

Disaster Preparedness – Why now?

*2023 Kentucky Extension Disaster/Emergency
Preparation Training*

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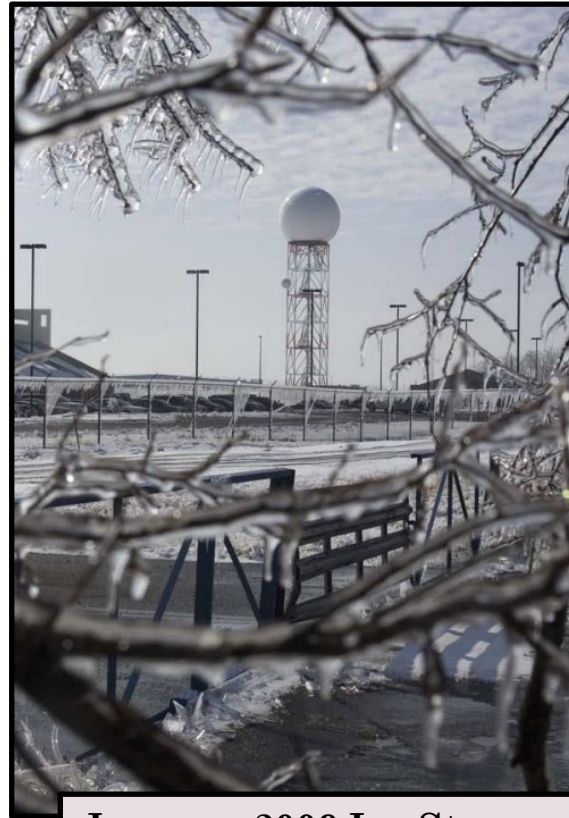
Disasters are not new to Kentucky

Doesn't matter the part of the state



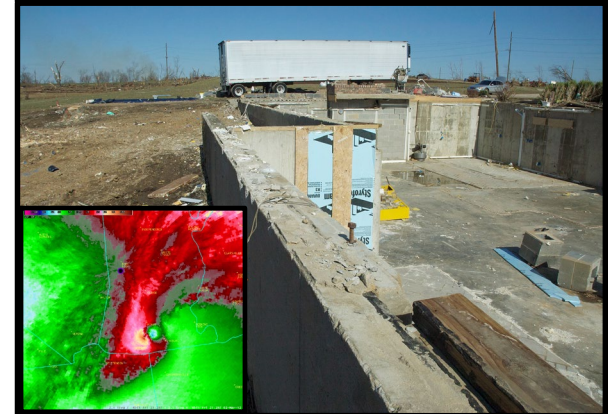
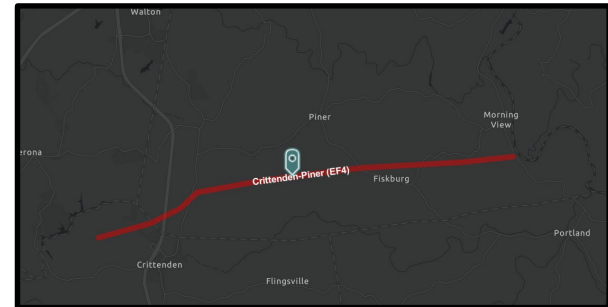
Great Flood of 1937

Image Courtesy/More info: *National Weather Service Louisville, KY*,
https://www.weather.gov/lmk/flood_37



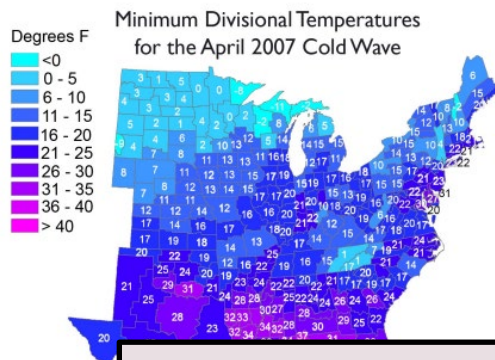
January 2009 Ice Storm

Image Courtesy/More info: *National Weather Service Paducah, KY*,
<https://www.weather.gov/media/pah/Top10Events/2009/Ice%20Storm%20Jan%2026-28%202009.pdf>



March 2, 2012 Tornado Outbreak – EF4 Tornado, peak winds of 175 mph

Image Courtesy/More info: *National Weather Service Wilmington, OH*,
<https://storymaps.arcgis.com/stories/5aa744562f7441f8a3c8caec34d75740>



