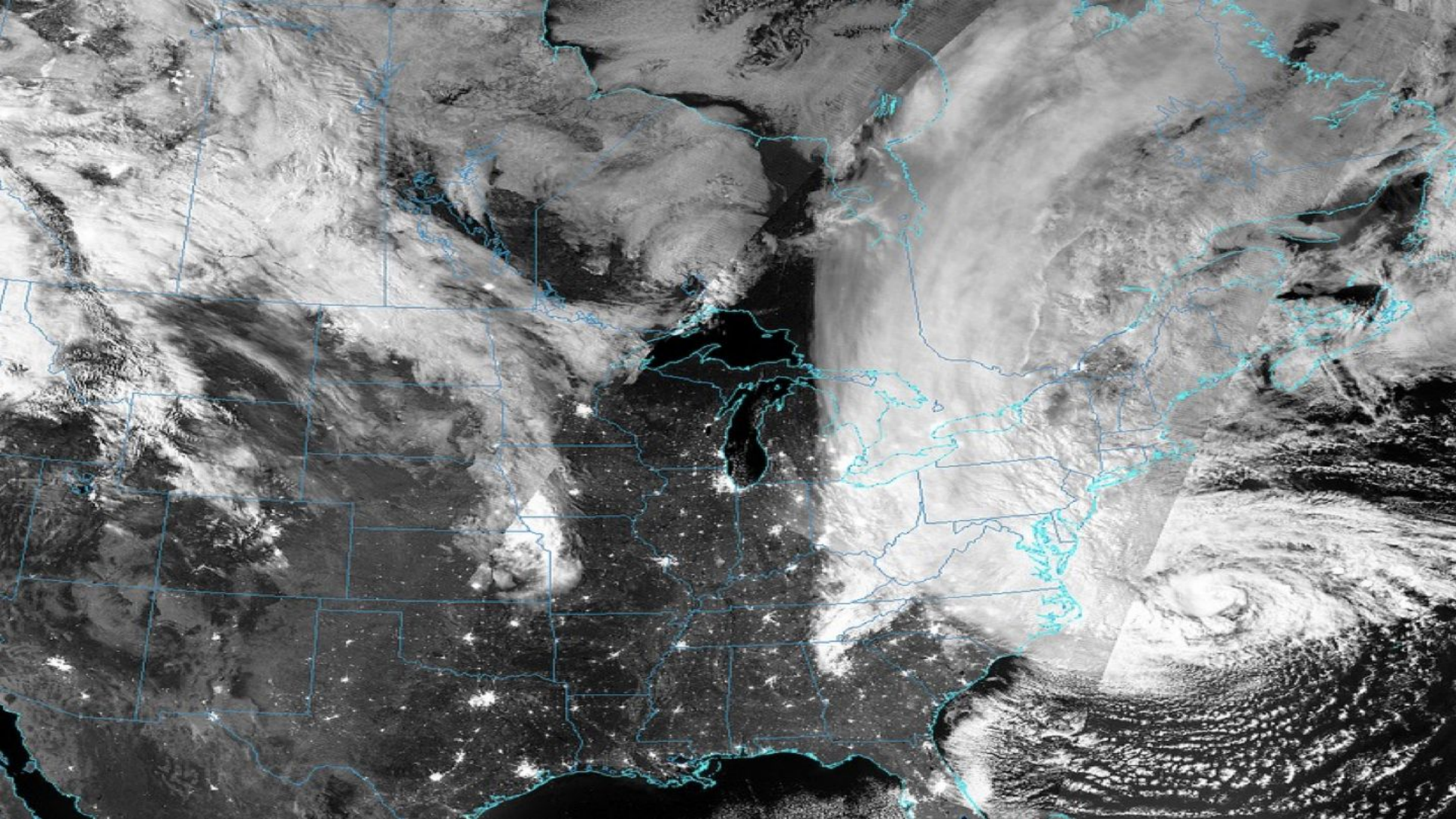


REBUILD BY DESIGN







TYPICAL DESIGN PROCESS

Site

Budget

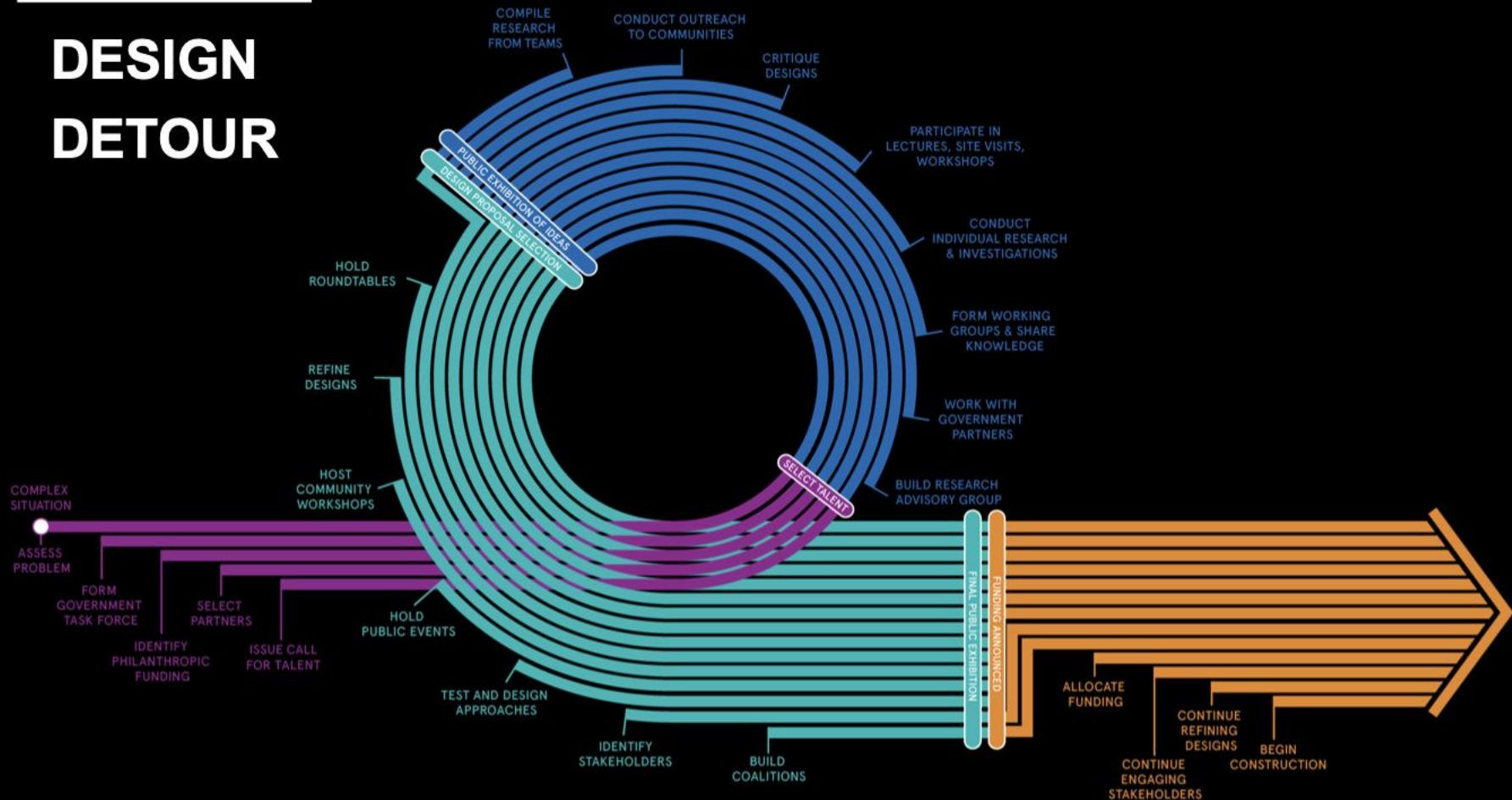
Program

Square Footage

Timeline



DESIGN DETOUR



REGIONAL PROJECTS: \$4.3 Billion Climate Infrastructure

NEW YORK CITY:

- **\$335M:** The BIG U in Manhattan, NY
- **\$20M:** Lifelines in Hunts Point, Bronx, NY

NEW JERSEY:

