



# **Spatial Hazard Events and Losses Database for the United States (SHELDUS™)**



**Melanie Gall**  
Center for Emergency Management & Homeland Security

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# What's in this presentation

- **What's in SHELDUS™**
- **Data sources and geography**
- **Data management**
- **Access and web interface**

# What's in SHELDUS™?

Natural hazards only

Time period: 1960-present

Loss categories

**Direct property damage**

**Direct crop damage**

**Direct injuries**

**Direct fatalities**

**Crop indemnities (1989-present)**

Avalanche	Hail	Tornado
Coastal	Heat	Tsunami/ Seiche
Drought	Hurricane/TS	Volcano
Earthquake	Landslide	Wildfire
Flooding	Lightning	Wind
Fog	Severe Thunderstorm	Winter Weather

# Data Sources and Geography



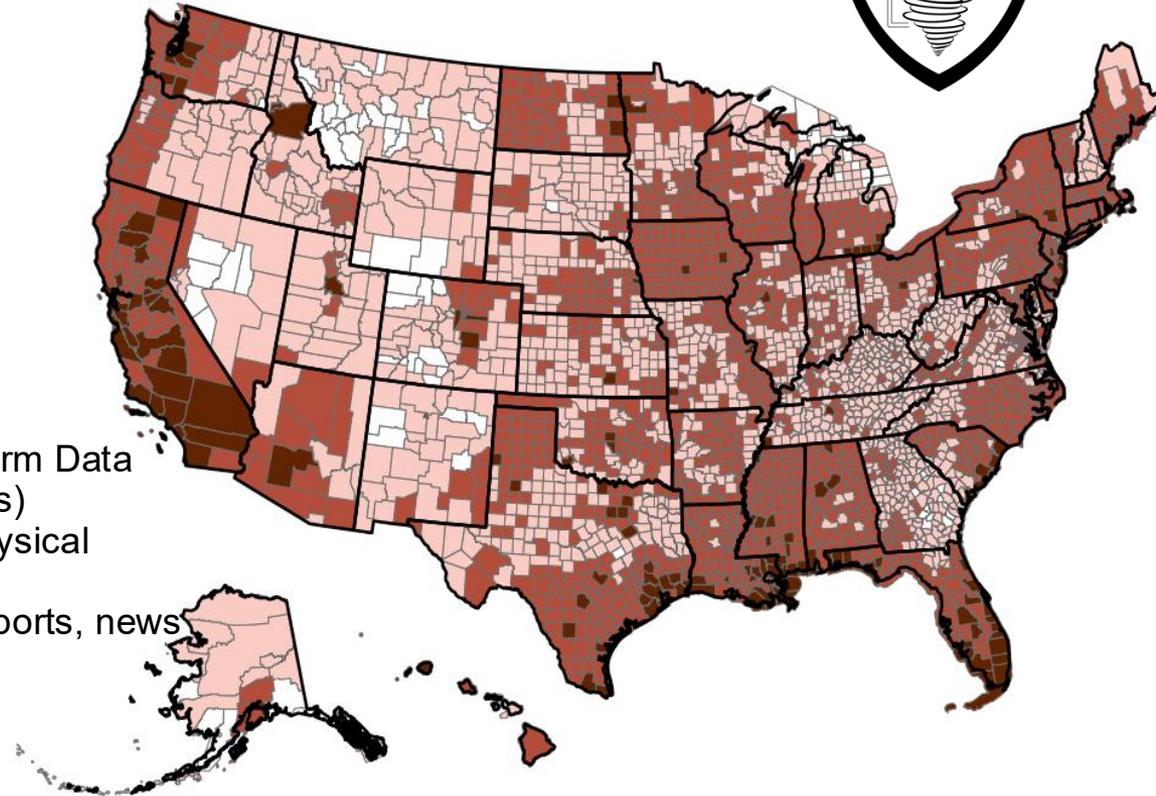
## Geography

State  
Counties  
U.S. territories (2000-present)

## Data Sources

National Weather Service's Storm Data  
(hydro-meteorological events)  
U.S. Geological Survey (geophysical  
events)  
Landslide estimates utilizing reports, news  
media, etc.