Easter Freeze 2007

Image Courtesy/More info: *NOAA/USDA Technical Report: The Easter Freeze of April 2007, A Climatological Perspective and Assessment of Impacts and Services.*

December 10/11th EF4 Tornado:

Statistics, Rarity, and Environment



Image Courtesy/More info: National Weather Service, NWS Storm Damage Summaries: Dec. 10-11, 2021, Tornado Outbreak
 URL: <https://www.weather.gov/crh/dec112021>

Statistics and Rarity

Long-track EF4 tornado with estimated peak winds of 190 mph (170 mph in Princeton, KY). The tornado was on the ground for 165.7 miles, spanning a stretch from Fulton to Breckinridge Counties. Maximum width was measured at 1.13 miles. The 1925 “Tri-state” tornado still holds the record for longest track at 219 miles.

Courtesy: NWS Paducah KY, Dec 10-11, 2021, Tornado Event,
 URL: <https://www.weather.gov/pah/December-10th-11th-2021-Tornado>



Image Courtesy/More info: Ben Rudy, ANR Agent in Fulton County, KY

Image Courtesy/More info: Matt Barton, UK Agriculture Communications Photographer

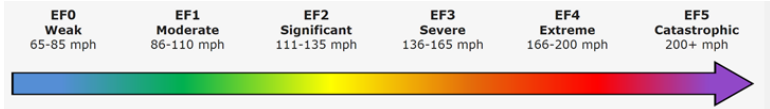


Image Courtesy/More info: NWS Paducah, KY, The Enhanced Fujita Scale, URL: <https://www.weather.gov/pah/December-10th-11th-2021-Tornado>

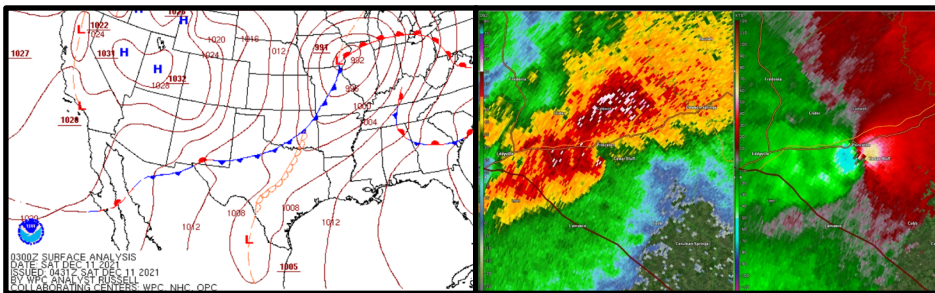
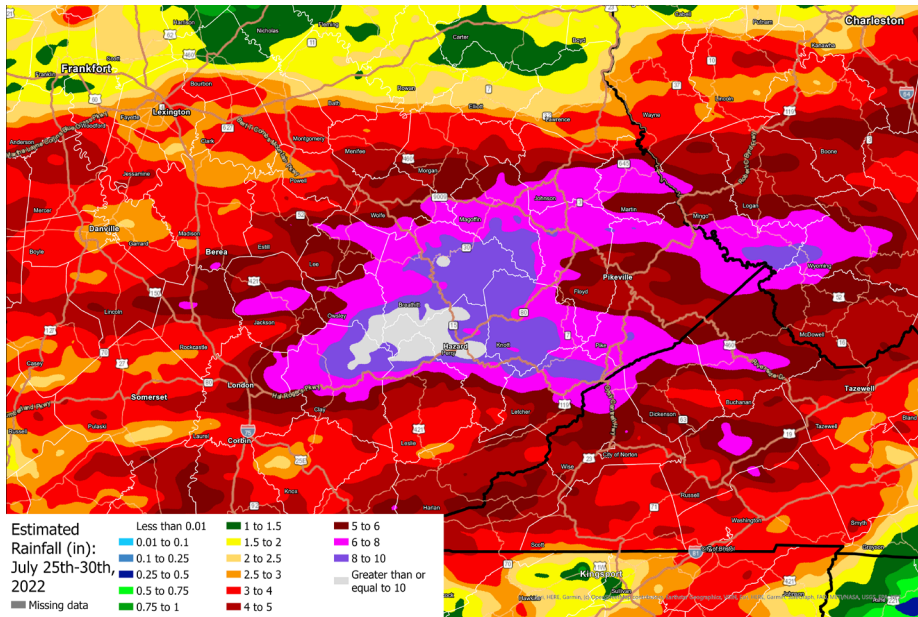