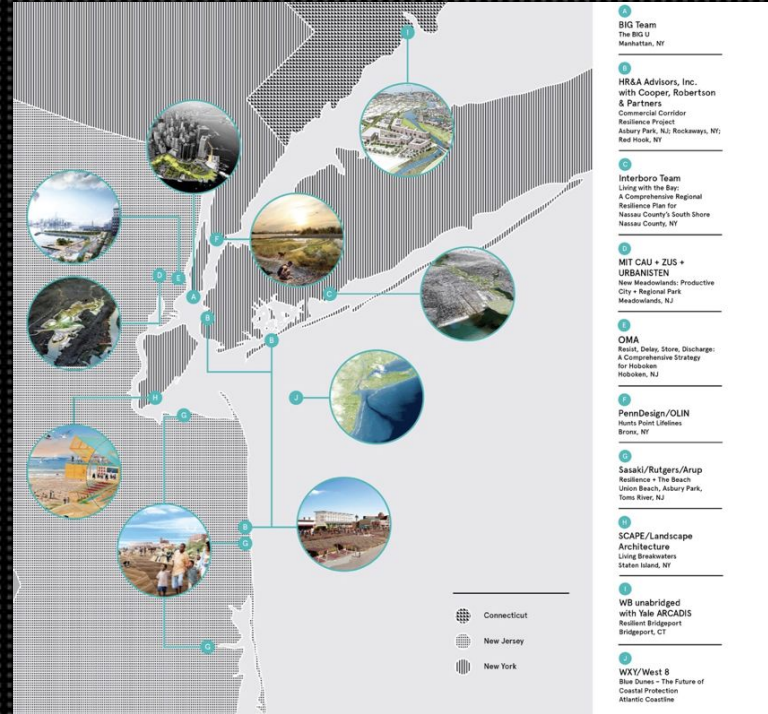
- **\$230M:** Resist, Delay, Store, Discharge in Hoboken, Weehawken, Jersey City, NJ
- **\$150M:** New Meadowlands in Little Ferry, Moonachie, Carlstadt, Teterboro, NJ

NEW YORK STATE:

- **\$125M** Living with the Bay in Nassau County, Long Island
- **\$60M:** Living Breakwaters in Tottenville, Staten Island, NY

CONNECTICUT

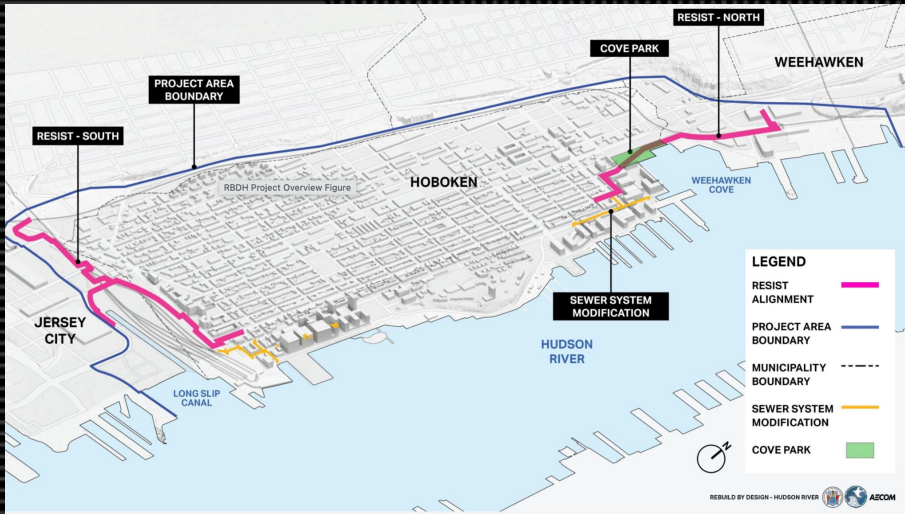
- **\$10M:** Resilient Bridgeport in Bridgeport, CT



NJ PROJECTS IN IMPLEMENTATION

Resist, Store, Delay, Discharge in
Hoboken and Jersey City

New Meadowlands



PROJECT FINAL DESIGN

AN APPROACH TO REDUCING FLOOD RISK



DESIGN APPROACH

The final design seeks to achieve three primary goals: to reduce flood risk by managing drainage from rainfall events, to cultivate ecology with native planting, and to energize community through new public realm improvements.

The project uses a watershed approach to provide opportunities to reduce the flood-risk and provide ecological and community benefits.

FINAL DESIGN COMPONENTS

- 1 new waterfront park
- 4 municipal site landscape improvements
- 10 streetside green infrastructure-type improvements
- 2 pump stations
- 4100 linear feet channel improvements
- 2900 linear feet force main

PROJECT IMPROVEMENTS
The designed project improvements include new pump stations, channel improvements, a new force main, native planting, green infrastructure-type improvements on public rights-of-way and at existing municipal buildings, and a proposed waterfront park on the Hackensack River. The map below shows these features located within 4 primary drainage basins (subwatersheds): East Riser Ditch, West Riser, Losen Slote, and the Hackensack River/Main Street area. To assess the flood risk reduction benefits, the team used hydraulic modeling to compare existing and proposed conditions water surface elevations for rainfall events varying in size from 2-year to 100-year across an extensive network covering 69 miles of stormwater pipes on a 4,400-acre drainage area.

ADDITIONAL INFORMATION
This project is one component of the efforts the NJDEP is facilitating to assist communities in building resilience. For more information, check out these resources:
www.nj.gov/dep/floodresilience/rd-meadowlands.htm
and www.nj.gov/dep/pltr/ and www.nj.gov/dep/floodresilience/toolkit.html

MAINTENANCE ACCESS
Long-term maintenance access was considered for each feature

INCREASED CONVEYANCE
Dispersing and widening channels and a new force main increases capacity for better stormwater conveyance

ENHANCED PUBLIC REALM
Landscape improvements to parks and municipal facilities provide an improved aesthetic, recreational and ecological community experience

IMPROVED WATER QUALITY
Green infrastructure-type improvements filter runoff and temporarily store it before releasing it into the stormwater network

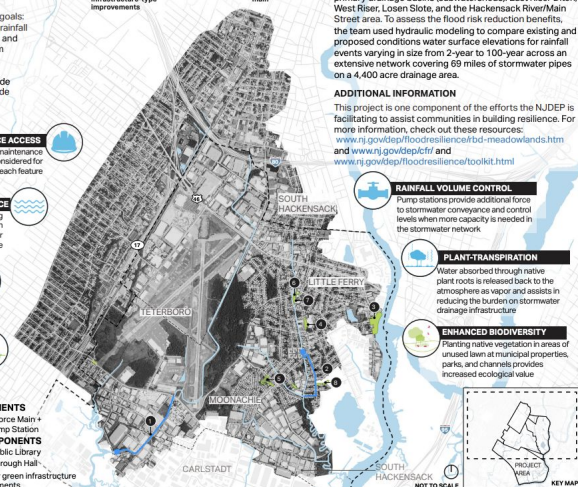
RAINFALL VOLUME CONTROL
Pump stations provide additional force to stormwater conveyance and control levels when more capacity is needed in the stormwater network

PLANT-TRANSPIRATION
Water absorbed through native plant roots is released back to the atmosphere as vapor and assists in reducing the burden on stormwater drainage infrastructure

ENHANCED BIODIVERSITY
Planting native vegetation in areas of unused lawn at municipal properties, parks, and channels provides increased ecological value

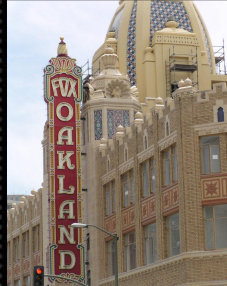
- PRIMARY FLOOD RISK REDUCTION COMPONENTS**
- East Riser Ditch Channel + Pump Station
 - Riverfront Park
 - Memorial Middle School
 - Monarch Civic Center / Joseph Street Park
 - Losen Slote Force Main + Liberty St. Pump Station
 - Little Ferry Public Library
 - Little Ferry Borough Hall
 - Rights-of-way green infrastructure type improvements

- PRIMARY ECOLOGICAL + COMMUNITY COMPONENTS**
- 1 new waterfront park
 - 4 municipal site landscape improvements
 - 10 streetside green infrastructure-type improvements



PLACE-BASED ENGAGEMENTS THROUGHOUT THE WORLD

- **Athens:** Promoted stewardship for Lycabettus Hill
- **Atlanta, GA:** Developed a student design competition for Ted Turner Drive Resilience Corridor
- **Amman:** RBD_U program on waste, water, transportation
- **Boulder, CO:** Created a resilient and sustainable mobile home park, and later designing a collaborative process to address COVID needs
- **Boston, MA:** Proposed a citywide plan to create resilience districts
- **Juarez, MX:** Executed a design competition for Juan Gabriel Plaza
- **Los Angeles, CA:** Collaborated with stakeholders to create climate-forward building codes
- **Mexico City:** Developed a master plan framework for Xochimilco
- **Oakland, CA:** Implemented a workshop series on effective engagement
- **San Juan, PR:** Convened experts and the community for a master plan process
- **Singapore:** Promoted a community led plan to build social resilience to address flash floods



NYS ENVIRONMENTAL BOND ACT

Created the research, strategy, and coalition that led former Governor Andrew Cuomo to create the **\$3 billion** Environmental Bond Act that provides ecological restoration and flood resilience.