See SHELDUS™ [Metadata](#)



Under \$10 Million  
Between \$10 and \$100 Million

Between \$100 Million and \$1 Billion  
More than \$1 Billion

# Legacy Versions of SHELDUS™

	Direct Records	Insured Records	Fatalities	Direct Losses (at time of release)
Version 23	981,528	3,166,955	38,789	\$1.373 Trillion
Version 22	964,875	2,968,726	37,842	\$1.274 Trillion
Version 21	955,161	2,869,191	37,058	\$1.208 Trillion
Version 20	938,779	2,787,409	35,731	\$1.161 Trillion
...				
Version 12	809,990	n/a	31,060	\$778 Billion

# Data Management

## Measurement at county-level

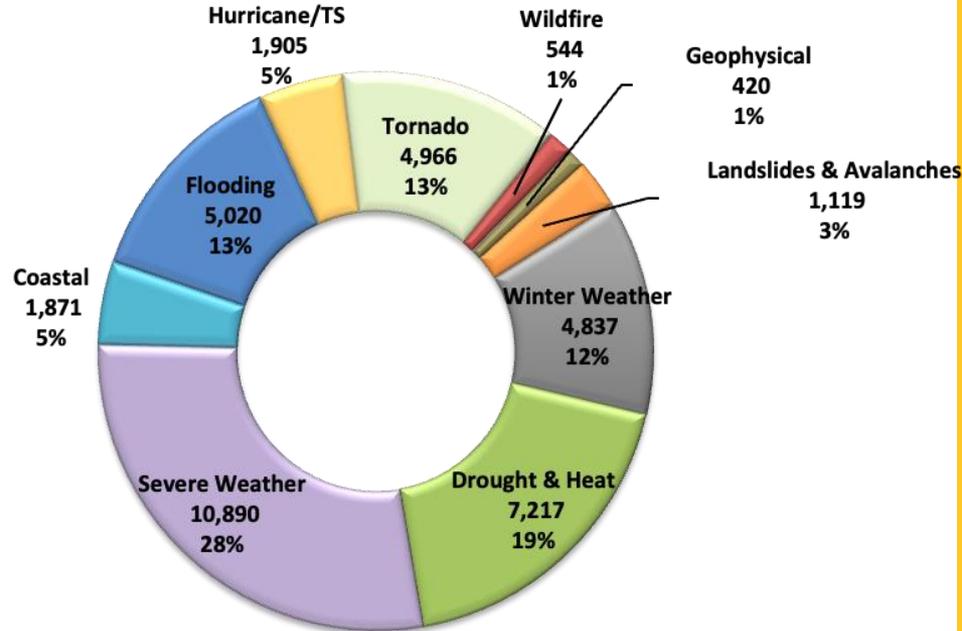
- Georeferencing of losses to individual counties
- Incorporation of census geography changes
- Translation of weather forecast zones to counties
- Georeferencing of fatalities and injuries

## Loss Adjustments

- Equal distribution of multi-county and/or multi-hazard losses
- Inflation and population adjustments  
(loss divided by county population of that year → choose your ratio multiplier)
- Calculation of “Duration Days”

## Event Association

- Major events (e.g., Hurricane Maria)  
(similar to Billion Dollar Events)
- Presidential Disaster Declaration #
- GLIDE (Global Identifier Number)



## Fatalities

# SHELDUS™ Access

Web-based access  
email verification required

Instant query access  
data download requires  
subscription or pay-as-you-go

All drought, Arizona, and South  
Carolina data are free

Annual updates  
Subscriptions expire with new version release

[Data sharing and data use restrictions](#) (see EULA)

ASU  
Arizona State  
University

SHELDUS

Welcome to SHELDUS™

Email

Email is required

Password

LOG IN

FORGOT PASSWORD?

CREATE A NEW ACCOUNT

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# Query Options

Location and date

Disaster identifiers  
(PDD, etc.)