Image Courtesy/More info: (Left) WPC Surface Analysis Archive, Valid: 12/11/21 at 03 UTC, URL: https://www.wpc.ncep.noaa.gov/archives/web_pages/sfc/sfc_archive_maps.php
 (Right) NWS Paducah, KY, Radar Images at ~10:20PM, URL: <https://www.weather.gov/pah/December-10th-11th-2021-Tornado>

July Flooding - Eastern KY:

Statistics, Rarity, and Environment



Statistics and Rarity

This was a 1 in 1,000-year rain event (0.1% chance of happening in any given year) over a 5-day period, caused by a training of thunderstorms over the same area. Tropical, moist air was advected north in Kentucky where a frontal boundary was seemingly stationary across the area. A highly unstable and very moist atmosphere led to storms capable of torrential downpours. Upper-level winds steer surface systems, and, in this case, these winds were running parallel to the front.

Rainfall rates of 4 inches/hour

13 flash flood warnings issued that night, 3 upgraded to a flash flood emergency

Highest total was 14.00 inches from southern Knott County.

North Fork of the Kentucky River at Jackson set a new record crest at 43.47 feet.

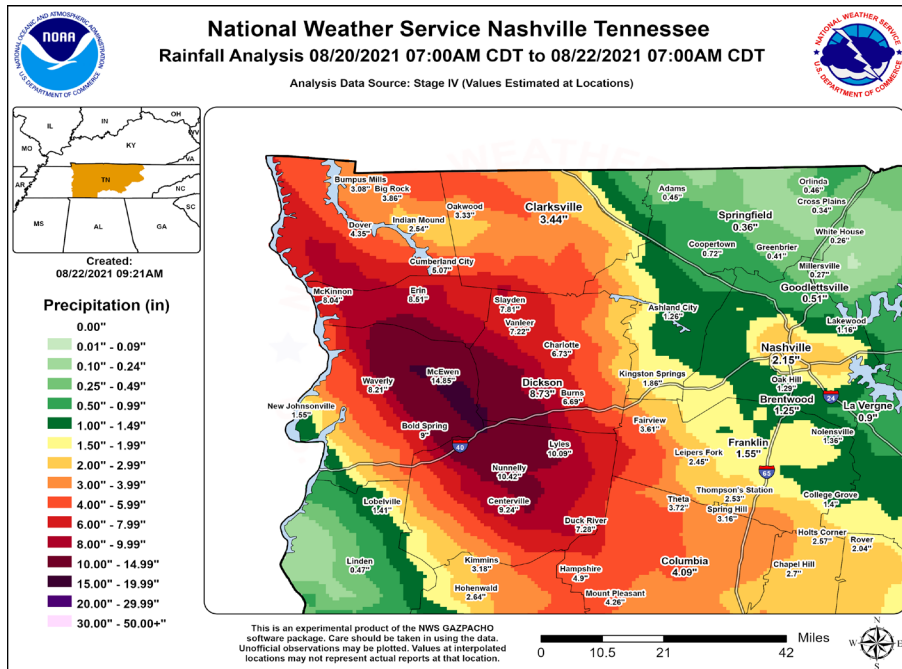
This amount of rainfall could overwhelm any location across KY.



Images & Statistics Courtesy/More info: Historic July 26th – July 30th, 2022 Eastern Kentucky Flooding, URL: <https://www.weather.gov/jkl/July2022Flooding>