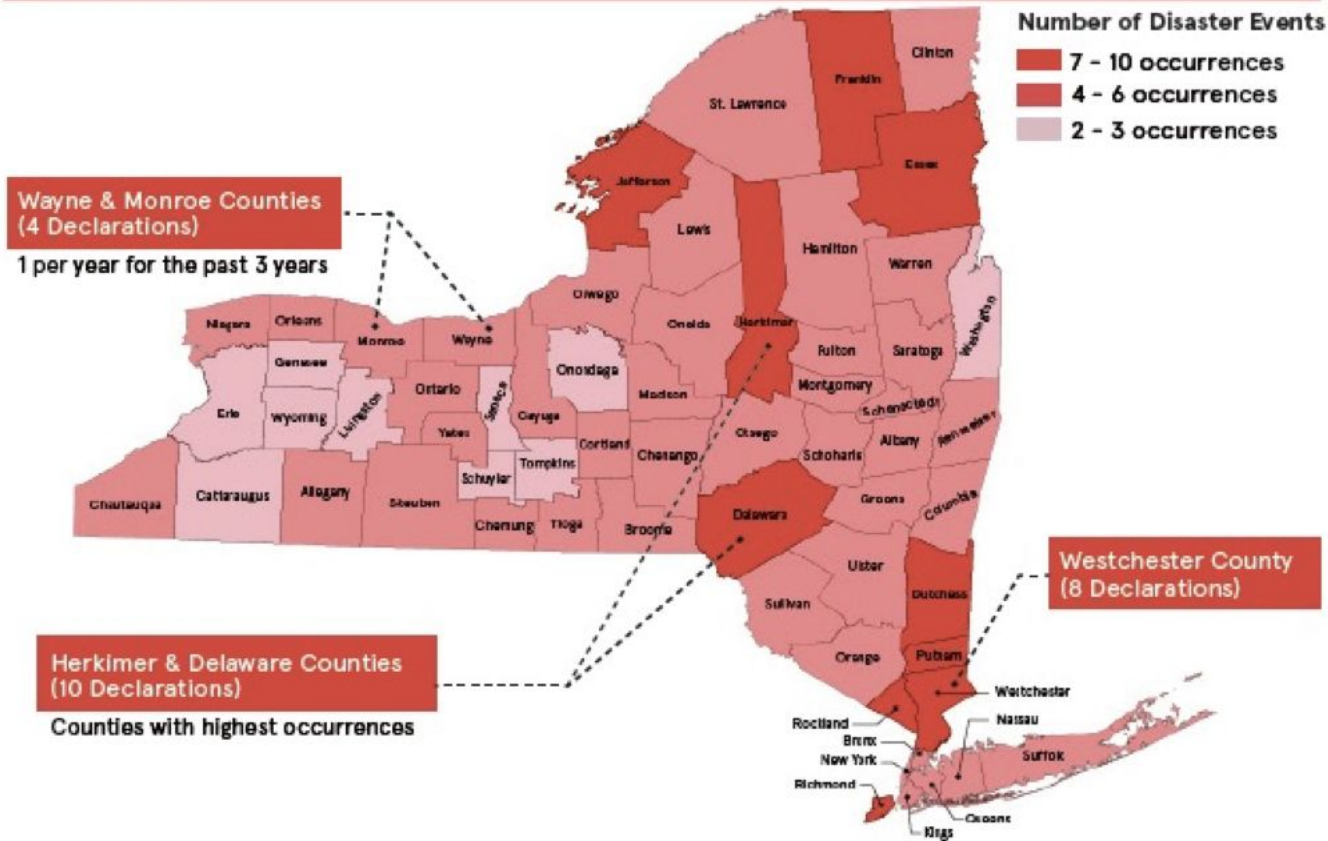
Governor Kathy Hochul, recognizing additional needs, increased the Bond Act to **\$4.2 billion**.

NYS Voters approved the Bond Act in November, 2022



Map of Disaster Declaration Frequency in New York Counties, 2011 - 2019

REBUILD
BY
DESIGN



- 90% of New Yorkers live near a body of water
- Since 2011, every county has had at least two disasters for flooding
- 60% have had more than five

In partnership with:



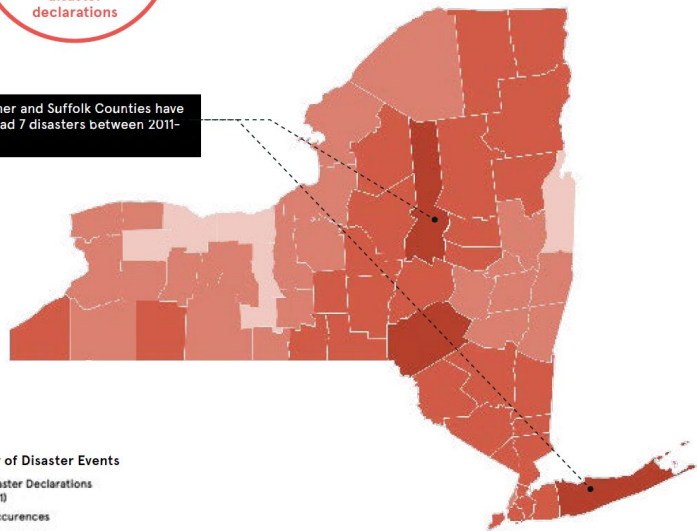
With support from:

- **Siegel Family Endowment**
- **Rockefeller Brothers Fund**
- **Tiger Global**

URBAN

16
disaster
declarations

Herkimer and Suffolk Counties have each had 7 disasters between 2011-2021.



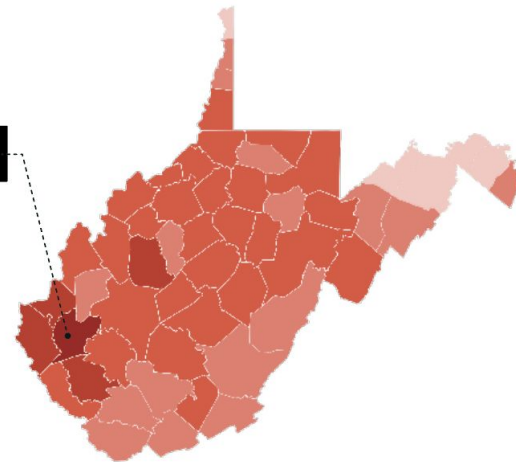
New York

RURAL

17
disaster
declarations

Lincoln County has had 10 disaster declarations.

Every County in West Virginia has had a recent climate disaster. Twenty-two counties have had at least five.



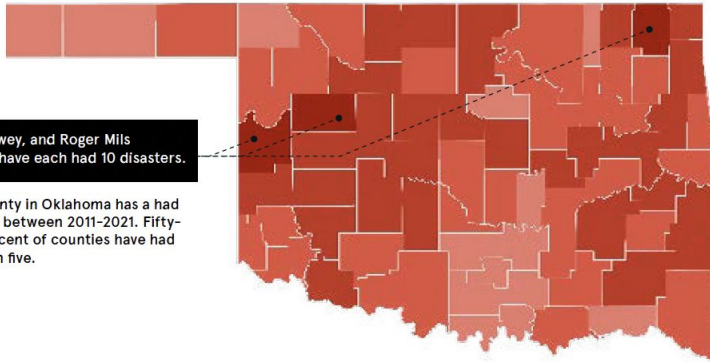
West Virginia

REPUBLICAN

22
disaster
declarations

Craig, Dewey, and Roger Mills
Counties have each had 10 disasters.

Every county in Oklahoma has had a disaster between 2011-2021. Fifty-three percent of counties have had more than five.



Oklahoma

DEMOCRAT

25
disaster
declarations

Lake County has had 8
disasters.

Napa County has had 9
disasters.



Number of Disaster Events

Disaster Declarations

California

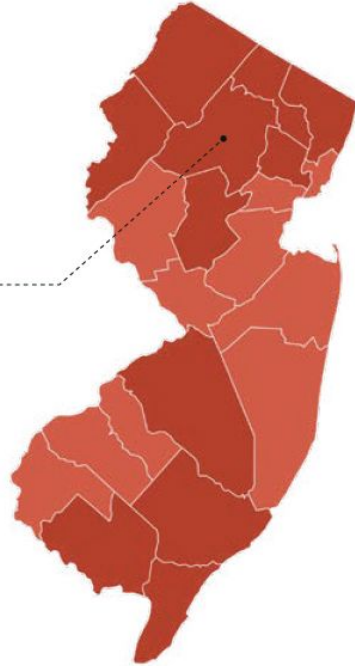
COASTAL

13
disaster
declarations

Morris County has had 9 recent climate disasters.

Every county in New Jersey has had at least 5 recent disasters.

Atlantic, Bergen, Burlington, Cape May, Cumberland, and Essex Counties have each had 8 disasters.



