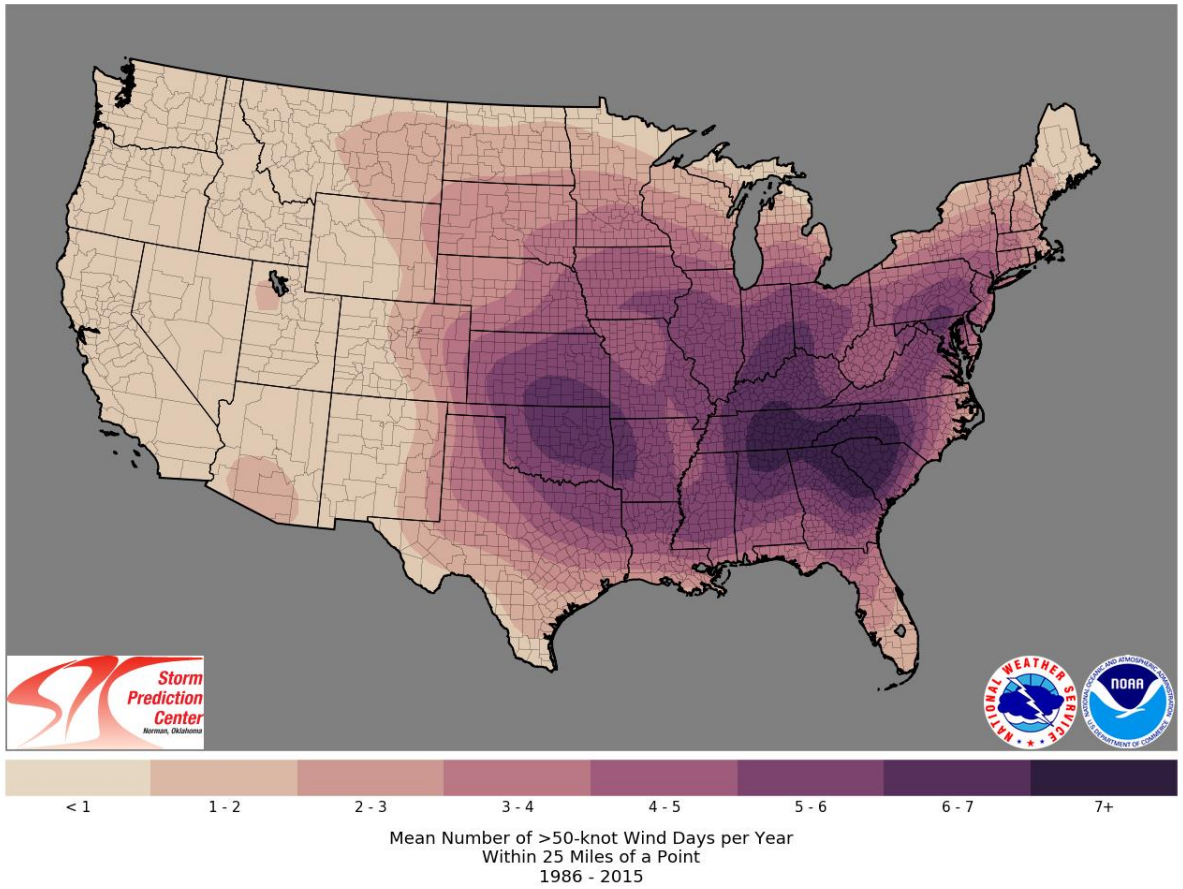
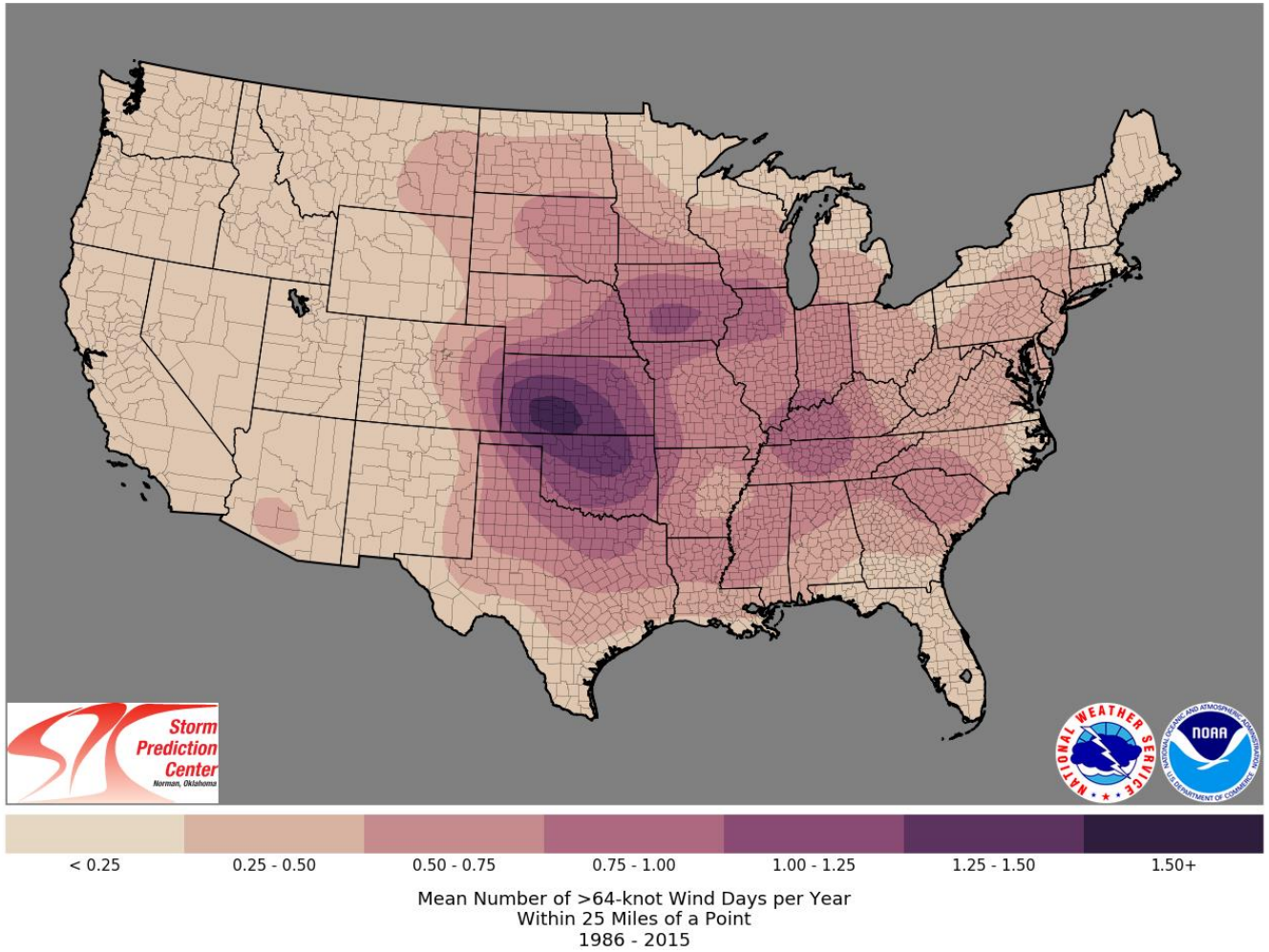
Where do we see severe winds across the US?