Hazard/peril

ASU Arizona State University SHELDUS™

Home  
Query  
Saved Queries  
Orders  
Subscriptions  
Metadata  
FAQ  
Contact Us  
Users  
Admins  
Organizations  
Affiliations  
Subscription Plans

## Query

Select the filters to query SHELDUS database

RESET FILTERS

Search By *i*  
Location and Dates

States *i*

Hazards/Perils *i*  
All Hazards & Perils

From Date *i* To Date *i*  
01/01/1960 12/31/2023

Loss Types *i*

981,528  
NCDC Records

3,166,955  
USDA Loss Records

# Query Options

## Search functionalities

Location and date

Disaster identifiers (PDD, etc.)

Hazard/peril

## Disaster Identifiers

**Named Events** using an event's name  
(e.g., Hurricane Maria)  
(similar to Billion Dollar's events)

**PDD** (using Presidential Disaster Declaration numbers)

**GLIDE** (Global Identifier Number)

### Query

Select the filters to query SHELDUS database

≡ RESET FILTERS

Search By ⓘ

Presidential Disaster Declaration (PDD)

PDDs ⓘ

FILTERS

<input type="checkbox"/>	DECL No.	Incident	DECL Date
<input type="checkbox"/>	5530	Fire	2024-08-12
<input type="checkbox"/>	5529	Fire	2024-08-09
<input type="checkbox"/>	5528	Fire	2024-08-06
<input type="checkbox"/>	5527	Fire	2024-08-02

Search By ⓘ

Named Events

Events ⓘ

FILTERS

<input type="checkbox"/>	Event Code	Name	Year
<input type="checkbox"/>	1967-000001	Blizzard 1967	1967
<input type="checkbox"/>	1993-000001	Blizzard 1993 Storm of the Century	1993
<input type="checkbox"/>	2011-000001	Blizzard 2011 Groundhog Day	2011
<input type="checkbox"/>	1996-000002	Blizzard/Flooding 1996	1996
<input type="checkbox"/>	2022-000008	Derecho 2022 Central	2022

Glides ⓘ

FILTERS

<input type="checkbox"/>	Glide	Start Date	End Date
<input type="checkbox"/>	FL-2023-000288-USA	2023-12-16	2023-12-22
<input type="checkbox"/>	ST-2023-000273-USA	2023-09-23	2023-09-26

# Output Formats

file formats (.csv)

Unaggregated ('raw') (w/begin and end dates, location, verbatim hazard description, etc.)  
not part of a subscription

Aggregated summary data  
(e.g., month, year, county, state, hazard, etc.)  
accessible w/subscription

Query #25684

 EDIT FILTERS

 SAVE QUERY

Aggregated   
Query Type

11  
Total Output Records

646  
Selected Raw Records

1  
File

Search By Location and Dates

Adjustment Year 2023

States COLORADO

Counties All

Date Range 2020-01-01 to 2023-12-31

Hazards & Perils All

Loss Types Fatalities, Injuries, Property Losses, Crop Losses

Aggregate By Hazard

# Data Download: Aggregated

Hazard	PropertyDmg	PropertyDmg(ADJ 2023)	PerCapita	Property_Dam age_Duration	Duration_ Days	Records
Avalanche	\$ -	\$ -	\$ -	0	1	89
Flooding	\$ 6,612,070.00	\$ 6,958,914.10	\$ 146.96	7	7	167
Hail	\$ 65,000.00	\$ 71,216.35	\$ 11.30	1	1	13
Heat	\$ -	\$ -	\$ -	0	1	2
Landslide	\$ 157,665,500.00	\$ 180,009,792.68	\$ 3,085.62	2	2	83
Lightning	\$ 25,000.00	\$ 25,000.00	\$ 0.04	1	1	5
Severe Storm	\$ 972,020.00	\$ 1,095,496.51	\$ 147.76	1	1	39
Tornado	\$ 2,100,500.00	\$ 2,179,924.55	\$ 132.31	1	1	7
Wildfire	\$ 336,561,000.20	\$ 380,584,305.30	\$ 14,544.88	31	31	209
Wind	\$ 1,214,020.01	\$ 1,365,958.56	\$ 164.75	1	3	60
Winter Weath	\$ 67,500.00	\$ 76,894.36	\$ 8.79	2	3	16