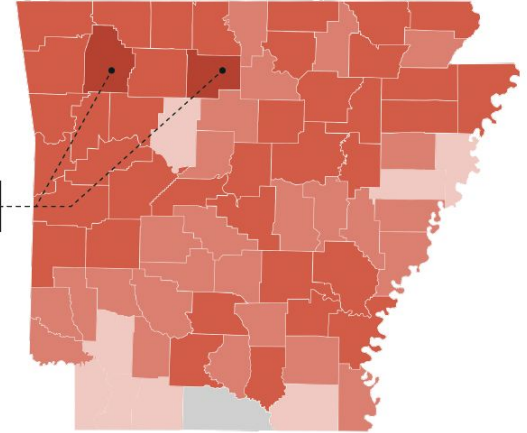
New Jersey

RIVERINE

16
disaster
declarations

Madison and Searcy have each had 7 disasters.

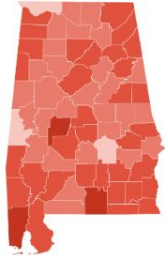
18 counties have had 5 or more disasters.



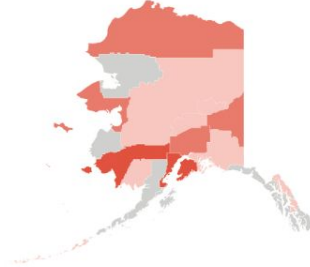
Arkansas

STATE BY STATE RISK MAPS BY COUNTY 2011-2021

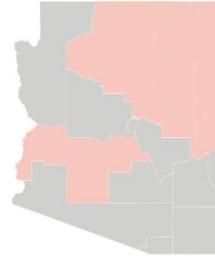
ALABAMA



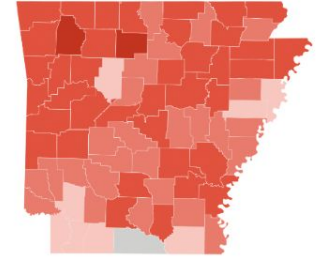
ALASKA



ARIZONA



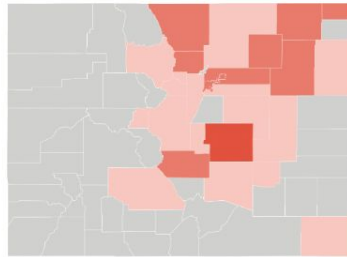
ARKANSAS



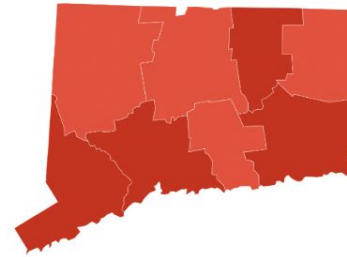
CALIFORNIA



COLORADO



CONNECTICUT

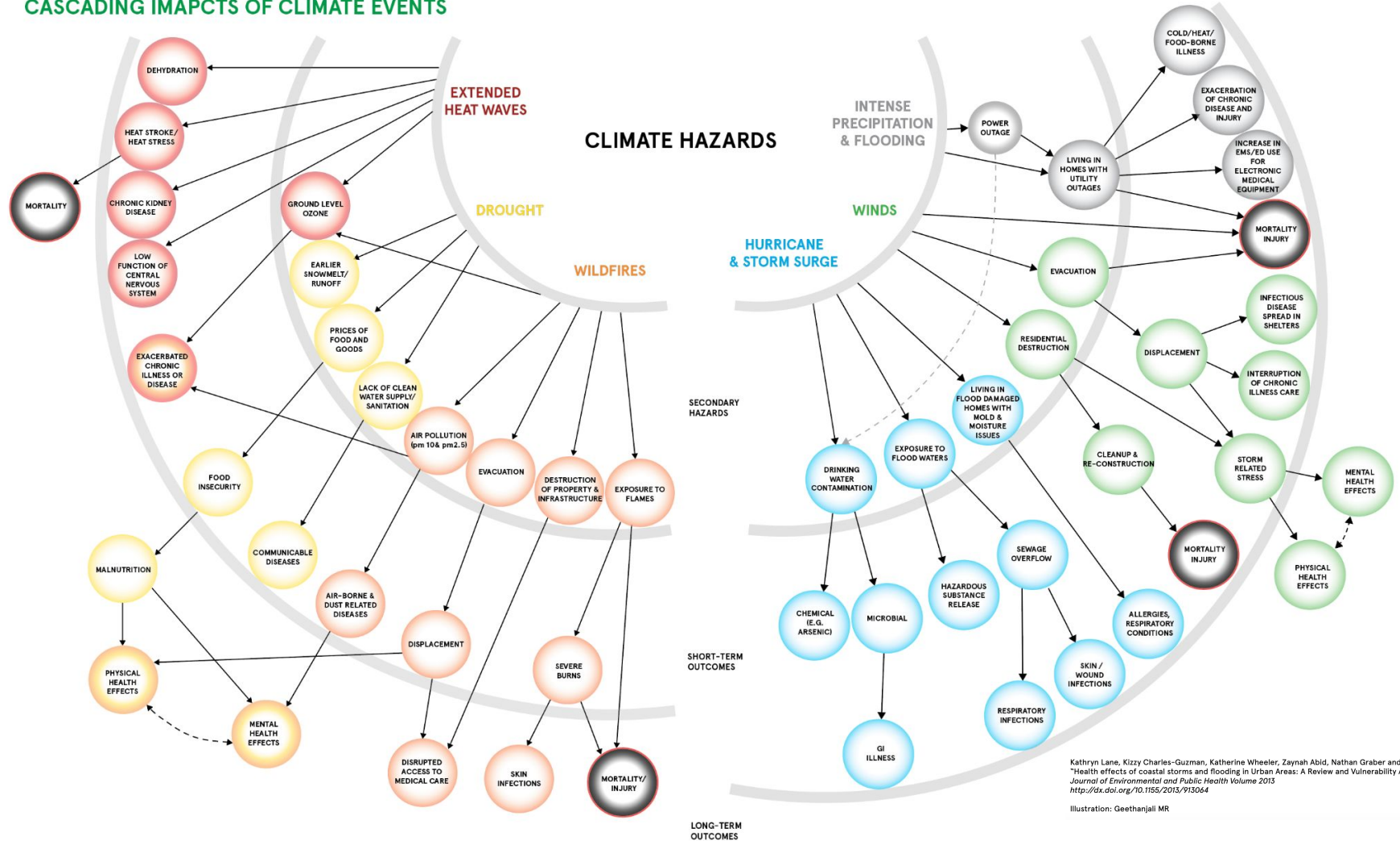


DELAWARE



Check out: RebuildByDesign.org/Atlas-of-disaster/

CASCADING IMPACTS OF CLIMATE EVENTS



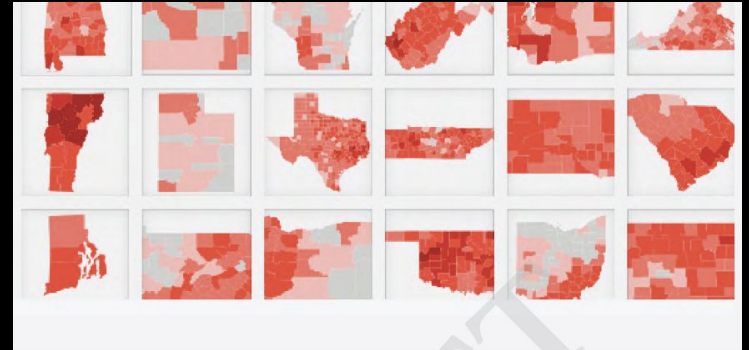
Kathryn Lane, Kizy Charles-Guzman, Katherine Wheeler, Zaynah Abid, Nathan Graber and Thomas Matte, "Health effects of coastal storms and flooding in Urban Areas: A Review and Vulnerability Assessment," *Journal of Environmental and Public Health* Volume 2013 <http://dx.doi.org/10.1155/2013/913064>

Illustration: Geethanjali MR

ATLAS OF DISASTER: NEW JERSEY

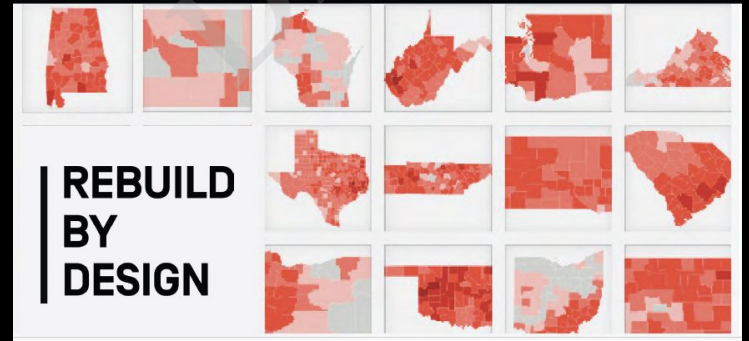
KEY FINDINGS 2011-2021

- Experienced **15 federally declared major disasters** due to **extreme weather** between 2011-2021.
- **Most** of those events were due to **storms and flooding**.
- **Ranked 3rd** in the country for highest per capita FEMA support
- **Every county has had 5 or more** recent major disasters.
- **50 percent of counties** have had at least **7 federal disasters**.
- **Morris County** has had the **highest number of disaster declarations** in the state: **9** disasters.



