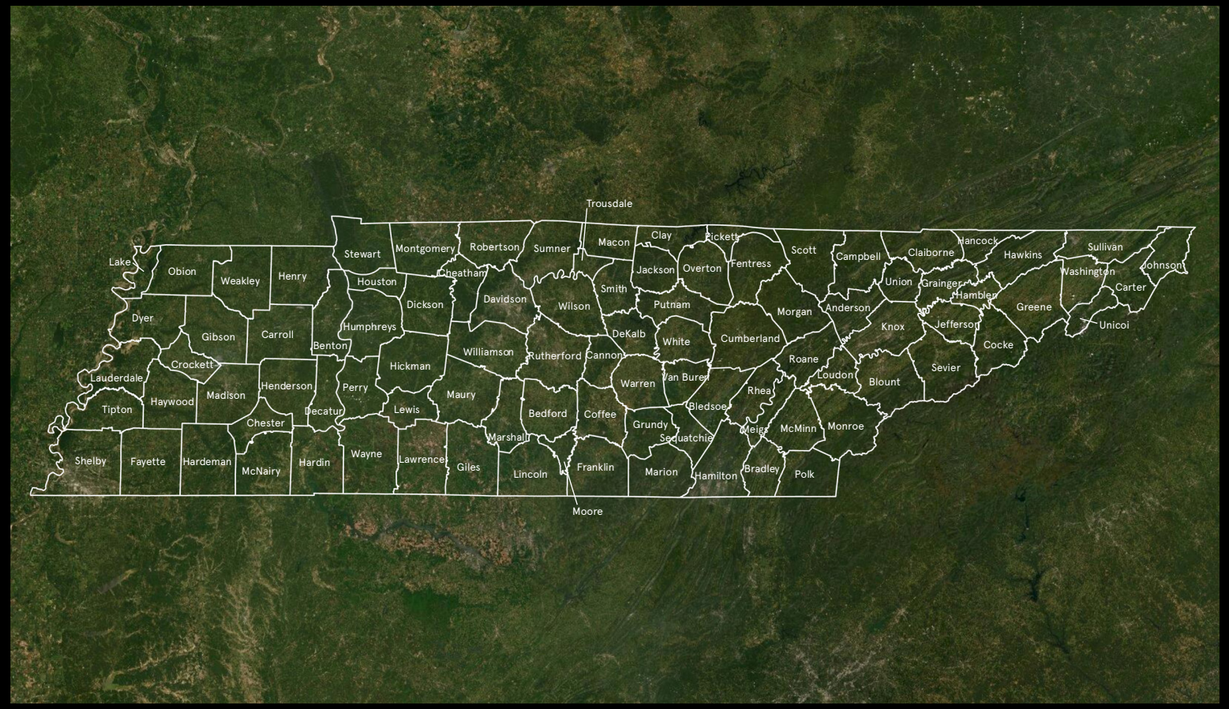
TENNESSEE



TENNESSEE STATISTICS SUMMARY (2011 – 2024)

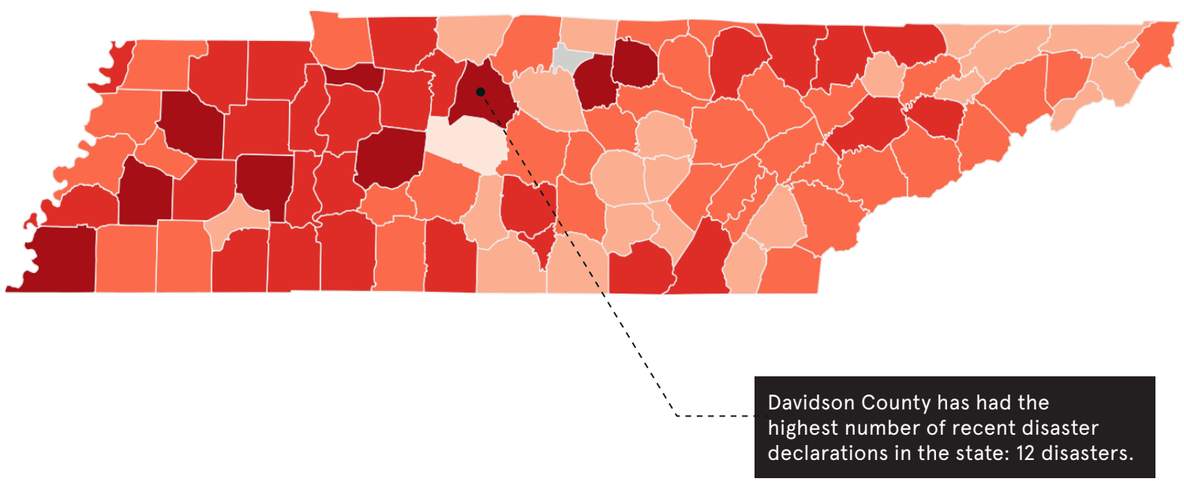
30	CLIMATE DISASTER DECLARATIONS
$1.0 BILLION	FEMA + HUD POST-DISASTER FUNDING
6.9 MILLION PEOPLE	POPULATION TOTAL
$149	PER CAPITA SPENDING ON CLIMATE DISASTERS
DAVIDSON (12 DISASTERS)	COUNTY WITH THE HIGHEST DISASTER OCCURRENCES
59	COUNTIES HAVE HAD FIVE OR MORE DISASTERS
1.3 MILLION PEOPLE	LIVE IN AREAS WITH VERY HIGH SOCIAL VULNERABILITY (SVI > 0.75)
15.4 HOURS	TOTAL OUTAGE DURATION (HOURS PER CUSTOMER PER YEAR)
C (2022)	ASCE INFRASTRUCTURE REPORT CARD GRADE
29	SUPERFUND SITES
$5.2 BILLION	CLIMATE INFRASTRUCTURE SUPPORTED THROUGH SMALL INSURANCE SURCHARGE
3RD HIGHEST	RANK IN TOP 10 STATES WITH HIGHEST NUMBER OF DISASTER DECLARATIONS

DISASTER OCCURRENCES 2011-2024

FEDERALLY DECLARED CLIMATE DISASTERS BY COUNTY

30
disaster declarations

62% of counties in Tennessee have had a recent disaster declaration.



Number of Disaster Events

Major Disaster Declarations (2011-2024)

- 0 occurences
- 1 occurrence
- 2-3 occurences
- 4-6 occurrences
- 7-9 occurrences
- 10+ occurrences

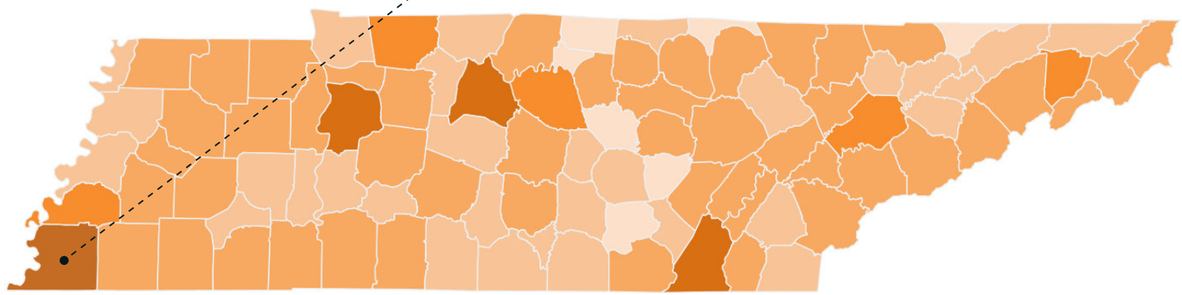
MAP MADE BY REBUILD BY DESIGN
FEMA DATA COURTESY OF IPARAMETRICS

FEDERAL ASSISTANCE 2011-2024

POST-DISASTER PUBLIC ASSISTANCE AND HAZARD MITIGATION FUNDS OBLIGATED BY COUNTY FOR CLIMATE DISASTERS

$1B
post-disaster assistance

Shelby County received the most post-disaster federal funding in the state from 2011-2024: over $63 million.