Finest aggregation level:  
by month, county AND hazard

# Data Download

Download (zip file) includes  
data (.csv)  
1 or 2 files (direct, crop indemnities)  
SHELDUS data documentation

Unaggregated ('raw') (w/begin and  
end dates, location, verbatim  
hazard description, etc.)  
not part of a subscription

Aggregated summary data  
(e.g., month, year, county, state,  
hazard, etc.)  
accessible w/subscription

Query #25683 EDIT FILTERS SAVE QUERY

Raw <sup>1</sup>  
Query Type

10838  
Total Output Records

10838  
Selected Raw Records

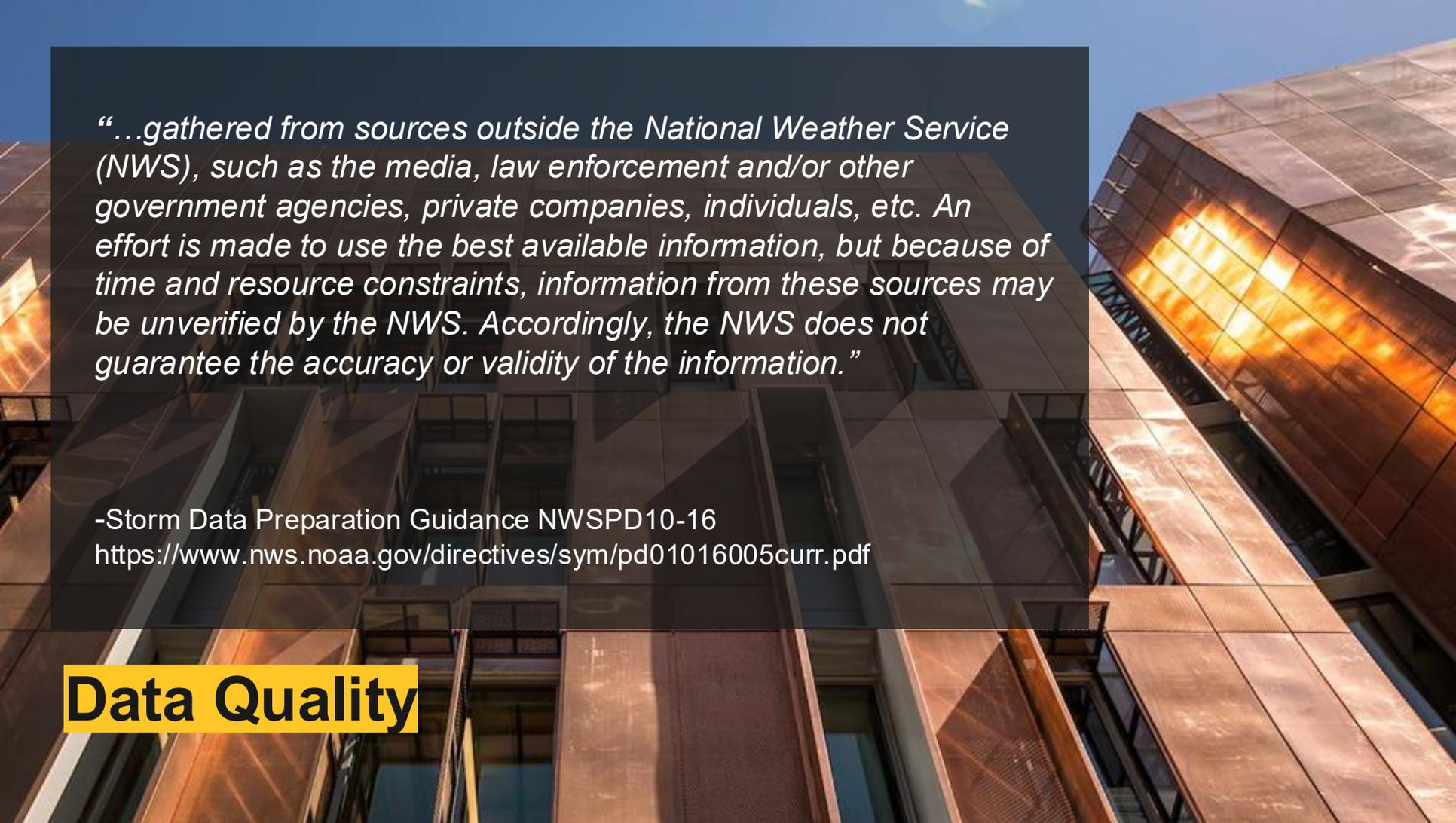
2  
Files

Search By	Location and Dates
Adjustment Year	2023
States	COLORADO
Counties	All
Date Range	2020-01-01 to 2023-12-31
Hazards & Perils	All
Loss Types	Fatalities, Injuries, Property Losses, Crop Losses, Insured Crop Losses

# Data Download: Unaggregated (Raw)

CountyName	Hazard	StartDate	EndDate	Duration Days	Location	County_FIPS	Remarks	PropertyDmg	PropertyDmg(ADJ)	PropertyDmgPerCapita	PropertyDmgDuration
Adams	Wind, Winter Weather	12/21/22	12/23/22	3		08001	NCDC_Cold/Wind Chill	\$ -	\$ -	\$ -	0
Adams	Flooding	5/11/23	5/12/23	1	7 - N - NORTH	08001	Flood	\$ 1,000,000.00	\$ 1,000,000.00	\$ 1.87	1
Adams	Flooding	6/29/23	6/29/23	1	1 - SSE - DENV	08001	Flash Flood	\$ 50,000.00	\$ 50,000.00	\$ 0.09	1
Arapahoe	Flooding	8/15/22	8/15/22	1		08005	NCDC_Flash Flood	\$ 10,000.00	\$ 10,641.01	\$ 0.02	1
Arapahoe	Wind, Winter Weather	12/21/22	12/23/22	3		08005	NCDC_Cold/Wind Chill	\$ -	\$ -	\$ -	0