NEW JERSEY

ATLAS OF DISASTER



NEW JERSEY



NEW JERSEY STATISTICS SUMMARY (2011 - 2021)

13	CLIMATE DISASTER DECLARATIONS
3RD HIGHEST	PER CAPITA SPENDING ON CLIMATE DISASTERS IN THE COUNTRY
ATLANTIC, BERGEN, BURLINGTON, CAPE MAY, CUMBERLAND, ESSEX, MORRIS	COUNTIES WITH THE HIGHEST DISASTER OCCURENCES
ALL 20	COUNTIES WITH FIVE OR MORE DISASTERS
946	SUPERFUND SITES
D+	ASCE INFRASTRUCTURE REPORT CARD GRADE
OCEAN COUNTY	HIGHEST COMPOUNDING RISKS
\$7.2 BILLION	FEMA + HUD POST-DISASTER FUNDING
8.9 MILLION	POPULATION TOTAL
\$157	PER CAPITA SPENDING ON CLIMATE DISASTERS
\$9.1 Billion	OF CLIMATE INFRASTRUCTURE COULD BE SUPPORTED THROUGH A SMALL INSURANCE SURCHARGE



100%

of New Jersey's counties
have experienced a recent
climate disaster.⁷

HUDSON COUNTY

DURING HURRICANE SANDY, EXCHANGE PLACE
WATERFRONT EXPERIENCED SUSTAINED WINDS OF UP TO
30 MPH PER HOUR, HEAVY RAIN, AND STORM SURGE

DISASTER OCCURRENCES 2011-2021

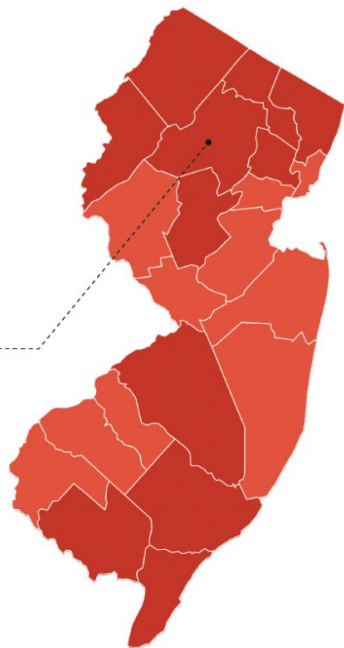
FEDERALLY DECLARED CLIMATE DISASTERS BY COUNTY

13
disaster
declarations

Every county in New Jersey has had at least 5 recent disasters.

Morris County has had 9 recent climate disasters.

Atlantic, Bergen, Burlington, Cape May, Cumberland, and Essex counties have each had 8 disasters.



Number of Disaster Events

Major Disaster Declarations (2011-2021)

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

Source: FEMA 2021
Maps courtesy of iParametrics

FEDERAL ASSISTANCE 2011-2021

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

\$7.2B
post-disaster
assistance

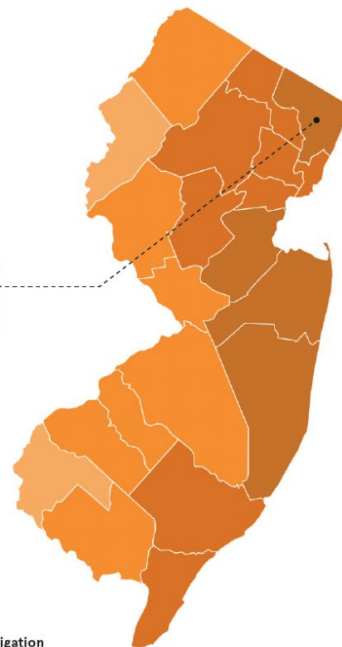
Bergen County received the most post-disaster federal assistance in the state: over \$110M.

\$2.8B FEMA obligations

\$4.4B HUD CDBG-DR Funds

\$7.2B FEMA + HUD assistance

\$815 per capita cost



FEMA Public Assistance and Hazard Mitigation

Federal Share Obligated (2011-2021)

- \$0 to \$100K
- \$100K to \$1M
- \$1M to \$10M
- \$10M to \$50M
- \$50M to \$100M
- \$100M to \$500M
- \$500M to \$1.25B

Source: FEMA 2021
Maps courtesy of iParametrics

SOCIAL VULNERABILITY INDEX 2011-2021

AREAS OF GREATEST SOCIAL VULNERABILITY



Social Vulnerability Index

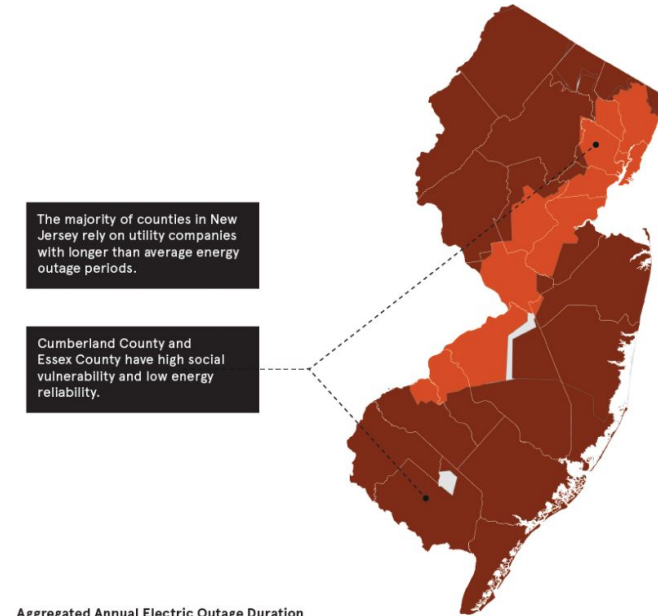
CDC (2018)

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

Source: CDC/ATSDR 2018 Social Vulnerability Index
Maps courtesy of iParametrics

ENERGY RELIABILITY 2011-2021

COUNTIES AT GREATEST RISK OF POWER OUTAGES



Aggregated Annual Electric Outage Duration

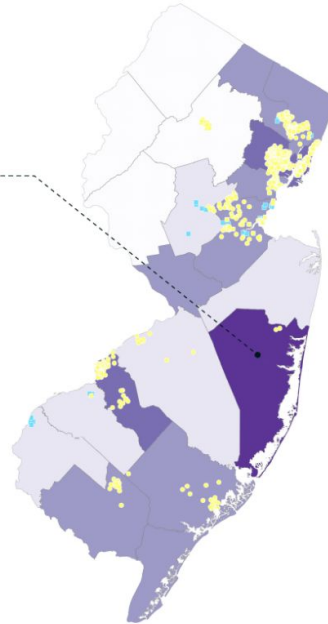
Including major events - SAIDI_W_MED

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

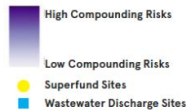
Source: U.S. Energy Information Administration
Maps courtesy of APTIM

COMPOUNDING RISKS: A FRAMEWORK FOR FUTURE INVESTMENT

Ocean County has high risk of climate disasters, high density, high population change, and high risk of sea level rise.



Areas with the greatest return on investment due to physical and social risk



U.S. counties were analyzed for social benefits using the following parameters: NOAA Sea Level Rise (Source: Sea Level Rise and Coastal Flooding Impacts (noaa.gov)); Population Density (Source: 2020 Census Demographic Data Map Viewer); Population Change (Source: 2020 Census Demographic Data Map Viewer); Poverty (Source: 2020 Census Demographic Data Map Viewer); Cardiovascular Diseases (Source: US Data | GHDx (healthdata.org)); Neoplasms (Source: US Data | GHDx (healthdata.org)); Diabetes, urogenital, blood, and endocrine diseases (Source: US Data | GHDx (healthdata.org)); FEMA Natural Hazard risk (Source: Map | National Risk Index (fema.gov)) | Map courtesy of APTIM.