FEMA Public Assistance and Hazard Mitigation

Federal Share Obligated (2011-2024)

- $0 to $100K
- $100K to $1M
- $1M to $10M
- $10M to $50M
- $50M to $100M
- $100M to $500M

$749M FEMA obligations

$285M HUD CDBG-DR Funds

$1B FEMA + HUD assistance

$149 per capita cost

MAP MADE BY REBUILD BY DESIGN
FEMA DATA COURTESY OF IPARAMETRICS

SOCIAL VULNERABILITY INDEX 2022

AREAS OF GREATEST SOCIAL VULNERABILITY

Trousdale County is the only county in Tennessee that has not had a recent diaster, and it grew the most in population from 2010 to 2024, 47%.

Montgomery County has experienced 7 recent diasters and has a social vulnerability of 0.6, but grew 29% in population from 2010 to 2024.

Social Vulnerability Index
CDC (2022)

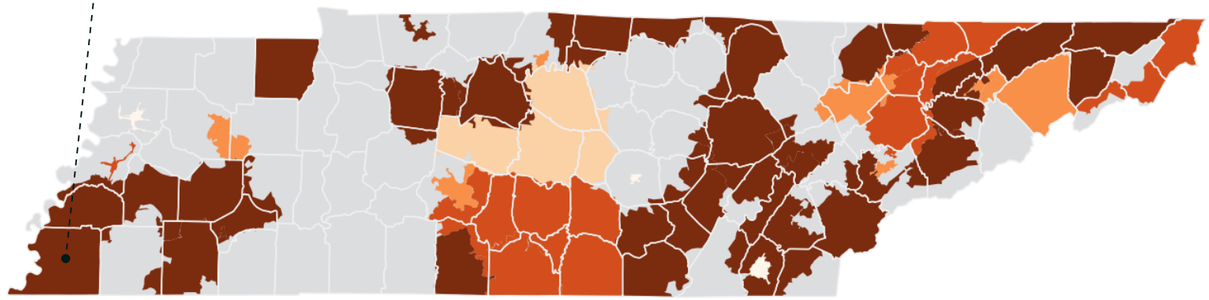
- No Value
- 0.0 - 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1.0

MAP MADE BY REBUILD BY DESIGN
DATA SOURCE: CDC/ATSDR 2022 SVI

ENERGY RELIABILITY 2023

COUNTIES AT GREATEST RISK OF POWER OUTAGES

Shelby County has the largest area with the longest service distruptions in the state, 2,694 minutes total, as well as 10 recent disasters and a high social vulnerability of 0.87.



Aggregated Annual Electric Outage Duration
Including major events - SAIDI_W_MED

- missing electric outage data
- 0 - 60 minutes
- 60 - 120 minutes
- 120 - 240 minutes
- 240 - 456 minutes
- 456- 7,700 minutes