Arapahoe	Flooding	5/12/23	5/13/23	2	4 - NNW - PAR	08005	Flood	\$ 50,000.00	\$ 50,000.00	\$ 0.08	2
Arapahoe	Flooding	6/21/23	6/22/23	1	3 - NNE - AUR	08005	Flash Flood	\$ 50,000.00	\$ 50,000.00	\$ 0.08	1
Arapahoe	Flooding	6/21/23	6/22/23	1	8 - NE - ARAPA	08005	Flash Flood	\$ 50,000.00	\$ 50,000.00	\$ 0.08	1

Unique to Unaggregated Data:  
 Start and end date  
 Location  
 Remarks



*“...gathered from sources outside the National Weather Service (NWS), such as the media, law enforcement and/or other government agencies, private companies, individuals, etc. An effort is made to use the best available information, but because of time and resource constraints, information from these sources may be unverified by the NWS. Accordingly, the NWS does not guarantee the accuracy or validity of the information.”*

-Storm Data Preparation Guidance NWSPD10-16  
<https://www.nws.noaa.gov/directives/sym/pd01016005curr.pdf>

**Data Quality**

# Difference between SHELDUS™ and NWS Storm Events Database

	SHELDUS	Storm Events
Hazard Coverage	Geological, hydrological, and meteorological hazards	Hydrological and meteorological hazards
Temporal Coverage	1960 – present: all hazards	1996 – present: all hydro-meteo hazards 1960 – 1996 : only severe storm events
Type of Events	Only loss events	Loss and zero loss events
Contextualization	Association with major event, GLIDE, PDD	
Geography	Counties and resolved forecast zones	Counties and forecast zones
Distribution of losses	Yes	No
Loss adjustments	Yes	No
Output format	csv	csv
Availability	Partially free	Free