County Name	High Population Density	High Percent of Population Change	High Poverty Rate	High Health Risk	Types of High Climate Risk	Sea Level	Total Risk Count
Atlantic					7		3
Bergen					1		3
Burlington							1
Camden					3		4
Cape May					2		3
Cumberland					2		3
Essex					5		4
Gloucester							1
Hudson					6		4
Hunterdon							0
Mercer					3		3
Middlesex					1		3
Monmouth							1
Morris							0
Ocean					6		5
Passaic					5		3
Salem							1
Somerset							1
Sussex							0
Union					3		3
Warren							0

NEW JERSEY

**TOTAL: 13 DISASTERS
 FEMA PA + HM: \$2.8 B
 HUD CDBG-DR: \$4.4 B
 FEMA + HUD ASSISTANCE: \$7.2B**

		2011										2012										2015										2016										2018										2020										2021									
		1954: SEVERE WINTER STORM AND SNOWSTORM		4021: HURRICANE IRENE		4033: SEVERE STORMS AND FLOODING		4035: REMNANTS OF TROPICAL STORM LEE		4048: SEVERE STORM		4070: SEVERE STORMS AND STRAIGHT-LINE WINDS		4096: HURRICANE SANDY		4221: SEVERE STORM		4264: SEVERE WINTER STORM AND SNOWSTORM		4368: SEVERE WINTER STORM AND SNOWSTORM		4574: TROPICAL STORM ISAIAS		4597: SEVERE WINTER STORM AND SNOWSTORM		4614: REMNANTS OF HURRICANE IDA																																													
County Name	# of Climate Disasters 2011-2021	Total FEMA 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	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations																																									
Atlantic County	8	\$83,255,817	\$1,045,400	\$0	\$1,869,874	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Bergen County	8	\$110,200,658	\$3,434,169	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Burlington County	8	\$30,280,312	\$1,452,101	\$0	\$3,758,279	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Camden County	5	\$10,562,711	\$0	\$0	\$1,071,733	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Cape May County	8	\$50,591,579	\$3,171,115	\$4,684,384	\$1,583,171	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Cumberland County	8	\$32,873,447	\$483,195	\$0	\$1,451,880	\$0	\$4,105,431	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Essex County	8	\$56,276,183	\$2,833,171	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Gloucester County	6	\$11,375,621	\$0	\$0	\$2,546,003	\$0	\$1,084,498	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Hudson County	5	\$87,178,927	\$1,881,888	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Hunterdon County	6	\$14,188,791	\$0	\$0	\$2,177,773	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Mercer County	6	\$28,646,584	\$1,203,880	\$0	\$4,886,382	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Middlesex County	6	\$269,803,367	\$2,787,569	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Monmouth County	6	\$320,531,921	\$4,928,979	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Morris County	9	\$88,053,073	\$1,601,130	\$0	\$14,308,541	\$10,848,643	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Ocean County	6	\$283,965,799	\$3,859,015	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Passaic County	7	\$52,272,156	\$1,287,828	\$1,862,639	\$8,600,113	\$10,024,038	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Salem County	6	\$6,266,708	\$0	\$0	\$2,591,925	\$0	\$1,199,622	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Somerset County	7	\$61,169,658	\$1,310,085	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Sussex County	7	\$12,316,811	\$0	\$0	\$4,777,980	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Union County	6	\$51,878,687	\$2,810,225	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Warren County	7	\$7,871,630	\$0	\$0	\$1,368,810	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0																																									
Total FEMA Allocation		\$2,819,726,335	\$82,013,250	\$7,385,982	\$120,826,747	\$34,828,458	\$7,037,265	\$230,367	\$4,007,818	\$1,220,631	\$26,411,716	\$2,144,910	\$8,706,880	\$38,483	\$2,026,298,919	\$38,978,513	\$12,486,465	\$1,607,474	\$81,002,719	\$11,586,702	\$30,188,384	\$4,822,888	\$17,834,166	\$0	\$5,834,837	\$0	\$2,163,684	\$0	\$0																																										

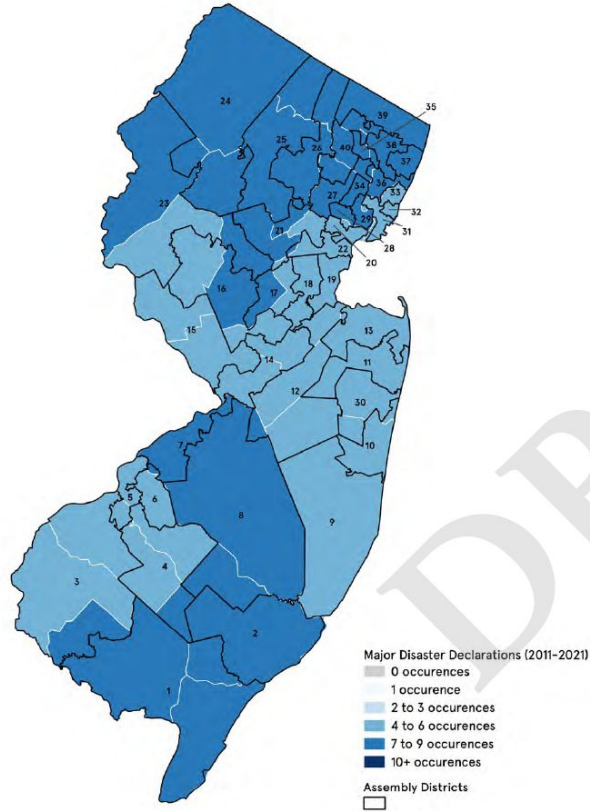
TOTAL: 13 DISASTERS
FEMA PA + HM: \$2.8 B
HUD CDBG-DR: \$4.4 B
FEMA + HUD ASSISTANCE: \$7.2B

2011

			1954: SEVERE WINTER STORM AND SNOWSTORM		4021: HURRICANE IRENE		4033: SEVERE STORMS AND FLOODING	
County Name	# of Climate Disasters 2011-2021	Total FEMA Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations	PA Obligations	HM Obligations
Statewide	13	\$1,165,079,099	\$18,726,825	\$388,929	\$18,445,345	\$1,751,443	\$667,746	\$239,397
Atlantic County	8	\$52,251,817	\$1,043,400	\$0	\$1,889,674	\$0		
Bergen County	8	\$110,260,606	\$3,434,189	\$0	\$8,453,448	\$2,934,152		
Burlington County	8	\$20,280,312	\$1,452,101	\$0	\$3,786,275	\$0		
Camden County	5	\$10,592,711			\$1,071,733	\$0		
Cape May County	8	\$50,591,579	\$3,171,115	\$4,984,384	\$1,183,171	\$0		
Cumberland County	8	\$32,873,447	\$483,165	\$0	\$1,451,980	\$0	\$4,105,431	\$0
Essex County	8	\$56,276,181	\$2,833,171	\$0	\$6,026,174	\$2,627,587		
Gloucester County	6	\$11,375,621			\$2,546,093	\$0	\$1,064,496	\$0
Hudson County	5	\$97,170,927	\$1,681,886	\$0	\$2,238,772	\$0		
Hunterdon County	6	\$14,196,791			\$2,177,773	\$0		
Mercer County	6	\$26,645,584	\$1,293,898	\$0	\$4,866,392	\$0		
Middlesex County	6	\$299,803,367	\$2,797,569	\$0	\$9,999,591	\$1,558,218		
Monmouth County	6	\$320,531,921	\$4,926,979	\$0	\$9,351,231	\$0		
Morris County	9	\$68,053,073	\$1,901,139	\$0	\$14,308,541	\$10,648,643		
Ocean County	6	\$283,965,799	\$3,659,015	\$0	\$2,438,380	\$0		
Passaic County	7	\$52,272,156	\$1,287,628	\$1,992,639	\$8,950,113	\$10,024,038		
Salem County	6	\$5,265,708			\$2,591,925	\$0	\$1,199,622	\$0