MAP MADE BY REBUILD BY DESIGN
SOURCE: U.S. ENERGY INFORMATION ADMINISTRATION 2023

TOTAL: 30 DISASTERS
FEMA PA + HM: $748.6 M
HUD CDBG-DR: $285.3 M
FEMA + HUD ASSISTANCE: $1.0 B

GEOID	COUNTY NAME	# OF DISASTERS	FEMA TOTAL	Total		2011									
						1965: SEVERE STORMS, TORNADOES, AND FLOODING		1974: SEVERE STORMS, TORNADOES, STRAIGHT-LINE WINDS, AND ASSOCIATED FLOODING		1978: SEVERE STORMS, FLOODING, TORNADOES, AND STRAIGHT-LINE WINDS		1979: SEVERE STORMS, STRAIGHT-LINE WINDS, TORNADOES, AND FLOODING		4005: SEVERE STORMS, STRAIGHT-LINE WINDS, TORNADOES, AND	
				PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations
47000	47000: Statewide	29	$82,699,332.09	$80,205,619.33	$2,493,712.76	$134,411.87	$56,084.00	$5,668,010.88	$160,558.00	$451,273.77	$55,333.00	$2,064,269.62	$80,475.00	$309,488.15	$44,529.00
47001	47001: Anderson County	4	$1,054,927.11	$1,054,927.11	$0.00									$163,547.03	$0.00
47003	47003: Bedford County	9	$4,757,257.21	$4,712,277.91	$44,979.30	$87,516.47	$0.00								
47005	47005: Benton County	7	$1,298,684.78	$1,298,684.78	$0.00			$336,097.28	$0.00			$90,620.55	$0.00		
47007	47007: Bledsoe County	6	$1,082,787.20	$1,082,787.20	$0.00			$438,550.94	$0.00						
47009	47009: Blount County	4	$2,545,920.54	$2,538,420.54	$7,500.00			$324,419.28	$0.00						
47011	47011: Bradley County	3	$6,427,979.86	$6,427,979.86	$0.00			$4,453,386.92	$0.00						
47013	47013: Campbell County	7	$1,199,237.70	$1,199,237.70	$0.00			$136,454.58	$0.00					$27,170.54	$0.00
47015	47015: Cannon County	4	$393,437.09	$393,437.09	$0.00										
47017	47017: Carroll County	7	$1,751,844.21	$1,751,844.21	$0.00			$369,090.28	$0.00			$333,652.15	$0.00		
47019	47019: Carter County	2	$8,408,680.93	$8,408,680.93	$0.00										
47021	47021: Cheatham County	7	$887,291.70	$887,291.70	$0.00										
47023	47023: Chester County	2	$228,600.91	$228,600.91	$0.00			$218,975.57	$0.00	$9,625.34	$0.00				
47025	47025: Claiborne County	7	$1,949,356.13	$1,949,356.13	$0.00									$1,391,593.82	$0.00
47027	47027: Clay County	4	$348,767.22	$348,767.22	$0.00										
47029	47029: Cocke County	5	$6,801,258.71	$6,801,258.71	$0.00			$391,928.81	$0.00						
47031	47031: Coffee County	5	$615,675.37	$615,675.37	$0.00										
47033	47033: Crockett County	4	$1,099,894.86	$159,598.86	$940,296.00			$93,103.05	$940,296.00			$66,495.81	$0.00		
47035	47035: Cumberland County	4	$6,499,917.70	$6,499,917.70	$0.00										
47037	47037: Davidson County	12	$81,800,123.82	$81,594,127.82	$205,996.00					$1,631,589.48	$0.00				
47039	47039: Decatur County	8	$869,709.85	$869,709.85	$0.00					$2,718.38	$0.00				
47041	47041: DeKalb County	4	$84,374.39	$84,374.39	$0.00										
47043	47043: Dickson County	8	$5,802,743.69	$5,802,743.69	$0.00					$592,955.84	$0.00				
47045	47045: Dyer County	4	$890,133.33	$890,133.33	$0.00							$637,376.50	$0.00		
47047	47047: Fayette County	6	$3,423,092.26	$3,423,092.26	$0.00			$706,030.32	$0.00						
47049	47049: Fentress County	7	$2,794,722.01	$2,794,722.01	$0.00	$53,464.85	$0.00	$5,476.56	$0.00						
47051	47051: Franklin County	2	$241,118.71	$241,118.71	$0.00	$33,399.50	$0.00	$207,719.21	$0.00						
47053	47053: Gibson County	10	$6,982,904.21	$2,998,779.21	$3,984,125.00			$194,858.65	$3,984,125.00	$26,150.71	$0.00	$522,490.89	$0.00		
47055	47055: Giles County	7	$593,293.05	$593,293.05	$0.00			$76,894.97	$0.00						
47057	47057: Grainger County	6	$156,034.16	$156,034.16	$0.00	$35,663.95	$0.00							$42,105.38	$0.00
47059	47059: Greene County	5	$7,444,178.13	$7,444,178.13	$0.00			$2,037,616.19	$0.00						
47061	47061: Grundy County	2	$10,797.38	$10,797.38	$0.00										
47063	47063: Hamblen County	3	$270,358.77	$270,358.77	$0.00										
47065	47065: Hamilton County	7	$76,687,609.26	$76,687,609.26	$0.00	$2,138,859.49	$0.00	$20,528,388.17	$0.00						
47067	47067: Hancock County	3	$15,319.73	$15,319.73	$0.00										
47069	47069: Hardeman County	4	$1,241,653.80	$646,687.45	$594,966.35			$223,687.95	$0.00						
47071	47071: Hardin County	8	$2,805,439.86	$2,805,439.86	$0.00			$724,449.89	$0.00						
47073	47073: Hawkins County	3	$103,399.62	$103,399.62	$0.00										
47075	47075: Haywood County	10	$4,102,597.44	$4,102,597.44	$0.00					$72,612.45	$0.00				
47077	47077: Henderson County	10	$640,684.50	$640,684.50	$0.00			$6,153.10	$0.00	$6,192.99	$0.00	$15,989.57	$0.00	$5,878.95	$0.00
47079	47079: Henry County	7	$2,806,362.41	$2,806,362.41	$0.00			$519,089.53	$0.00			$464,364.15	$0.00		
47081	47081: Hickman County	11	$6,196,573.73	$6,196,573.73	$0.00			$158,396.93	$0.00	$34,017.92	$0.00				
47083	47083: Houston County	11	$2,288,897.51	$2,163,259.51	$125,638.00	$117,470.91	$0.00	$394,553.68	$0.00			$82,201.83	$0.00		
47085	47085: Humphreys County	8	$84,155,430.49	$82,297,194.24	$1,858,236.25	$79,728.26	$0.00	$622,013.80	$1,396,099.00	$23,848.09	$0.00				
47087	47087: Jackson County	10	$4,357,544.35	$4,331,570.35	$25,974.00	$884,706.08	$0.00	$57,919.39	$25,974.00						
47089	47089: Jefferson County	7	$582,274.88	$582,274.88	$0.00	$32,677.01	$0.00	$36,425.14	$0.00						
47091	47091: Johnson County	4	$1,320,319.13	$1,320,319.13	$0.00			$77,257.47	$0.00						
47093	47093: Knox County	7	$17,204,579.61	$17,140,800.61	$63,779.00			$3,071,908.88	$0.00					$4,565,816.57	$0.00
47095	47095: Lake County	7	$684,227.82	$684,227.82	$0.00			$0.00	$0.00	$0.00	$0.00	$393,689.92	$0.00		
47097	47097: Lauderdale County	4	$774,744.90	$774,744.90	$0.00							$374,960.31	$0.00		
47099	47099: Lawrence County	6	$1,074,283.89	$1,074,283.89	$0.00			$159,525.99	$0.00						
47101	47101: Lewis County	6	$469,789.23	$469,789.23	$0.00			$63,616.52	$0.00						
47103	47103: Lincoln County	3	$684,106.25	$684,106.25	$0.00			$102,535.63	$0.00			$0.00	$0.00		
47105	47105: Loudon County	6	$3,215,682.48	$3,215,682.48	$0.00			$174,119.72	$0.00					$361,207.21	$0.00
47107	47107: McMinn County	3	$266,534.75	$266,534.75	$0.00			$266,534.75	$0.00						
47109	47109: McNairy County	7	$2,952,715.05	$2,952,715.05	$0.00			$276,149.56	$0.00						
47111	47111: Macon County	3	$0.00	$0.00	$0.00										
47113	47113: Madison County	7	$4,718,341.64	$4,718,341.64	$0.00			$1,218,366.16	$0.00			$1,061,478.90	$0.00		
47115	47115: Marion County	9	$2,098,201.21	$2,098,201.21	$0.00			$0.00	$0.00					$73,538.39	$0.00
47117	47117: Marshall County	3	$205,817.78	$205,817.78	$0.00			$59,103.73	$0.00						
47119	47119: Maury County	5	$1,796,960.50	$1,796,960.50	$0.00										
47121	47121: Meigs County	6	$2,364,601.62	$2,364,601.62	$0.00	$47,708.60	$0.00								
47123	47123: Monroe County	6	$1,537,958.48	$1,537,958.48	$0.00			$163,703.10	$0.00						
47125	47125: Montgomery County	7	$17,459,609.53	$17,459,609.53	$0.00			$651,476.15	$0.00			$690,538.71	$0.00		
47127	47127: Moore County	8	$550,354.73	$550,354.73	$0.00	$17,755.04	$0.00	$13,962.39	$0.00						
47129	47129: Morgan County	5	$491,119.96	$491,119.96	$0.00	$22,416.97	$0.00								
47131	47131: Obion County	6	$1,477,980.20	$1,384,230.20	$93,750.00							$96,405.60	$0.00		
47133	47133: Overton County	5	$1,920,689.79	$1,920,689.79	$0.00										
47135	47135: Perry County	7	$463,234.13	$463,234.13	$0.00			$58,436.80	$0.00						
47137	47137: Pickett County	5	$50,995.40	$50,995.40	$0.00	$9,181.18	$0.00	$22,638.77	$0.00						
47139	47139: Polk County	5	$311,153.59	$311,153.59	$0.00			$42,263.94	$0.00						
47141	47141: Putnam County	5	$7,870,235.77	$7,814,210.77	$56,025.00										
47143	47143: Rhea County	6	$1,082,614.59	$1,082,614.59	$0.00			$369,699.80	$0.00						
47145	47145: Roane County	5	$4,961,134.86	$4,961,134.86	$0.00										
47147	47147: Robertson County	3	$810,541.97	$810,541.97	$0.00										
47149	47149: Rutherford County	5	$7,968,344.07	$6,900,837.43	$1,067,506.64										
47151	47151: Scott County	8	$3,533,345.05	$3,533,345.05	$0.00	$1,499,993.19	$0.00	$139,992.95	$0.00						
47153	47153: Sequatchie County	3	$166,870.31	$166,870.31	$0.00			$54,485.36	$0.00						
47155	47155: Sevier County	5	$4,938,732.80	$4,837,482.80	$101,250.00										
47157	47157: Shelby County	10	$118,308,051.07	$118,191,715.07	$116,336.00			$3,181,810.20	$0.00	$3,865,156.28	$0.00	$8,784,343.58	$0.00		
47159	47159: Smith County	10	$3,799,155.94	$3,799,155.94	$0.00			$31,710.85	$0.00						
47161	47161: Stewart County	4	$225,844.68	$225,844.68	$0.00							$149,648.14	$0.00		
47163	47163: Sullivan County	2	$439,886.17	$399,475.17	$40,411.00			$399,475.17	$40,411.00						
47165	47165: Sumner County	5	$2,808,518.81	$2,808,518.81	$0.00					$325,697.18	$0.00				
47167	47167: Tipton County	9	$43,054,007.13	$42,817,644.63	$236,362.50							$2,393,176.47	$0.00		
47171	47171: Unicoi County	3	$9,307,744.62	$9,307,744.62	$0.00										
47173	47173: Union County	2	$487,312.35	$487,312.35	$0.00	$419,506.35	$0.00								
47175	47175: Van Buren County	3	$66,618.80	$66,618.80	$0.00										
47177	47177: Warren County	3	$872,363.19	$872,363.19	$0.00										
47179	47179: Washington County	4	$13,756,522.00	$13,756,522.00	$0.00			$593,772.84	$0.00						
47181	47181: Wayne County	7	$1,435,388.82	$1,435,388.82	$0.00			$158,471.24	$0.00						
47183	47183: Weakley County	7	$6,818,662.04	$5,923,749.04	$894,913.00			$128,788.08	$0.00			$211,814.07	$894,913.00		
47185	47185: White County	2	$1,306,457.26	$1,306,457.26	$0.00										
47187	47187: Williamson County	1	$553,973.00	$553,973.00	$0.00										
47189	47189: Wilson County	3	$22,542,515.42	$22,542,515.42	$0.00										
Total	Total	30	$748,607,065.05	$735,655,308.25	$12,951,756.80	$5,614,459.72	$56,084.00	$50,409,497.12	$6,547,463.00	$7,041,838.43	$55,333.00	$18,433,516.77	$975,388.00	$6,940,346.04	$44,529.00