Winds > 58 mph within 25 miles of a point

Winds > 74 mph within 25 miles of a point



Tornadoes

- Measured using the Enhanced Fujita Scale
- Damage-based indicator
- Expected damage to 28 different types of structures

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Tornado Strength

- Only one-third of all tornadoes are strong and just 2% violent
- This equates to about 25 EF4-EF5 tornadoes per year
- These violent tornadoes cause 70% of fatalities

EF Number		Wind Speed (mph)
EF0	Weak	65-85
EF1	Weak	86-109
EF2	Significant/ Strong	110-137
EF3	Significant/ Strong	138-167
EF4	Significant/ Violent	168-199
EF5	Significant/ Violent	200-234

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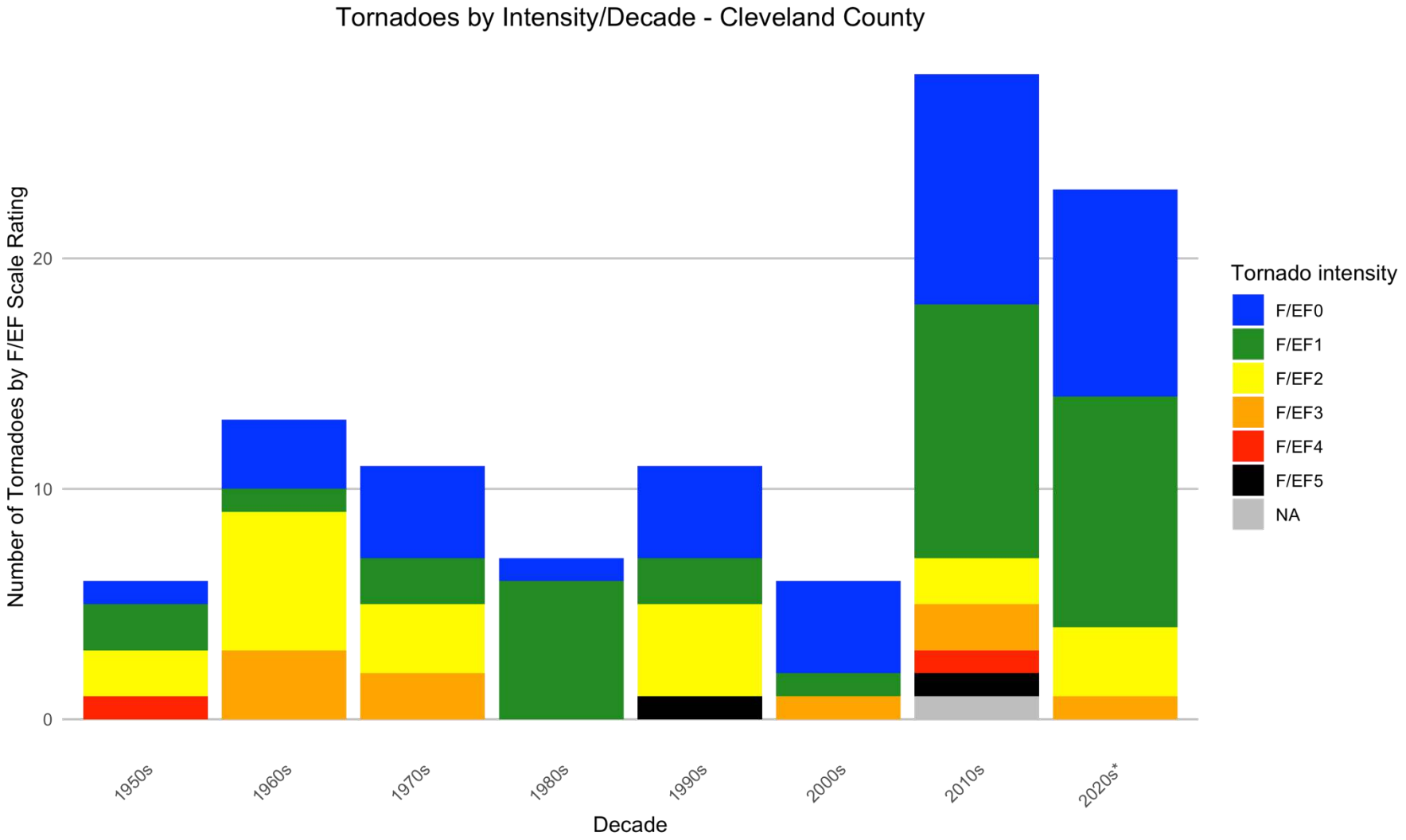
Tornado Reports Per Decade