N. Central TN Flooding of 2021

Statistics, Rarity, and Environment



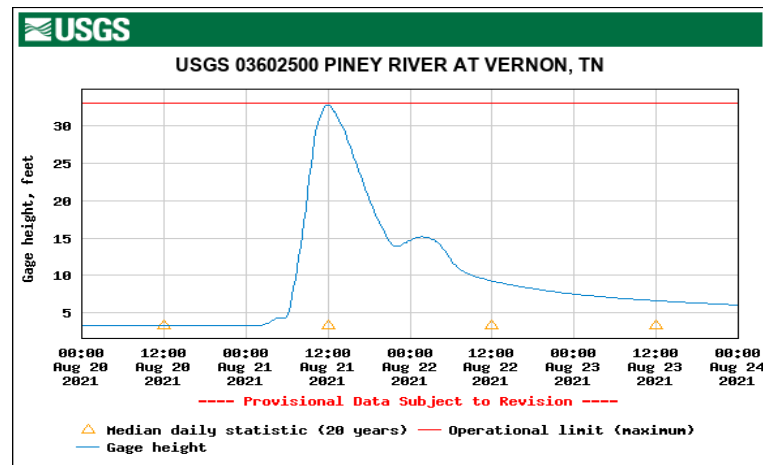
Statistics and Rarity

New state 24-hour rainfall record with 20.73 inches in McEwen, Tennessee, which is the highest total for any non-coastal state in the United States

Rainfall rates of 3-4.5 inches per hour for three hours straight

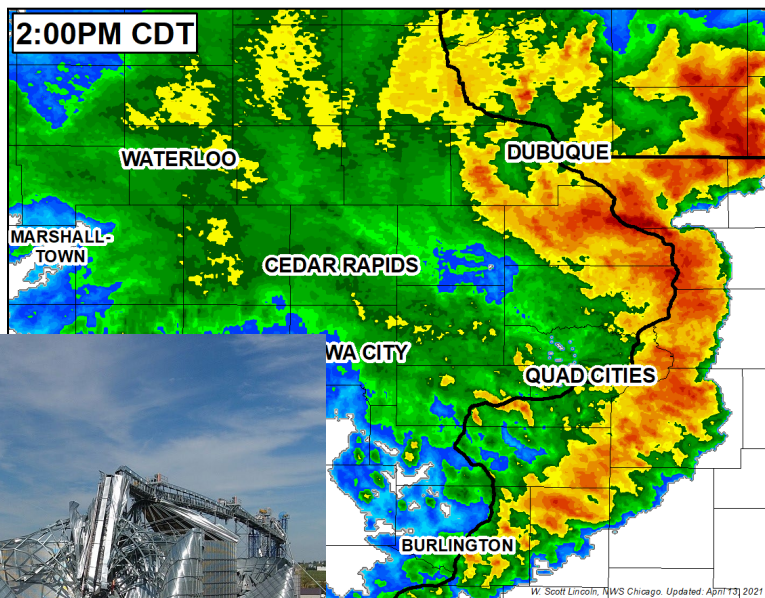
Deadliest 24-hour flash flooding event in Middle Tennessee with 20 fatalities

USGS at the Piney River gauge site reached nearly 33 feet, 5 feet over the record crest in 2010 and 9 feet above major flood stage



August 10, 2021 Derecho

Statistics, Rarity, and Environment



Statistics and Rarity

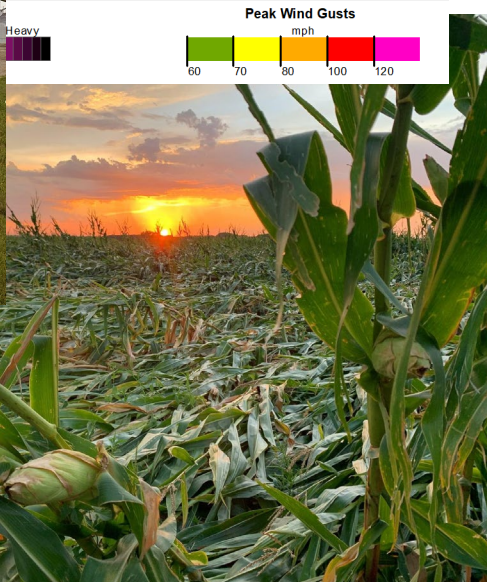
Severe wind damage across 8 states from South Dakota to Ohio

Estimates of 11 billion dollars in damage - costliest severe thunderstorm event in U.S. history

Winds gusts of 70 to 80 mph over a large portion of Iowa and Central Illinois. Some over 100 mph. The strongest wind speeds were measured near Cedar Rapids with gusts at roughly 140 mph.

Area of damage comprised 90,000 square miles

Images & Statistics Courtesy/More info: August 10, 2020 Midwest Derecho, NOAA National Weather Service, URL: <https://storymaps.arcgis.com/stories/f98352e2153b4865b99ba53b86021b65>



December 2022 Arctic Blast

Sub-zero temps, Wind chills < -20

Winter Storm/Wind Chill Headlines

December 22, 2022
12:51 PM

Valid This Evening through Friday Afternoon

Headline Details

- Wind Chill Warning and Winter Weather Advisory for light snow accumulations and dangerous wind chills Tonight and Friday.
- Plan on slippery road conditions. The hazardous conditions will impact the morning commute.