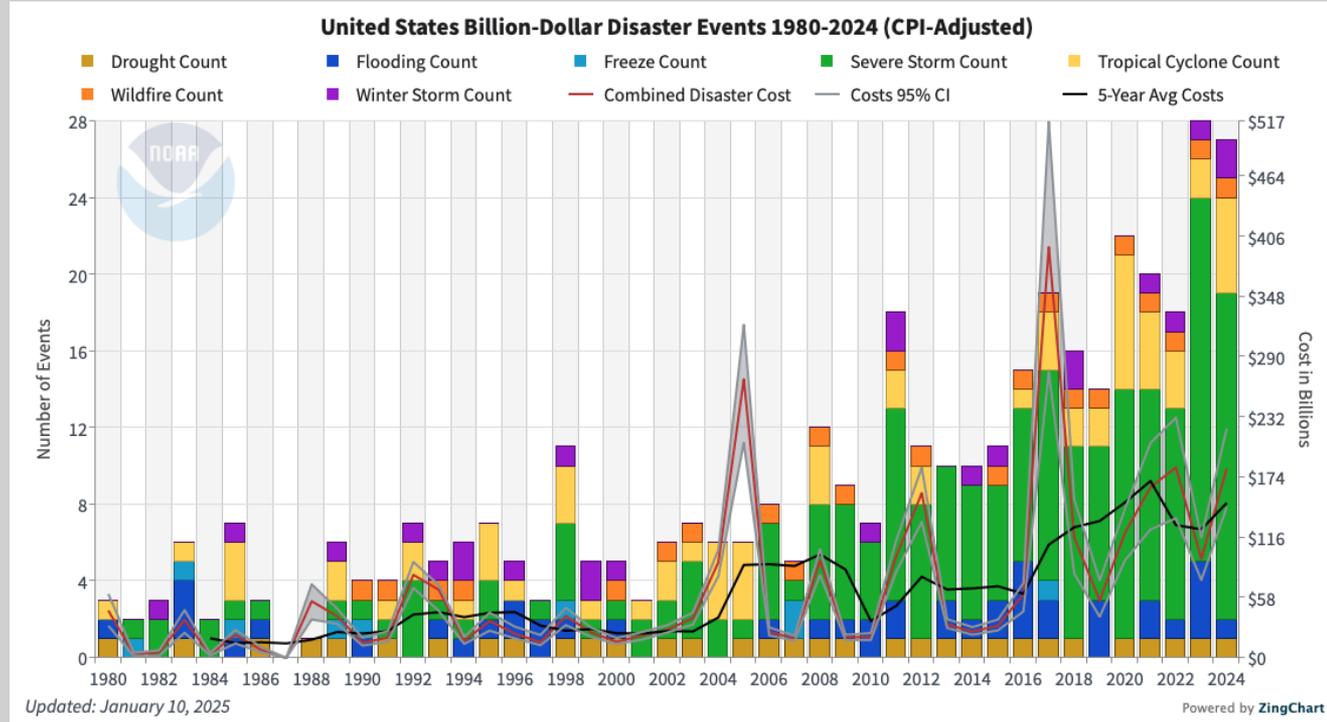
# Difference between SHELDUS™ and Billion-Dollar Disasters