NCEI Storm Events Database, 2025

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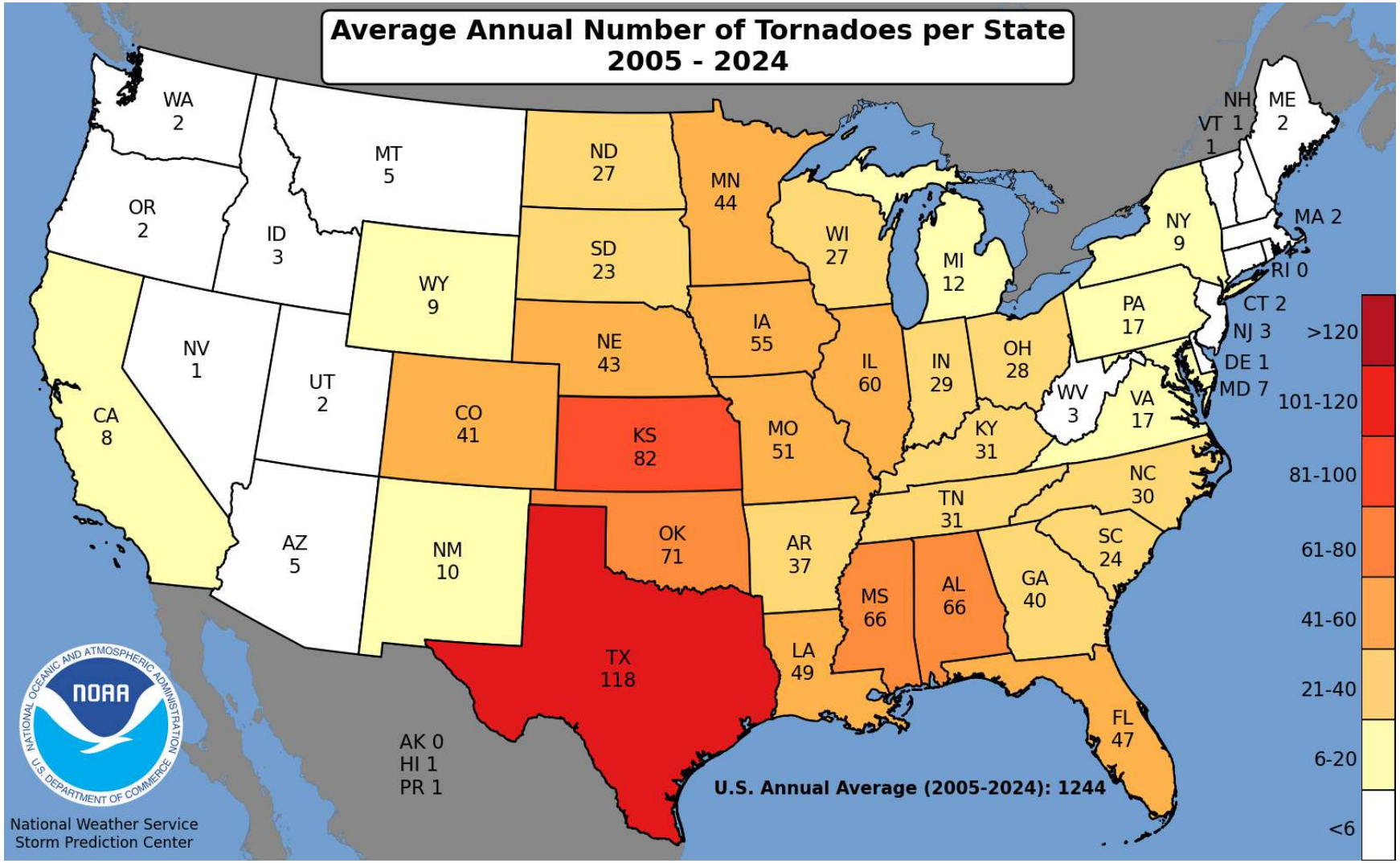
How Many Do We See?