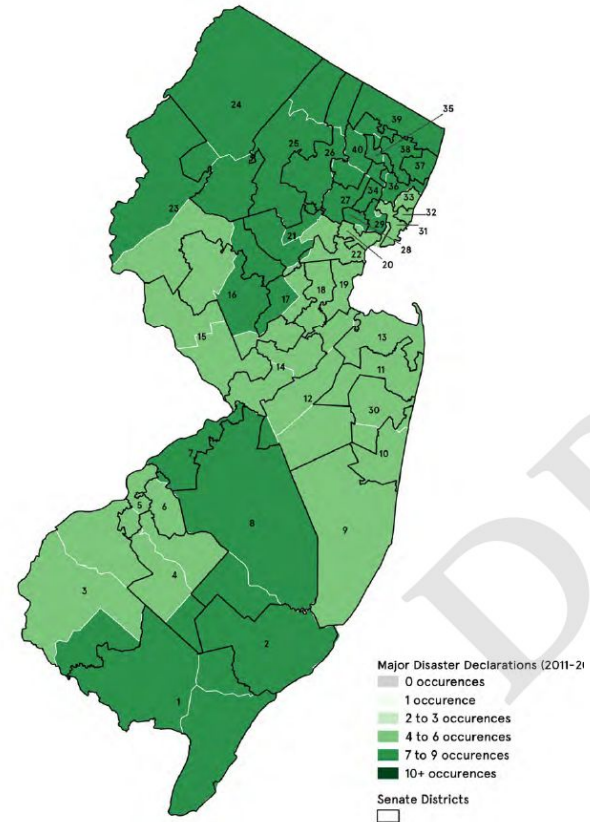
NJ ASSEMBLY DISTRICTS

MAJOR DISASTER DECLARATIONS 2011-2021



NJ SENATE DISTRICTS

MAJOR DISASTER DECLARATIONS 2011-2021



DISASTER OCCURRENCES

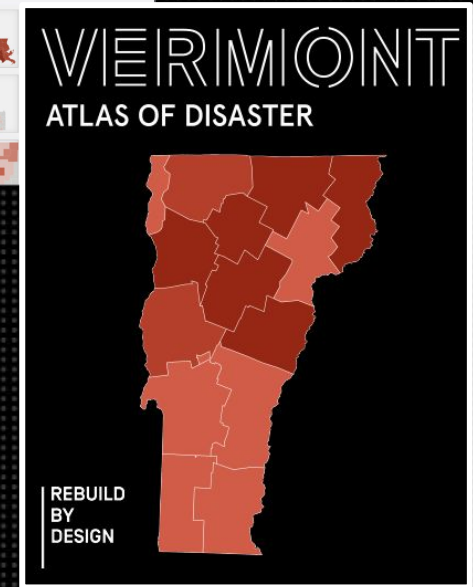
HIGHEST DISASTER STATES		HIGHEST DISASTER STATES	
STATES	TOTAL DISASTERS	STATES	TOTAL DISASTERS
California	25	Virginia	11
Mississippi	22	Florida	11
Oklahoma	22	Georgia	11
Iowa	21	Minnesota	11
Tennessee	20	Connecticut	10
Louisiana	18	Hawaii	10
Alabama	17	Maryland	10
Texas	17	New Mexico	10
Vermont	17	Wisconsin	10
West Virginia	17	Delaware	9
Arkansas	16	Idaho	9
New Hampshire	16	Massachusetts	9
New York	16	Pennsylvania	9
Washington	16	South Carolina	8
Alaska	15	Colorado	7
North Carolina	15	Utah	7
Nebraska	14	Maine	6
Missouri	13	Michigan	6
Kansas	13	Ohio	6
New Jersey	13	Arizona	5
North Dakota	13	Illinois	5
South Dakota	13	Indiana	4
Kentucky	12	Rhode Island	4
Montana	12	Wyoming	4
Oregon	12	Nevada	3

PER CAPITA FEMA + HUD SPENDING

HIGHEST COST PER CAPITA		HIGHEST COST PER CAPITA	
STATES	PER CAPITA	STATES	PER CAPITA
Louisiana	\$1,736	New Mexico	\$97
New York	\$1,348	Arkansas	\$81
New Jersey	\$815	Massachusetts	\$73
North Dakota	\$738	Georgia	\$64
Vermont	\$593	Montana	\$63
Texas	\$518	Kansas	\$60
West Virginia	\$481	New Hampshire	\$55
Alaska	\$401	Rhode Island	\$53
Florida	\$390	Minnesota	\$49
Nebraska	\$390	Pennsylvania	\$49
South Carolina	\$289	Virginia	\$49
Alabama	\$275	Maryland	\$39
South Dakota	\$269	Washington	\$36
North Carolina	\$243	Wyoming	\$32
Hawaii	\$229	Idaho	\$32
Iowa	\$228	Wisconsin	\$27
Oklahoma	\$215	Illinois	\$24
Oregon	\$210	Michigan	\$23
Missouri	\$162	Ohio	\$19
Mississippi	\$159	Maine	\$18
California	\$157	Delaware	\$14
Connecticut	\$149	Utah	\$11
Colorado	\$141	Nevada	\$11
Kentucky	\$105	Indiana	\$7
Tennessee	\$97	Arizona	\$2

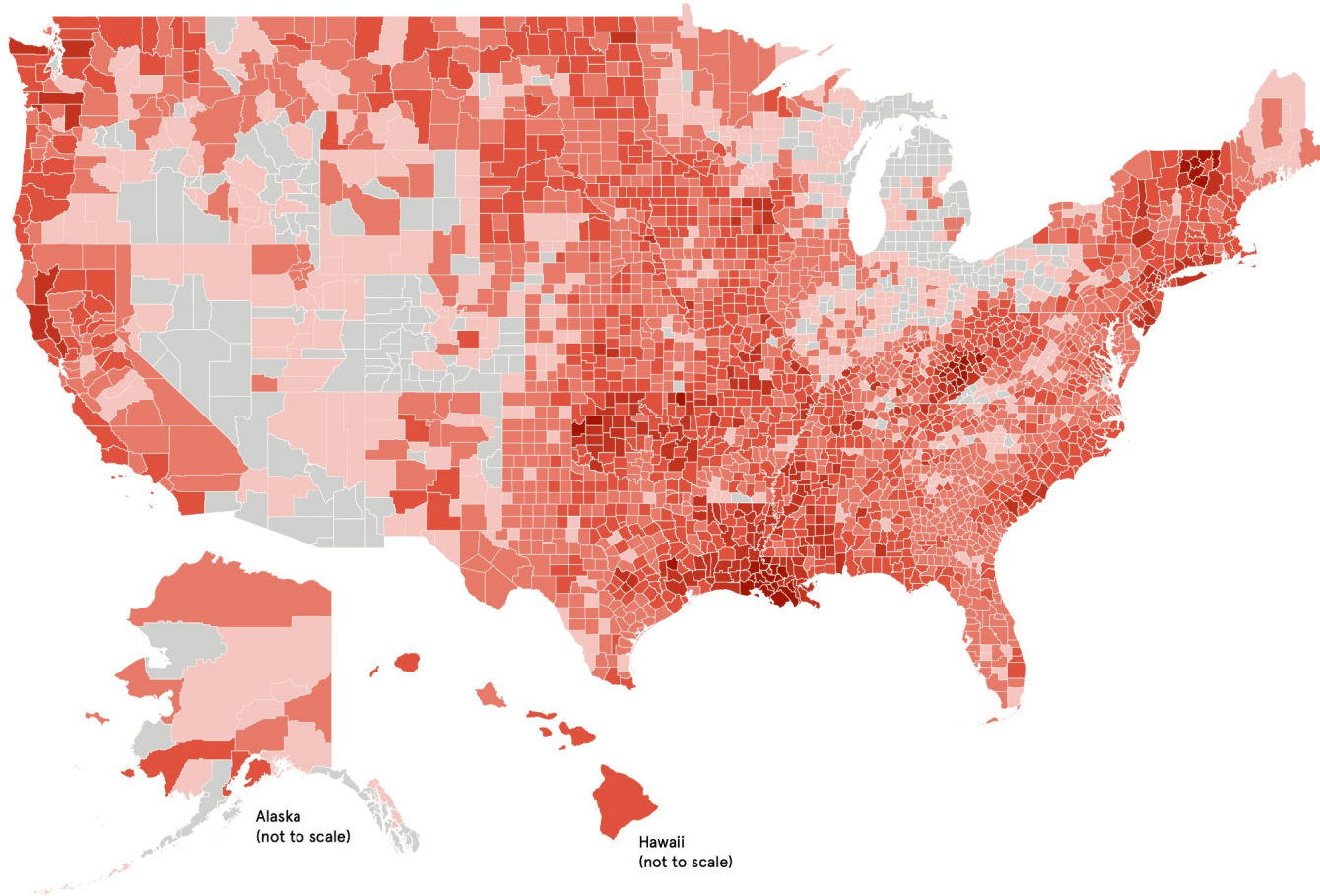
ATLAS OF DISASTER

1. County-level data for the entire U.S. - over 300 maps
2. Status of current disaster and adaptation practices, and discussion of what should be changed
3. Cost of Inaction
4. **Guide for States to build a Collaborative Program**
5. **New Finance tools**
6. Cost Benefit Reform
7. Recommendations



Created in partnership with APTIM and iParametrics

U.S. DISASTER OCCURRENCES 2011-2021





**90% of counties in the
U.S. have had a federal
disaster declaration due
to extreme weather
between 2011-2021.**

Alaska
(not to scale)

Hawaii
(not to scale)

CLIMATE CHANGE IS COMING

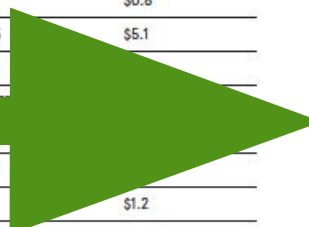
CLIMATE CHANGE ~~IS COMING~~

CLIMATE CHANGE IS HERE.