## SHELDUS™ (and NWS Storm Events)

Direct Losses

## Billion Dollar Disasters

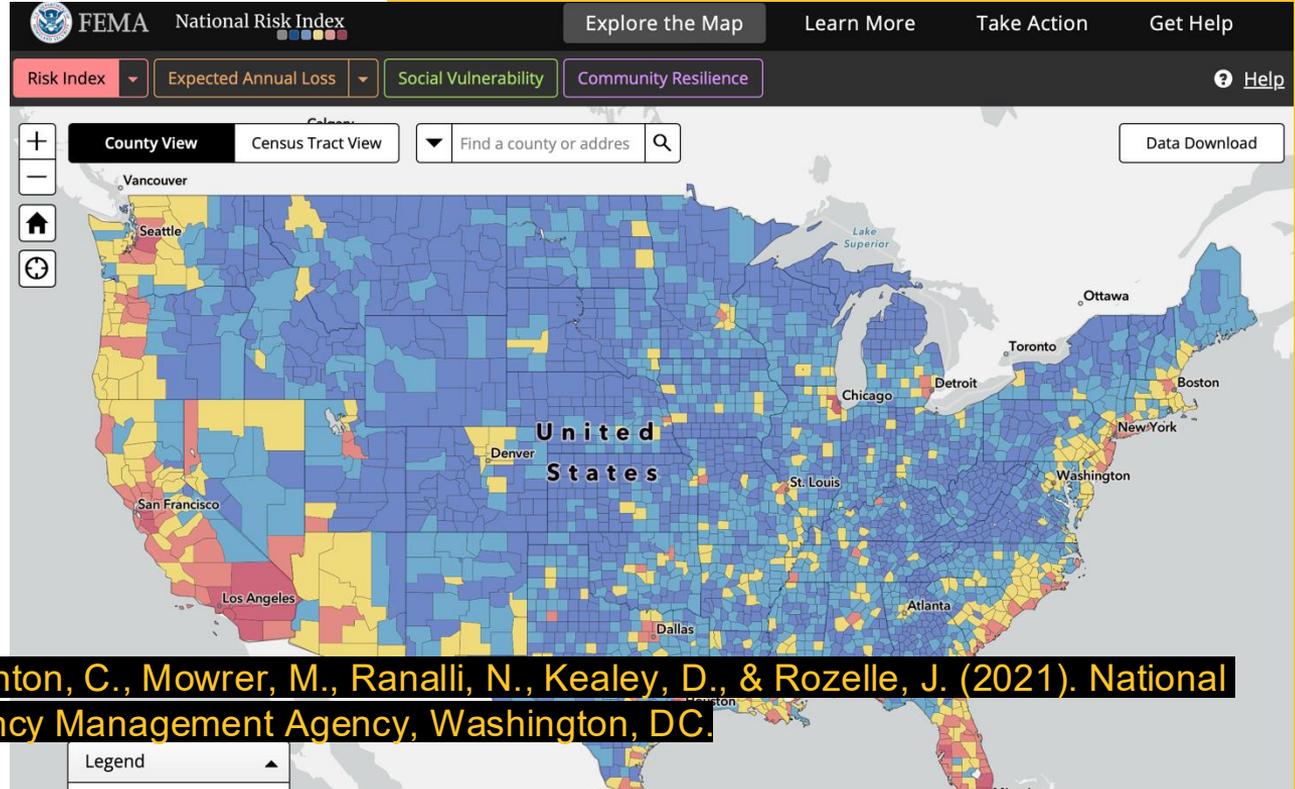
Insured and modeled losses  
(proprietary data from Verisk/Property Claim Services)



# National Risk Index

<https://hazards.fema.gov/nri/>

Community  
Development  
Resilience Zones  
Act (2022) P.L.  
117-255



Zuzak, C., Goodenough, E., Stanton, C., Mowrer, M., Ranalli, N., Kealey, D., & Rozelle, J. (2021). National Risk Index. US Federal Emergency Management Agency, Washington, DC.

Zuzak, C., Mowrer, M., Goodenough, E., Burns, J., Ranalli, N., & Rozelle, J. (2022). The national risk index: establishing a nationwide baseline for natural hazard risk in the US. *Natural Hazards*, 114(2), 2331-2355.

# Coming in SHELDUS 24

**Updates and  
Corrections to years  
prior**

**Data for 2024**

Including U.S. territories

**API**

Free access to  
most recent SHELDUS year  
and all freely available data

Melanie Gall  
Co-Director, Assistant Professor  
Center for Emergency Management and  
Homeland Security (CEMHS)  
Arizona State University  
[melanie.gall@asu.edu](mailto:melanie.gall@asu.edu)

[sheldus.org](http://sheldus.org)  
[cemhs.asu.edu](http://cemhs.asu.edu)



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The ASU logo, consisting of the letters "ASU" in a bold, white, sans-serif font. The letter "A" is stylized with a sunburst or gear-like pattern inside it.