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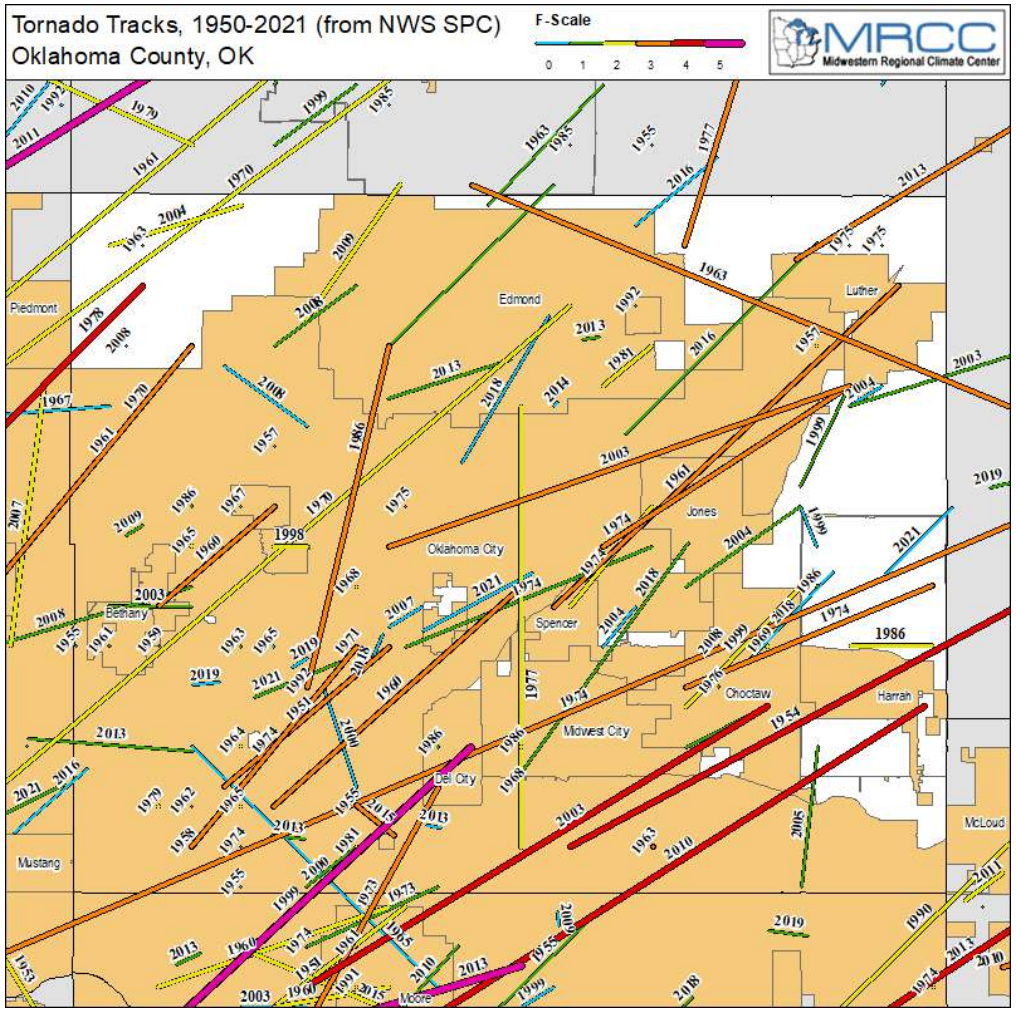
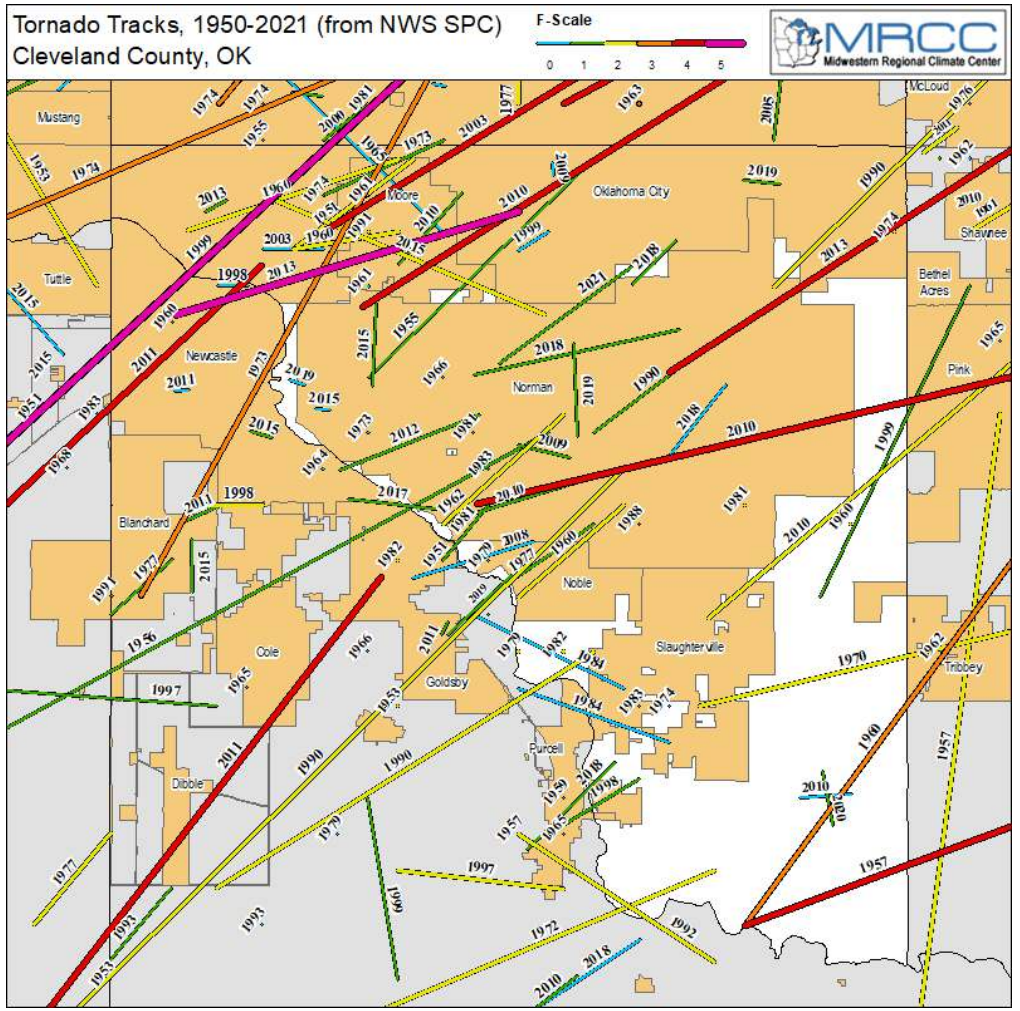
Tornado Paths - Is Moore Really a Magnet?