Quick Forecast

- Total snow accumulations of 1 to 4 inches with locally higher amounts possible.
- Wind gusts as high as 40-45 mph
- Wind chills as low as 25 to 30 degrees below zero late tonight and Friday morning





National Oceanic and Atmospheric Administration
U.S. Department of Commerce



National Weather Service
Louisville, KY

Past 10 months

July 19, 2023 Western KY Flooding

Mayfield, KY - 11.28" in 24-hours broke the state record

March 3, 2023 Windstorm

All-time low-pressure records, 4th billion-dollar disaster in past two years

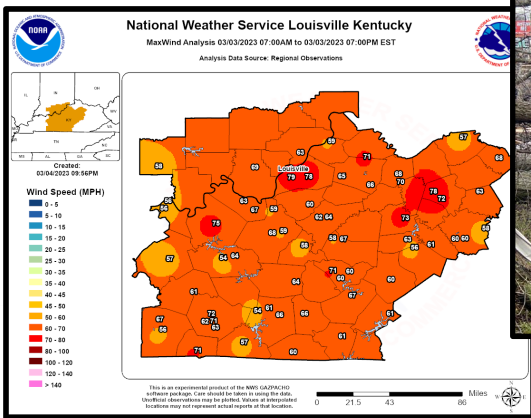








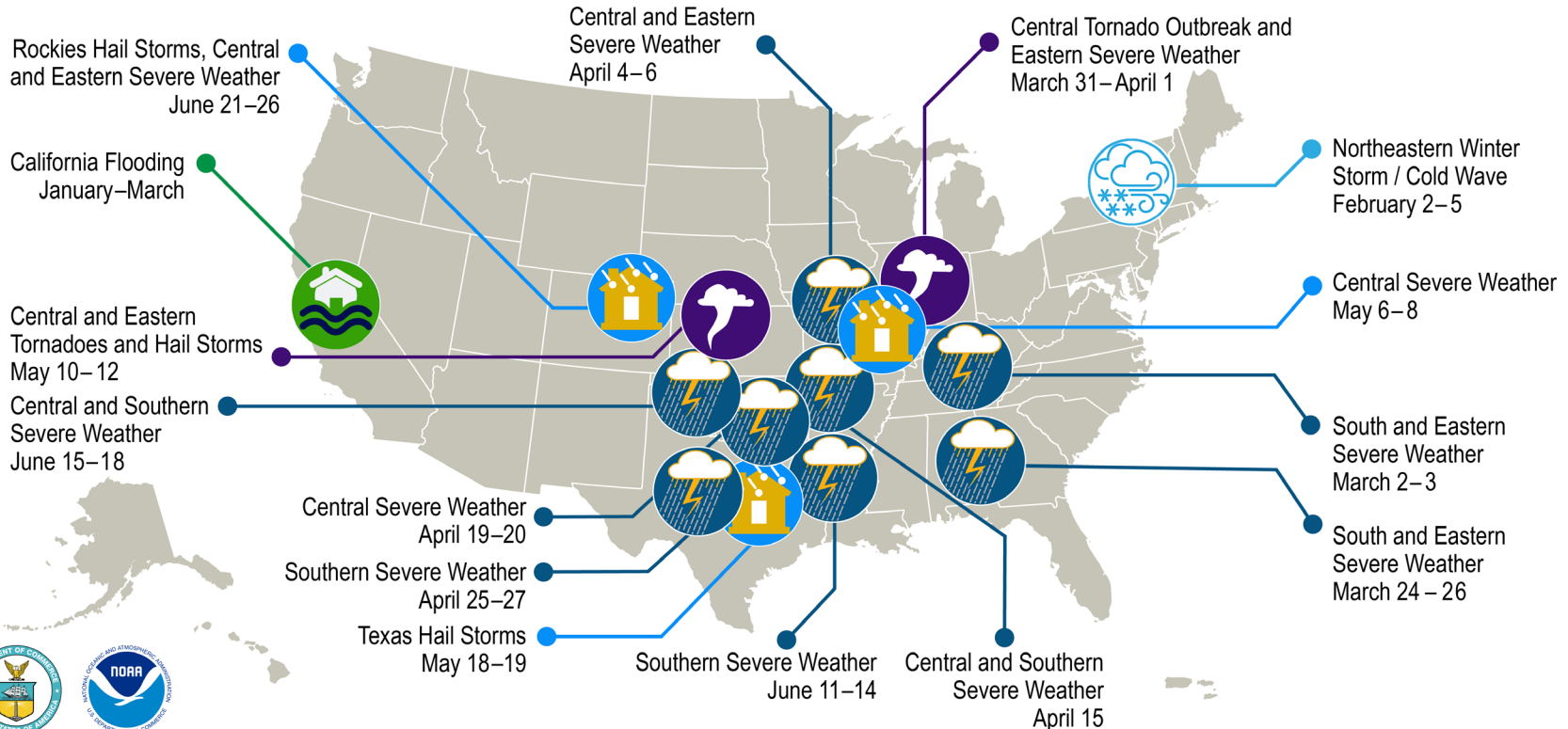


Image Courtesy: Ryan D. Ridenbaugh,
Charles Avenue in Lexington, URL:
<https://www.weather.gov/lmk/2023-03-04-KentuckyandSouthernIndiana-HighWinds>

Billion Dollar Weather & Climate Disasters across the U.S.:

U.S. 2023 Billion-Dollar Weather and Climate Disasters

-  Drought/Heat Wave
-  Flooding
-  Hail
-  Hurricane
-  Severe Weather
-  Tornado Outbreak
-  Wildfire
-  Winter Storm/Cold Wave



This map denotes the approximate location for each of the 15 separate billion-dollar weather and climate disasters that impacted the United States through July 2023.