GEOID	2012		2014				2015		2016		2017		2019				2020					
	4060: SEVERE STORMS, TORNADOES, STRAIGHT-LINE WINDS AND		4171: SEVERE WINTER STORM		4189: SEVERE STORMS, TORNADOES, STRAIGHT-LINE WINDS, AND FLOODING		4211: SEVERE WINTER STORM AND FLOODING		4293: WILDFIRES		4320: SEVERE STORMS, STRAIGHT-LINE WINDS, AND FLOODING		4427: SEVERE STORMS, FLOODING, LANDSLIDES, AND MUDSLIDES		4471: SEVERE STORM AND STRAIGHT-LINE WINDS		4476: SEVERE STORMS, TORNADOES, STRAIGHT-LINE WINDS, AND FLOODING		4541: SEVERE STORMS, TORNADOES, STRAIGHT-LINE WINDS, AND FLOODING		4550: SEVERE STORMS, STRAIGHT-LINE WINDS, AND FLOODING	
	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations
47000			$321,373.33	$54,899.14	$936,080.72	$39,032.63	$11,836,538.96	$290,791.79	$1,120,450.69	$21,370.00	$3,630,891.33	$232,211.00	$3,774,912.75	$506,791.00	$5,790,367.84	$186,467.20	$9,547,422.79	$257,929.00	$964,917.20	$0.00	$2,433,453.21	$57,242.00
47001					$339,817.33	$0.00	$158,152.16	$0.00					$393,410.59	$0.00								
47003							$791,282.03	$0.00					$106,765.31	$44,979.30							$397,421.96	$0.00
47005															$178,037.58	$0.00	$147,916.40	$0.00			$131,919.73	$0.00
47007					$181,790.20	$0.00	$73,410.93	$0.00					$286,655.70	$0.00								
47009							$684,658.32	$0.00			$1,357,067.26	$0.00	$172,275.68	$7,500.00								
47011	$0.00	$0.00																	$1,974,592.94	$0.00		
47013							$106,023.66	$0.00					$352,375.97	$0.00					$9,492.12	$0.00		
47015																						
47017			$28,264.71	$0.00	$507,690.18	$0.00											$208,303.99	$0.00			$134,702.54	$0.00
47019													$325,305.67	$0.00								
47021			$0.00	$0.00									$91,598.08	$0.00								
47023																						
47025	$0.00	$0.00			$58,244.19	$0.00	$7,820.62	$0.00					$207,771.34	$0.00								
47027							$6,280.52	$0.00					$64,816.01	$0.00								
47029							$18,510.48	$0.00					$368,689.51	$0.00								
47031							$153,335.96	$0.00					$199,067.57	$0.00								
47033																						
47035	$0.00	$0.00					$6,423,742.98	$0.00			$76,174.72	$0.00										
47037							$449,514.35	$205,996.00									$41,260,169.16	$0.00			$8,646,121.71	$0.00
47039					$0.00	$0.00							$202,893.37	$0.00	$354,722.64	$0.00					$112,863.70	$0.00
47041	$0.00	$0.00					$28,585.72	$0.00					$55,788.67	$0.00								
47043			$777,284.73	$0.00									$162,758.86	$0.00							$604,050.34	$0.00
47045													$226,332.26	$0.00							$26,424.57	$0.00
47047			$87,146.03	$0.00							$182,072.66	$0.00										
47049							$2,011,848.48	$0.00					$173,629.09	$0.00								
47051																						
47053			$4,989.16	$0.00	$157,305.80	$0.00							$143,715.78	$0.00							$399,578.80	$0.00
47055					$137,759.31	$0.00	$132,087.07	$0.00					$173,788.98	$0.00								
47057							$6,877.39	$0.00					$71,387.44	$0.00								
47059							$80,410.20	$0.00					$653,180.99	$0.00								
47061							$10,797.38	$0.00														
47063							$135,605.56	$0.00					$134,753.21	$0.00								
47065	$0.00	$0.00											$650,205.04	$0.00					$49,556,878.35	$0.00		
47067							$15,319.73	$0.00					$0.00	$0.00								
47069							$164,995.59	$594,966.35														
47071							$123,538.83	$0.00					$546,591.71	$0.00	$736,213.08	$0.00					$35,176.90	$0.00
47073							$37,325.54	$0.00					$62,599.63	$0.00								
47075			$513,782.91	$0.00	$17,727.11	$0.00															$118,634.62	$0.00
47077															$81,136.54	$0.00					$47,008.87	$0.00
47079					$115,038.91	$0.00															$369,713.40	$0.00
47081			$45,755.66	$0.00	$325,901.70	$0.00							$199,057.96	$0.00	$1,325,373.03	$0.00					$777,463.48	$0.00
47083			$23,766.56	$125,638.00	$21,083.46	$0.00							$46,986.45	$0.00	$109,533.36	$0.00					$29,069.48	$0.00
47085													$149,525.45	$0.00	$330,583.77	$20,516.25					$0.00	$0.00
47087	$0.00	$0.00									$52,676.31	$0.00	$101,738.29	$0.00			$16,358.72	$0.00				
47089							$102,463.56	$0.00			$0.00	$0.00	$296,369.62	$0.00								
47091													$301,917.41	$0.00								
47093							$1,661,833.05	$63,779.00			$167,665.53	$0.00	$2,879,958.05	$0.00								
47095													$179,430.24	$0.00							$0.00	$0.00
47097													$289,951.97	$0.00								
47099					$194,016.93	$0.00	$141,692.25	$0.00					$224,882.26	$0.00							$124,765.44	$0.00
47101					$189,219.89	$0.00							$68,491.17	$0.00							$43,952.56	$0.00
47103													$581,570.62	$0.00								
47105							$1,065,591.63	$0.00			$140,504.96	$0.00	$17,075.43	$0.00								
47107	$0.00	$0.00					$0.00	$0.00														
47109					$134,944.91	$0.00	$111,592.81	$0.00					$608,196.85	$0.00	$511,926.32	$0.00						
47111																						
47113			$405,876.42	$0.00	$621,361.58	$0.00															$350,291.01	$0.00
47115					$208,221.20	$0.00	$131,573.35	$0.00					$409,740.55	$0.00					$375,050.95	$0.00		
47117							$107,719.76	$0.00					$38,994.29	$0.00								
47119					$242,017.54	$0.00															$828,667.86	$0.00
47121							$31,545.15	$0.00														
47123	$0.00	$0.00					$823,595.37	$0.00											$318,533.80	$0.00		
47125															$4,259,067.77	$0.00						
47127					$27,833.11	$0.00	$68,526.37	$0.00					$199,819.94	$0.00								
47129							$405,613.94	$0.00			$0.00	$0.00	$63,089.05	$0.00								
47131							$124,990.52	$0.00					$168,414.67	$93,750.00							$108,329.66	$0.00
47133	$0.00	$0.00					$611,719.99	$0.00					$209,763.97	$0.00								
47135					$109,556.17	$0.00							$119,131.35	$0.00	$115,056.90	$0.00					$8,986.74	$0.00
47137							$12,164.95	$0.00														
47139	$0.00	$0.00																	$268,889.65	$0.00		
47141							$1,527,675.90	$0.00			$1,013,842.40	$0.00					$4,339,593.00	$0.00				
47143							$106,835.96	$0.00			$77,115.02	$0.00	$269,049.34	$0.00								
47145					$637,150.82	$0.00	$1,149,929.27	$0.00			$981,584.31	$0.00	$1,631,936.40	$0.00								
47147													$0.00	$0.00								
47149																	$5,568,094.98	$1,067,506.64				
47151							$394,209.00	$0.00					$76,846.57	$0.00					$263,104.19	$0.00		
47153					$48,745.89	$0.00							$63,639.06	$0.00								
47155							$390,585.76	$0.00	$2,487,880.32	$0.00	$42,361.28	$101,250.00	$1,890,762.32	$0.00								
47157			$4,972,557.12	$116,336.00							$24,215,072.84	$0.00										
47159											$23,006.50	$0.00	$143,445.49	$0.00			$890,299.90	$0.00				
47161																						
47163																						
47165																						
47167			$343,851.30	$0.00	$143,903.74	$0.00							$578,724.28	$0.00								
47171													$0.00	$0.00					$276,711.73	$0.00		
47173													$67,806.00	$0.00								
47175							$53,842.03	$0.00					$12,776.77	$0.00								
47177							$521,982.27	$0.00					$350,380.92	$0.00								
47179																			$102,210.76	$0.00		
47181							$200,900.83	$0.00					$130,892.71	$0.00	$0.00	$0.00						
47183					$89,556.91	$0.00															$72,495.09	$0.00
47185							$1,306,457.26	$0.00														
47187																						
47189																	$22,300,904.34	$0.00				
Total	$0.00	$0.00	$7,524,647.93	$296,873.14	$5,444,967.60	$39,032.63	$34,509,703.44	$1,155,533.14	$3,608,331.01	$21,370.00	$31,960,035.12	$333,461.00	$21,971,634.66	$653,020.30	$13,792,018.83	$206,983.45	$84,279,063.28	$1,325,435.64	$54,110,381.69	$0.00	$15,801,091.67	$57,242.00