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Hail is Expensive!

- Fort Collins, CO (10 July 1979)
  - 40-minute hailstorm, 2,000 homes and 2500 automobiles severely damaged, 25 injuries, 1 fatality
- Wichita, KS (19 June 1992)
  - 10,000 homes damaged, $500M property damage & $100M crop damage
- Dallas & Fort Worth (5 May 1995)
  - "Mayfest Storm", $1.1B insured losses, $2B total
- St. Louis MO (10 April 2001)
  - Costliest hailstorm, $2B+ damage
- Vivian, SD (23 July 2010)
  - Largest hailstone, larger than a bowling ball & weighing nearly 2 pounds

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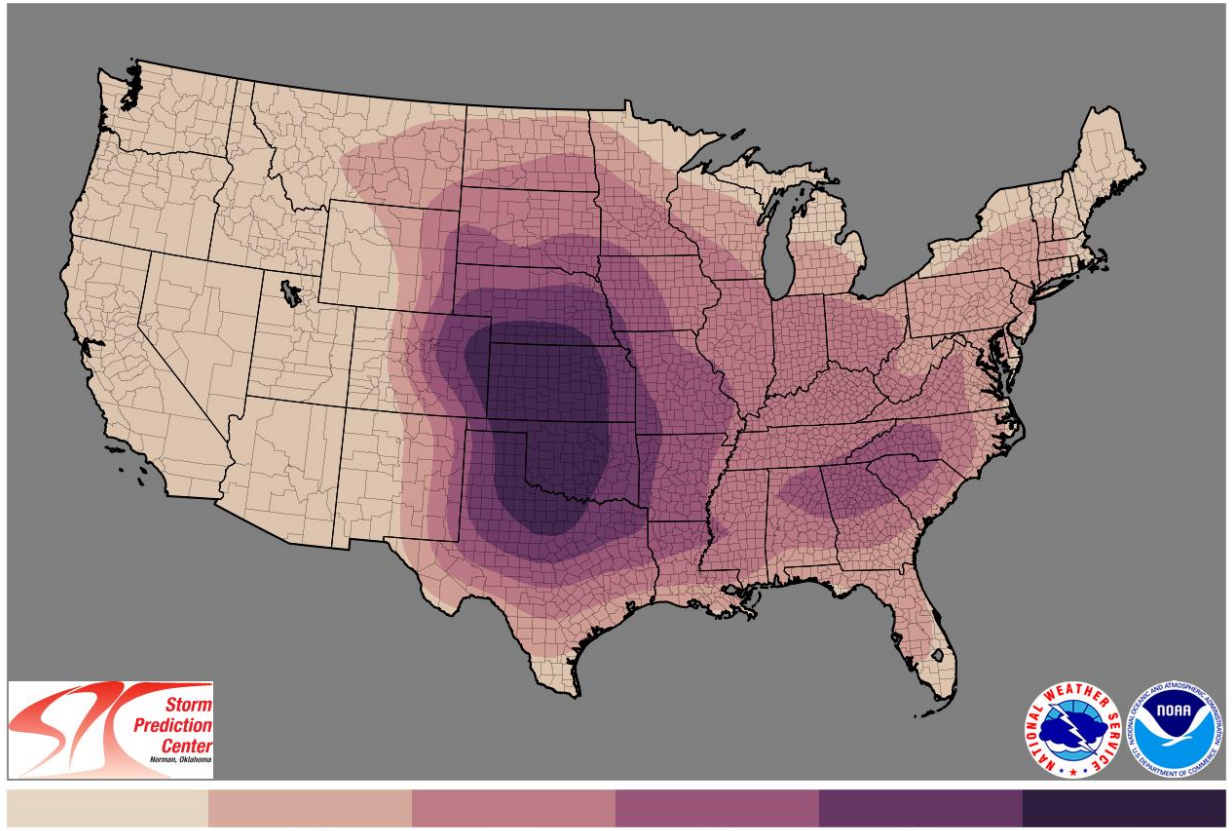
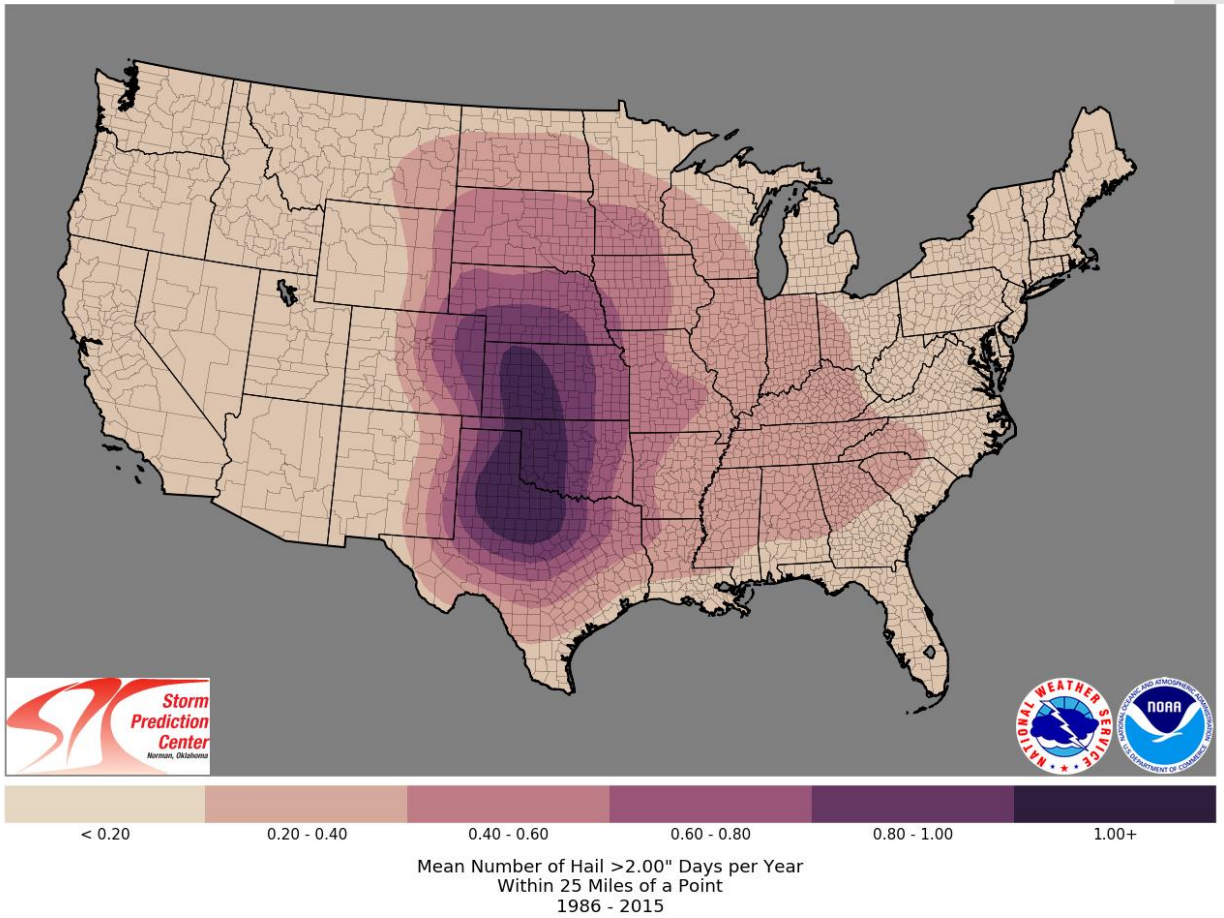