Images Courtesy/More info: NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2023). <https://www.ncei.noaa.gov/access/billions/>

Billion Dollar Weather & Climate Disasters in Kentucky:

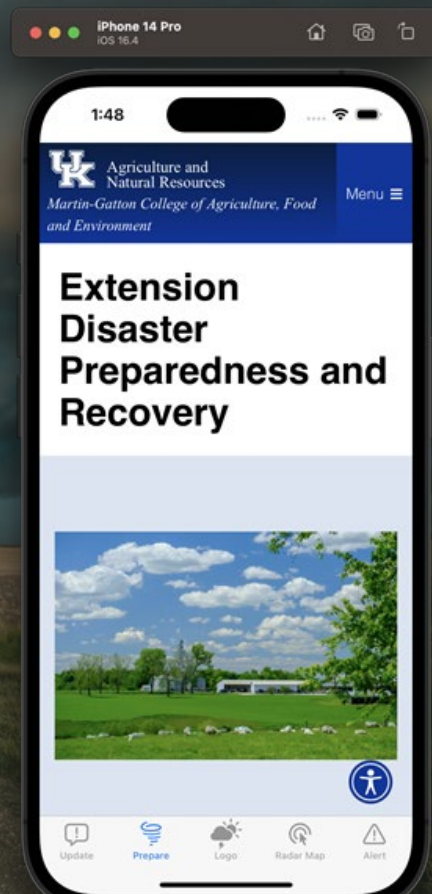
Select Time Period Comparisons of Kentucky Billion-Dollar Disaster Statistics (CPI-Adjusted)

Time Period	Billion-Dollar Disasters	Events/Year	Cost	Percent of Total Cost
1980s (1980-1989)	9	0.9	\$2.0B-\$5.0B	17.3%
1990s (1990-1999)	11	1.1	\$1.0B-\$2.0B	7.2%
2000s (2000-2009)	21	2.1	\$5.0B-\$10.0B	22.6%
2010s (2010-2019)	24	2.4	\$5.0B-\$10.0B	24.9%
Last 5 Years (2018-2022)	15	3.0	\$5.0B-\$10.0B	18.9%
Last 3 Years (2020-2022)	13	4.3	\$2.0B-\$5.0B	17.7%
Last Year (2022)	5	5.0	\$1.0B-\$2.0B	4.6%
All Years (1980-2023)*	84	1.9	\$20.0B-\$50.0B	100.0%

Images Courtesy/More info: NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2022). <https://www.ncei.noaa.gov/access/billions/>, DOI: [10.25921/stkw-7w73](https://doi.org/10.25921/stkw-7w73)

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Ag Weather Update