GEOID	2021						2022			
	4594: SEVERE WINTER STORMS		4601: SEVERE STORMS, TORNADOES, AND FLOODING		4609: SEVERE STORM AND FLOODING		4637: SEVERE STORMS, STRAIGHT-LINE WINDS, AND TORNADOES		4645: SEVERE WINTER STORM	
	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations
47000	$2,113,908.24	$0.00	$1,365,242.35	$0.00	$2,320,108.11	$450,000.00	$4,436,807.57	$0.00	$1,178,777.87	$0.00
47003	$2,109,507.41	$0.00	$17,786.40	$0.00						
47005							$16,017.00	$0.00		
47013			$443,972.09	$0.00						
47015	$67,516.13	$0.00	$120,998.29	$0.00						
47021			$292,860.45	$0.00			$426,313.41	$0.00		
47025			$283,926.16	$0.00						
47027			$277,670.69	$0.00						
47031	$263,271.84	$0.00								
47033									$0.00	$0.00
47037	$92,887.15	$0.00	$7,529,036.96	$0.00	$359,014.68	$0.00	$3,427,092.58	$0.00		
47039			$88,264.47	$0.00			$101,918.10	$0.00		
47041	$0.00	$0.00								
47043					$395,913.54	$0.00	$1,348,580.79	$0.00		
47045							$0.00	$0.00		
47047									$622,797.67	$0.00
47049	$257,068.84	$0.00	$293,234.19	$0.00						
47053							$1,202,506.05	$0.00		
47057			$0.00	$0.00						
47069			$203,433.19	$0.00						
47071			$109,744.71	$0.00						
47075			$36,193.22	$0.00					$345,579.48	$0.00
47077			$296,209.58	$0.00			$115,976.42	$0.00		
47079							$421,582.00	$0.00		
47081			$663,290.44	$0.00	$1,702,668.88	$0.00				
47083					$1,325,296.09	$0.00	$8,963.27	$0.00		
47085					$81,091,494.87	$441,621.00				
47087	$329,927.40	$0.00	$2,766,229.06	$0.00						
47095							$111,107.66	$0.00		
47097									$43,810.29	$0.00
47109			$828,480.47	$0.00						
47113			$588,140.39	$0.00						
47115			$22,005.92	$0.00						
47119			$358,108.97	$0.00						
47121	$660,297.68	$0.00								
47125							$173,935.47	$0.00		
47127	$107,073.08	$0.00	$34,209.91	$0.00						
47131							$886,089.75	$0.00		
47133	$718,487.92	$0.00	$380,717.91	$0.00						
47137	$7,010.50	$0.00								
47141	$852,526.85	$56,025.00								
47149	$750,199.08	$0.00	$81,165.14	$0.00						
47151	$137,293.33	$0.00	$967,619.99	$0.00						
47157	$9,278,146.32	$0.00							$32,691,707.74	$0.00
47159	$1,993,823.78	$0.00	$338,137.22	$0.00						
47161							$56,323.51	$0.00		
47165							$560,169.82	$0.00		
47167									$480,825.38	$236,362.50
47181			$416,969.95	$0.00						
47183							$5,412,562.68	$0.00	$8,532.21	$0.00
47187			$553,973.00	$0.00						
47189			$241,611.08	$0.00			$0.00	$0.00		
Total	$19,738,945.55	$56,025.00	$19,599,232.20	$0.00	$87,194,496.17	$891,621.00	$18,705,946.08	$0.00	$35,372,030.64	$236,362.50