Days with hail over 1 inch in diameter

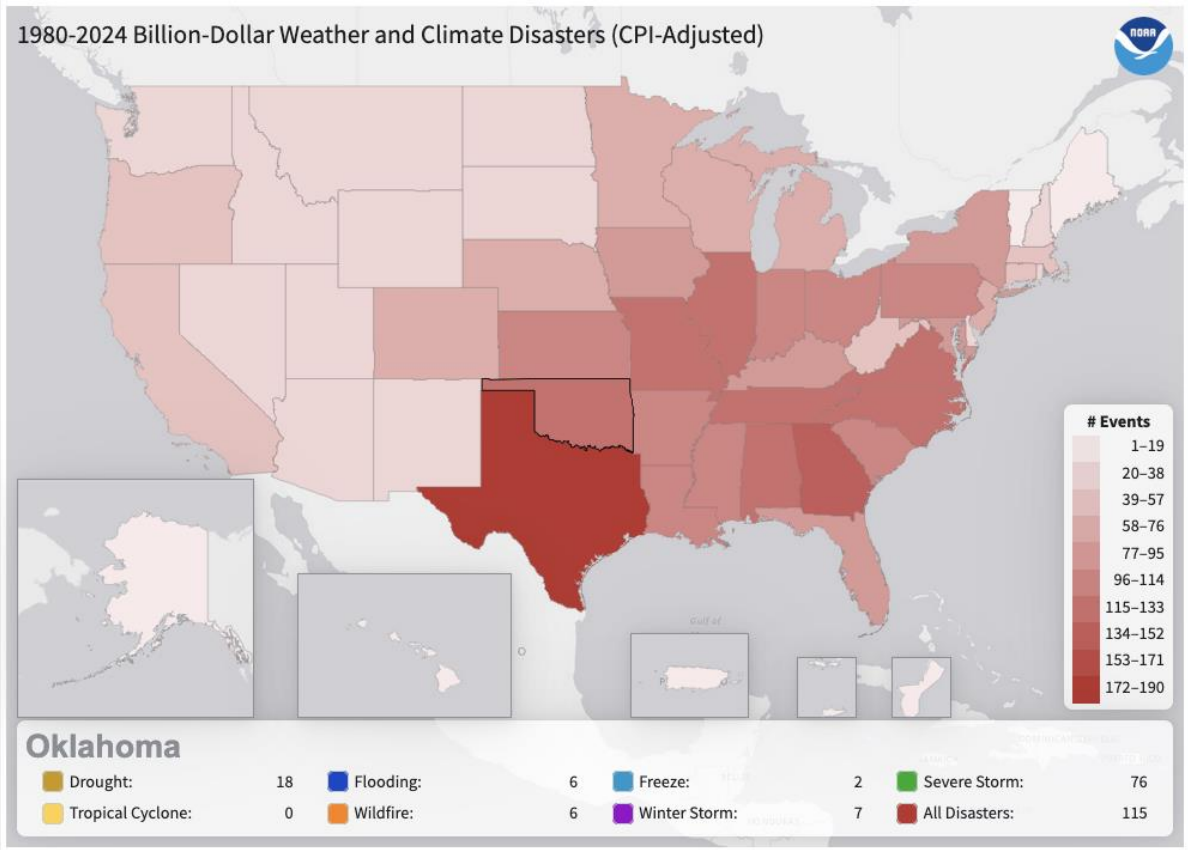
Days with hail over 2 inches in diameter



Billion-Dollar Disasters

- Oklahoma has experienced **115 billion-dollar disasters** since 1980.
- This resulted in **$20-50 billion** in **damages***.
- Climate-informed planning and action can **reduce impacts** and **increase resilience**.

*Values represent total disaster costs – disasters often span multiple states



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Severe Weather Drives OK Disaster Costs

Billion-dollar events to affect Oklahoma from 1980 to 2024 (CPI-Adjusted)

Disaster Type	Events	Events/Year	Percent Frequency	Total Costs	Percent of Total Costs
Drought	18	0.4	15.7%	$10.0B-$20.0B	29.6%
Flooding	6	0.1	5.2%	$2.0B-$5.0B	5.7%
Freeze	2	0.0	1.7%	$500M-$1.0B	1.4%
Severe Storm	76	1.7	66.1%	$20.0B-$50.0B	60.2%
Tropical Cyclone	--	--	--	--	--
Wildfire	6	0.1	5.2%	$250M-$500M	0.8%
Winter Storm	7	0.2	6.1%	$1.0B-$2.0B	2.3%
All Disasters	**115**	**2.6**	**100.0%**	**$20.0B-$50.0B**	**100.0%**

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What We Expect From What We've Seen…

- Much uncertainty remains in projecting short- and long-term trends.
- Despite this, there is some consensus on how damaging wind event and hail risk will evolve with time.
- It is likely that severe thunderstorm events will become more pronounced, which may pose a higher risk of damaging wind events and hail.
- Over the past 40 years, the number of tornadoes per event has increased, but is happening on fewer days per year.

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Thank you!

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