GEOID	2023														2024			
	4691: SEVERE WINTER STORM		4701: SEVERE STORMS, STRAIGHT-LINE WINDS, AND TORNADOES		4712: SEVERE STORMS, STRAIGHT-LINE WINDS, AND TORNADO		4729: SEVERE STORMS AND STRAIGHT-LINE WINDS		4735: SEVERE STORMS AND STRAIGHT-LINE WINDS		4742: SEVERE STORMS, STRAIGHT-LINE WINDS, AND TORNADO		4751: SEVERE STORMS AND TORNADOES		4792: SEVERE STORMS, TORNADOES, AND FLOODING		4832: TROPICAL STORM HELENE	
	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations
47000	$973,694.71	$0.00	$2,684,830.13	$0.00	$1,641,754.25	$0.00	$934,461.24	$0.00	$856,253.08	$0.00	$1,833,749.51	$0.00	$1,188,234.30	$0.00	$1,547,791.48	$0.00	$8,146,143.38	$0.00
47003					$28,212.51	$0.00					$194,968.75	$0.00			$978,817.07	$0.00		
47005					$398,076.24	$0.00												
47007					$0.00	$0.00					$102,379.43	$0.00						
47013					$123,748.74	$0.00												
47015			$204,922.67	$0.00											$0.00	$0.00		
47017					$170,140.36	$0.00												
47019																	$8,083,375.26	$0.00
47021					$0.00	$0.00							$76,519.76	$0.00	$0.00	$0.00		
47025																	$0.00	$0.00
47027					$0.00	$0.00												
47029	$102,702.41	$0.00															$5,919,427.50	$0.00
47031	$0.00	$0.00									$0.00	$0.00						
47033					$0.00	$0.00												
47035											$0.00	$0.00						
47037	$2,778,050.12	$0.00			$9,007,009.67	$0.00							$6,409,523.63	$0.00	$4,118.33	$0.00		
47039					$6,329.19	$0.00												
47043					$1,663,580.43	$0.00							$257,619.16	$0.00				
47047							$1,633,611.27	$0.00	$191,434.31	$0.00								
47049					$0.00	$0.00												
47053					$247,213.19	$0.00							$99,970.18	$0.00				
47055			$0.00	$0.00	$0.00	$0.00									$72,762.72	$0.00		
47057																	$0.00	$0.00
47059	$16,682.75	$0.00															$4,656,288.00	$0.00
47061					$0.00	$0.00												
47063																	$0.00	$0.00
47065					$3,788,433.65	$0.00									$24,844.56	$0.00		
47067																	$0.00	$0.00
47069			$54,570.72	$0.00														
47071			$447,797.80	$0.00	$81,926.94	$0.00												
47073																	$3,474.45	$0.00
47075			$2,386,756.55	$0.00	$311,778.13	$0.00	$167,443.86	$0.00	$132,089.11	$0.00								
47077	$53,313.00	$0.00			$12,825.48	$0.00												
47079					$722,544.77	$0.00			$194,029.65	$0.00								
47081			$100,419.39	$0.00	$864,228.34	$0.00												
47083					$4,334.42	$0.00												
47085					$0.00	$0.00												
47087					$85,256.16	$0.00									$36,758.94	$0.00		
47089											$114,339.55	$0.00					$0.00	$0.00
47091			$0.00	$0.00													$941,144.25	$0.00
47093	$691,314.74	$0.00									$4,102,303.79	$0.00						
47095					$0.00	$0.00												
47097					$66,022.33	$0.00												
47099					$229,401.02	$0.00												
47101			$84,126.70	$0.00	$20,382.39	$0.00												
47105											$1,457,183.53	$0.00						
47109			$481,424.13	$0.00														
47111			$0.00	$0.00	$0.00	$0.00									$0.00	$0.00		
47113					$472,827.18	$0.00												
47115					$410,261.92	$0.00					$467,808.93	$0.00						
47119	$323,014.71	$0.00													$45,151.42	$0.00		
47121					$412,736.45	$0.00					$950,518.44	$0.00			$261,795.30	$0.00		
47123					$189,699.08	$0.00					$42,427.13	$0.00						
47125					$7,063,309.15	$0.00							$3,982,741.42	$0.00	$638,540.86	$0.00		
47127					$81,174.89	$0.00												
47129			$0.00	$0.00														
47131					$0.00	$0.00												
47135	$52,066.17	$0.00			$0.00	$0.00												
47137					$0.00	$0.00												
47139					$0.00	$0.00									$0.00	$0.00		
47141	$80,572.62	$0.00																
47143					$0.00	$0.00					$259,914.47	$0.00						
47145											$560,534.06	$0.00						
47147					$0.00	$0.00							$810,541.97	$0.00				
47149			$439,395.10	$0.00											$61,983.13	$0.00		
47151			$54,285.83	$0.00														
47155																	$25,893.12	$0.00
47157	$1,719,773.54	$0.00					$16,458,394.28	$0.00	$13,024,753.17	$0.00								
47159	$21,448.06	$0.00	$18,750.00	$0.00	$47,130.61	$0.00									$291,403.53	$0.00		
47161					$19,873.03	$0.00							$0.00	$0.00				
47163																	$0.00	$0.00
47165					$463,492.47	$0.00							$976,095.17	$0.00	$483,064.17	$0.00		
47167			$38,734,505.03	$0.00	$44,484.89	$0.00	$40,622.13	$0.00	$57,551.41	$0.00								
47171																	$9,031,032.89	$0.00
47175											$0.00	$0.00						
47177															$0.00	$0.00		
47179	$360,405.01	$0.00															$12,700,133.39	$0.00
47181			$504,535.02	$0.00	$23,619.07	$0.00												
47183													$0.00	$0.00				
47185					$0.00	$0.00												
Total	$7,173,037.84	$0.00	$46,196,319.07	$0.00	$28,701,806.95	$0.00	$19,234,532.78	$0.00	$14,456,110.73	$0.00	$10,086,127.59	$0.00	$13,801,245.59	$0.00	$4,447,031.51	$0.00	$49,506,912.24	$0.00

APPENDIX

MAPPING THE IMPACT

DATA VISUALIZATION TOOLS

It is evident the U.S. is already paying a steep price for this challenge. Rebuild by Design partnered with APTIM and iParametrics to create the following visual tools to demonstrate how climate events have affected each state. The set of six maps depicts which areas have been hit the hardest by recent climate events, where recovery funds are focused, where those individuals with high social vulnerabilities live, and which areas have the least energy reliability.

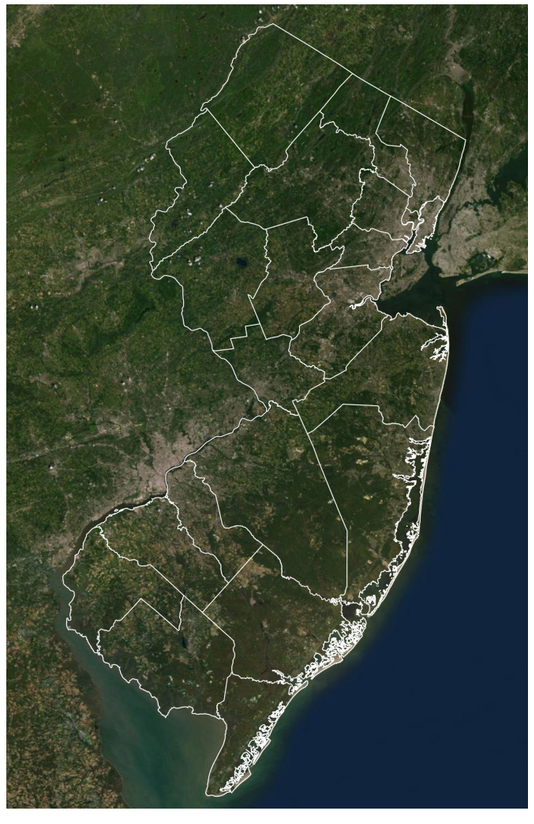
The U.S. needs to change the way it is making funding decisions. Where we make priority investments is equally important to what we invest in. Returns on investments (ROI) in the form of social benefits to communities needs to be part of grant evaluations. The U.S. need to utilize new decision-making frameworks that are forward-looking. The final map in the set includes an example of a new decision-making framework that takes into account current vulnerabilities and future climate risks. This is one example of how physical and social vulnerability indicators could inform where investments in adaptation infrastructure can yield high returns in social benefits to the most impacted communities. Our team recognizes, however, that there are other decision-making frameworks to explore, and further research is needed to understand which indicators should be included in any state-specific model. Given the ever-present constraints on funding availability, the intent of presenting these maps together is to prompt investments that address multiple known vulnerabilities simultaneously within projects, furthering comprehensive climate adaptation planning.

The following data are designed as a tool to help communities understand their risks to make better-informed choices with higher returns on investment, though each state should determine their own framework for investment.

There are always many ways to present these data. For the purposes of this report, we chose to analyze the years 2011-2024. The following six maps and two tables are presented in this format with the following considerations and limitations:

GEOGRAPHIC MAP

The map provides topographic and geographic context for each state and its surrounding areas, indicating whether the state encompasses coastal, riverine, lake, alpine, or desert land.

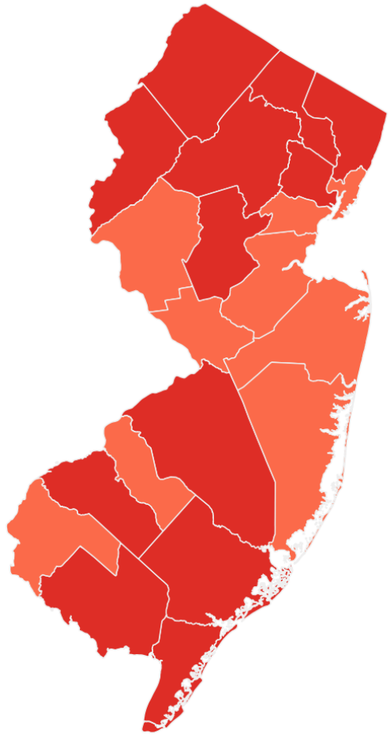


GEOGRAPHIC MAP. SOURCE: ESRI
WORLD IMAGERY BASEMAP

DISASTER DECLARATIONS (RED)

This map shows federally declared climate disasters by county from 2011-2024 – providing a snapshot of the magnitude of climate disasters across the country in recent history. This report only identifies federally declared disasters, as there is no entity that collects and publishes state disaster declarations. It should be noted that the declarations shown in this report do not reflect every climate event that has occurred between 2011-2024; the report instead only shows those which have met the cost threshold for a federal disaster declaration. Therefore, the findings overall underestimate the number of occurrences and the suffering that some communities have experienced.

According to the Stafford Act, as amended in May 2021, a "major disaster" includes "any natural catastrophe (including any hurricane, tornado, storm, high water, winddriven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought), or, regardless of cause, any fire, flood, or explosion, in any part of the United States, which in the determination of the President causes damage of sufficient severity and magnitude to warrant major disaster assistance under this Act to supplement the efforts and available resources of States, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby."



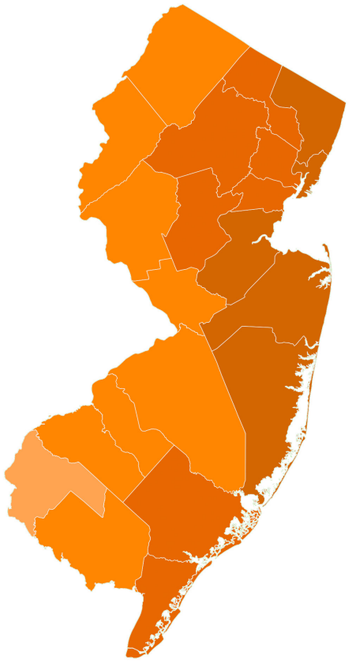
DISASTER OCCURRENCES
SOURCE: FEMA 2011-2024
MAP MADE BY REBUILD BY DESIGN

Importantly, extreme heat waves do not fit the criteria for federal disaster declarations despite being the leading cause of deaths among climate hazards. Likewise, sea level rise is not included in this definition despite the threat it poses to numerous communities, including damage to property, loss of land, and displacement.

It should be noted that while most disaster declarations are due to climate events, there are a few instances of disasters due to other natural hazards, such as earthquakes and volcanic eruptions. Though these events are not increasing in magnitude or frequency due to climate change, the severity of their impact may be connected. As climate impacts degrade household and critical infrastructure, communities may become more vulnerable to other natural hazards. Retrofitting infrastructure after these events often requires the same measures as floods, tornadoes, fires, etc., so these events were included in the report to demonstrate the need to prioritize multi hazard adaptation approaches.

FEDERAL ASSISTANCE (ORANGE)

The map shows the amount of federal dollars allocated to counties through FEMA's Public Assistance and Hazard Mitigation Grant Programs between 2011-2024 which allocates funding to individual counties and statewide. The map does not show where "statewide" allocations were spent within the state, but rather only shows county allocations. However, these statewide allocation amounts are included in the Disaster Declaration table at the end of each chapter and included in the "FEMA Total" provided next to the map. The adjacent table adds HUD's Community Development Block Grant Disaster Recovery funds – which are only available to states after a disaster – to the FEMA Total for an estimate of federal post-disaster spending in each state.



FEDERAL ASSISTANCE
SOURCE: FEMA (HA+PM) 2011-2024
MAP MADE BY REBUILD BY DESIGN

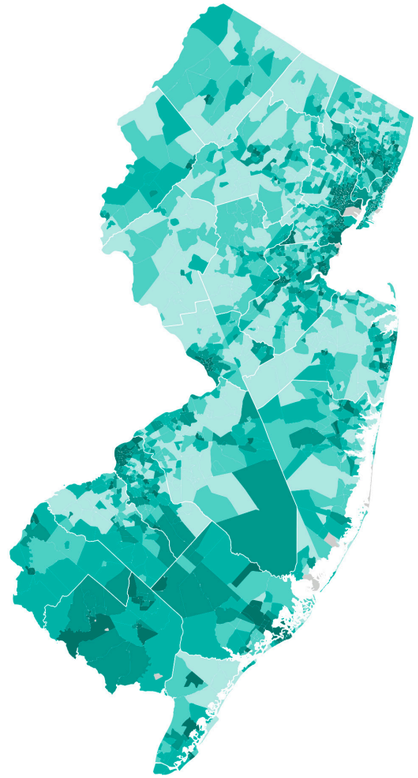
The Disaster Declaration tables provided at the end of each chapter show all federal Disaster Declarations declared between 2011-2024 and the corresponding FEMA obligations associated with those events. **However, in some instances, FEMA continues to obligate funds for years following a declaration. Some states have received funds for events that took place between 2011-2024 after 2024, so the total sum of funds associated with that event are not captured**. All FEMA funds allocated to counties between 2011-2024 are shown in the federal assistance map; however, they do not show up in the Disaster Declaration table if their corresponding event took place prior to 2011. For example, counties in the State of Illinois are still receiving funds from a 1960s storm. The funds obligated to those counties are included in the map, but that event is not included in the Disaster Declaration table at the end of the chapter.

There are additional sources of federal funding made available to governments or individuals in response to disasters, such as the U.S. Army Corp of Engineers (USACE) projects, Small Business Administration (SBA) loans, and private insurance payouts, which are not included in this report because they are harder to uniformly track and/or must be paid back. Therefore, our findings underestimate the total support available to states and individuals post-disaster.

Since disaster aid is allocated to repair physical damage to property, events such as extreme heat, which largely creates physical damage to persons and not property, rarely qualify for federal disaster recovery aid. Additionally, there is only a shallow understanding of the economic impact of social and health-related costs and environmental degradation after a disaster.

SOCIAL VULNERABILITY INDEX (GREEN)

Social vulnerability refers to the potential negative effects on communities caused by external stresses on human well-being. Such stresses include natural or human-caused disasters or disease outbreaks. The factors that determine social vulnerability are directly tied to social determinants of health or the social, economic, and physical factors – such as race, socioeconomic status, and environmental conditions – that influence health. Socially vulnerable populations fare the worst during a disaster and often take longer to recover. The Center for Disease Control/ Agency for Toxic Substance and Disease Registry Social Vulnerability Index (CDC/ATSDR SVI) uses 1**5 U.S. census variables** to help local officials identify communities that may need support before, during, or after disasters. The map presents the SVI on a census block



SOCIAL VULNERABILITY
SOURCE: CDC/ATSDR 2022
MAP MADE BY REBUILD BY DESIGN

level, indicating where the most socially vulnerable populations within each county live. The 15 indicators are grouped into four themes:

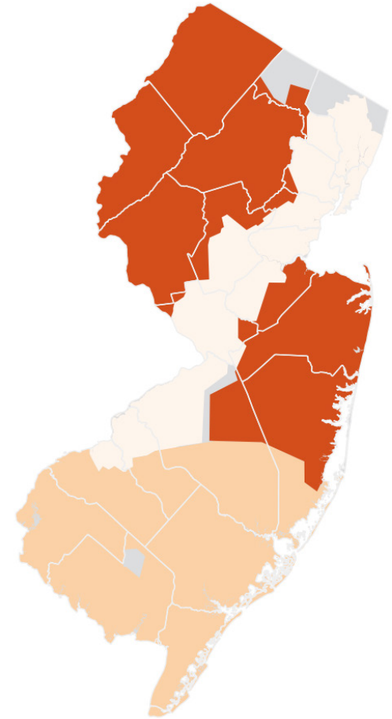
- **Socioeconomic Status** (below poverty, unemployed, income, no high school diploma);
- **Household Composition & Disability** (aged 65 or older, aged 17 or younger, older than age 5 with a disability, single-parent households);
- **Minority Status & Language** (minority, speak English "less than well"); and
- **Housing Type & Transportation** (multi-unit structures, mobile homes, crowding, no vehicle, group quarters).

Social Vulnerability Index data are not being used to make post-disaster assistance funding decisions. HUD only requires Low and Moderate Income for a portion of their funding. FEMA does not consider it in their allocations.

ENERGY RELIABILITY (BROWN)

Climate events often lead to energy disruptions for hours, days, or weeks. This map shows the annual average interruption time (in minutes) across the different energy utility providers within a state. Regions (or utility territories) in the darkest shade, on average, experience longer energy outages. These data are aggregated by utility territory, not county, meaning more than one provider can serve a county or group of counties.

Viewing the Energy Reliability Map next to the SVI Map, one can begin to infer which regions have the most socially vulnerable residents and are served by the least reliable energy providers. Energy reliability is increasingly becoming related to climate disasters and weather events. Inclusion of these maps is to support evaluation of need for concurrent flood and energy resilience projects.



ENERGY RELIABILITY
SOURCE: US ENERGY INFORMATION ADMINISTRATION 2023
MAP MADE BY REBUILD BY DESIGN

System Average Interruption Duration Index (SAIDI) is one of the performance metrics used to measure the reliability of an electric utility's service. This metric measures the total time (in minutes) an average customer experiences a non-momentary power interruption over a one-year (calendar) period.

A Major Event Day (MED) is another metric which occurs when the SAIDI exceeds a specific threshold within a given day and tends to reflect outages on the longer end of the spectrum. The data presented in this report shows a metric of SAIDI combined with MED to highlight and report electric reliability in areas (utility territories) irrespective of the root cause of the interruption. The Energy Reliability Map displays the SAIDI_W_MED metric for utility territories and highlights areas that are susceptible to electric system vulnerabilities based on reliability performances. These vulnerabilities serve as an indicator as to where investments and improvements in the distribution grid should be focused.

Electric utilities experience power interruptions due to a variety of issues. Those issues include inclement weather, vegetation management practices, utility practices, maintenance patterns, and capital investment strategy, among others, which all play a part in a utility's overall reliability performance. The U.S. Energy Information Administration produces an Annual Electric Power Industry Report which utilizes data collected from U.S. electric utilities reflecting their reliability performance against certain industry standards and performance metrics. Utilities have the flexibility to report interruptions according to duration and frequency either with major events, without major events, or both.

The annual SAIDI is the summation of the individual SAIDIs for each non-momentary interruption event over the entire year (2023):

$$\text{SAIDI} = \frac{\sum(\text{Duration of Interruption} \times \text{No. of Sustained Customer Interruptions})}{\text{Total No. of Customers Served}}$$

For utilities that report SAIDI metrics using the Institute of Electrical and Electronics Engineers (IEEE) standards, "non-momentary" interruptions are those lasting longer than five minutes. A Major Event Day (MED) is another metric which occurs when the SAIDI exceeds a specific threshold within a given day and tends to reflect outages on the longer end of the spectrum.

Utilities have certain flexibilities when reporting with these metrics. Including MED in the SAIDI metric (SAIDI_W_MED) provides an overall picture of the electric reliability experienced by customers. Excluding MED from the SAIDI metrics (SAIDI_WO_MED) tends to separate power interruption events by their durations, which provides an indicator of the source of the power interruption (i.e., distinguishes a Major Event vs. Systematic Operation interruption).

Our methodology utilizes SAIDI_W_MED as the primary measurement indicator for the electric reliability experience of the end user (customer). Our SAIDI_W_MED metric highlights the reported electric reliability in areas (utility territories, counties, and states) irrespective of the root cause of the interruption. Our metric does not exclude interruptions categorized as MEDs.

This report endeavors to highlight areas across the national electric distribution network (utility territories) that are susceptible to electric system vulnerabilities based on historical reliability of performance. We view vulnerabilities caused by major events (longer duration outages) on par with vulnerabilities caused by systematic failures (shorter duration outages) and believe they should equally drive electric grid investment and improvement decisions. These investments should also incorporate solutions aimed at mitigating systemic vulnerabilities that stem from issues like vegetation management practices, distribution automation improvements to major event vulnerabilities with root causes embedded in grid hardening, distribution generation schemes, and Automated Metering Infrastructure (AMI) upgrades aimed at minimizing customer interruption numbers and durations.