**NEW JERSEY NEEDS
SUSTAINABLE SOURCES OF
LONG-TERM CLIMATE
ADAPTATION INFRASTRUCTURE
FUNDING.**

CAPACITY OF A TWO PERCENT SURCHARGE P&C INSURANCE

	TOTAL INSURED P&C	TOTAL INSURED WITHOUT MED MAL AND WC	TWO PERCENT SURCHARGE WITHOUT BONDING	TWO PERCENT SURCHARGE WITH 10-YEAR BONDING (IN BILLIONS)
Total 50 States	\$695,509,700	\$629,385,861	\$12,587,717	\$287.1
Alabama	\$9,464,513	\$8,948,954	\$178,979	\$4.1
Alaska	\$1,655,434	\$1,402,346	\$28,047	\$0.6
Arizona	\$12,414,975	\$11,338,136	\$226,763	\$5.1
Arkansas	\$5,706,307	\$5,396,813	\$107,936	
California	\$84,880,338			
Colorado	\$14,285,006			
Connecticut	\$8,992,575	\$8,131,839	\$162,637	
Delaware	\$2,906,697	\$2,664,456	\$53,289	\$1.2
Florida	\$55,576,482	\$51,794,341	\$1,035,887	\$23.5
Georgia	\$22,954,861	\$20,953,153	\$419,063	\$9.5
Hawaii	\$2,701,615	\$2,381,525	\$47,631	\$1.1
Idaho	\$3,231,796	\$2,759,183	\$55,184	\$1.3
Illinois	\$27,060,540	\$24,181,953	\$483,639	\$11.0
Indiana	\$12,037,170	\$11,100,606	\$222,012	\$5.0
Iowa	\$6,790,563	\$6,069,738	\$121,395	\$2.8
Kansas	\$6,980,593	\$6,511,683	\$130,234	\$3.0
Kentucky	\$8,042,654	\$7,361,013	\$147,220	\$3.3
Louisiana	\$12,396,192	\$11,411,646	\$228,233	\$5.2
Maine	\$2,476,882	\$2,189,416	\$43,788	\$1.0
Maryland	\$12,684,730	\$11,527,865	\$230,557	\$5.2
Massachusetts	\$16,354,175	\$14,721,756	\$294,435	\$6.7
Michigan	\$20,817,467	\$19,547,615	\$390,952	\$8.9
Minnesota	\$12,462,639	\$11,416,765	\$228,335	\$5.2



	TOTAL INSURED P&C	TOTAL INSURED WITHOUT MED MAL AND WC	TWO PERCENT SURCHARGE WITHOUT BONDING	TWO PERCENT SURCHARGE WITH 10-YEAR BONDING (IN BILLIONS)
Mississippi	\$5,591,834	\$5,192,253	\$103,845	\$2.4
Missouri	\$12,677,046	\$11,576,608	\$231,532	\$5.3
Montana	\$2,603,859	\$2,293,122	\$45,862	\$1.0
Nebraska	\$5,246,314	\$4,842,941	\$96,859	\$2.2
Nevada	\$6,256,046	\$5,736,060	\$114,721	\$2.6
New Hampshire	\$2,594,294	\$2,323,267	\$46,465	\$1.1
New Jersey	\$22,875,472	\$19,993,159	\$399,863	\$9.1
New Mexico	\$3,749,295	\$3,392,114	\$67,842	\$1.5
New York	\$47,700,000	\$43,000,000	\$4,700,000	\$11.0
North Carolina	\$17,000,000	\$15,000,000	\$2,000,000	\$4.5
North Dakota	\$2,600,000	\$2,300,000	\$300,000	\$0.7
Ohio	\$17,700,000	\$16,000,000	\$1,700,000	\$4.0
Oklahoma	\$8,600,000	\$7,800,000	\$800,000	\$1.8
Oregon	\$7,700,000	\$7,000,000	\$700,000	\$1.6
Pennsylvania	\$26,000,000	\$23,000,000	\$3,000,000	\$7.0
Rhode Island	\$2,600,000	\$2,300,000	\$300,000	\$0.7
South Carolina	\$10,636,489	\$9,741,622	\$194,832	\$4.4
South Dakota	\$2,555,563	\$2,371,137	\$47,423	\$1.1
Tennessee	\$12,534,747	\$11,514,225	\$230,285	\$5.2
Texas	\$61,402,995	\$58,514,883	\$1,170,298	\$26.6
Utah	\$5,405,102	\$4,898,669	\$97,973	\$2.2
Vermont	\$1,506,858	\$1,302,233	\$26,045	\$0.6
Virginia	\$14,885,228	\$13,589,738	\$271,795	\$6.2
Washington	\$16,288,384	\$13,551,966	\$271,039	\$6.2
West Virginia	\$3,165,210	\$2,795,077	\$55,902	\$1.3
Wisconsin	\$11,213,538	\$9,196,595	\$183,932	\$4.2
Wyoming	\$1,288,005	\$1,263,939	\$25,279	\$0.6

\$9.1 billion over 10 years

CAPACITY OF A TWO PERCENT SURCHARGE P&C INSURANCE

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Alaska	\$1,655,434	\$1,402,346	\$28,047	\$0.6
Arizona	\$12,414,975	\$11,338,136	\$226,763	\$5.1
Arkansas	\$5,706,307	\$5,396,818	\$107,936	\$2.4
California	\$84,880,338	\$72,448,188	\$4,465,972	\$32.2
Colorado	\$14,285,000	\$13,069,111	\$1,115,889	\$9.1
Connecticut	\$8,992,575	\$8,131,839	\$162,637	\$3.7
Delaware	\$2,906,697	\$2,611,456	\$153,289	\$1.2
Florida	\$5,200,000	\$4,715,000	\$485,000	\$3.9
Georgia	\$7,200,000	\$6,500,000	\$700,000	\$5.5
Hawaii	\$2,701,615	\$2,381,525	\$47,631	\$1.1
Idaho	\$3,231,796	\$2,759,183	\$55,184	\$1.3
Illinois	\$27,060,540	\$24,181,953	\$2,850,587	\$22.8
Indiana	\$12,037,170	\$11,100,606	\$222,012	\$1.8
Iowa	\$6,790,563	\$6,069,738	\$121,395	\$2.8
Kansas	\$6,980,593	\$6,511,683	\$130,234	\$3.0
Kentucky	\$8,042,654	\$7,361,013	\$147,220	\$3.3
Louisiana	\$12,396,192	\$11,411,646	\$228,233	\$5.2
Maine	\$2,476,882	\$2,189,416	\$43,788	\$1.0
Maryland	\$12,684,730	\$11,527,865	\$230,557	\$5.2
Massachusetts	\$16,354,175	\$14,721,756	\$294,435	\$6.7
Michigan	\$20,817,467	\$19,547,615	\$390,952	\$8.9
Minnesota	\$12,462,639	\$11,416,765	\$228,335	\$5.2

A total of \$287 Billion could be raised through a 2% surcharge.

	TOTAL INSURED P&C	TOTAL INSURED WITHOUT MED MAL AND WC	TWO PERCENT SURCHARGE WITHOUT BONDING	TWO PERCENT SURCHARGE WITH 10-YEAR BONDING (IN BILLIONS)
Mississippi	\$5,591,834	\$5,192,253	\$103,845	\$2.4
Missouri	\$12,677,046	\$11,576,608	\$231,532	\$5.3
Montana	\$2,603,859	\$2,293,122	\$45,862	\$1.0
Nebraska	\$5,246,314	\$4,842,941	\$96,859	\$2.2
Nevada	\$6,211,011	\$5,734,060	\$114,721	\$2.6
New Hampshire	\$2,500,294	\$2,286,000	\$44,294	\$1.1
New Jersey	\$22,000,472	\$19,115,000	\$2,885,472	\$23.1
New Mexico	\$3,749,295	\$3,392,114	\$67,842	\$1.5
New York	\$47,566,816	\$42,538,109	\$850,762	\$19.3
North Carolina	\$10,059,009	\$9,144,215	\$308,800	\$7.0
North Dakota	\$4,000,000	\$3,700,000	\$300,000	\$2.4
Ohio	\$8,738,107	\$8,000,000	\$738,107	\$5.9
Oklahoma	\$8,605,457	\$7,844,825	\$159,897	\$3.6
Oregon	\$7,732,347	\$6,947,913	\$138,958	\$3.2
Pennsylvania	\$26,101,054	\$22,812,640	\$456,253	\$10.4
Rhode Island	\$2,047,799	\$1,882,057	\$47,641	\$1.1
South Carolina	\$10,200,000	\$9,100,000	\$900,000	\$7.2
South Dakota	\$2,555,563	\$2,371,137	\$47,423	\$1.1
Tennessee	\$12,534,747	\$11,514,225	\$230,285	\$5.2
Texas	\$61,402,995	\$58,514,883	\$1,170,298	\$26.6
Utah	\$5,405,102	\$4,898,669	\$97,973	\$2.2
Vermont	\$1,506,858	\$1,302,233	\$26,045	\$0.6
Virginia	\$14,885,228	\$13,589,738	\$271,795	\$6.2
Washington	\$16,288,384	\$13,551,966	\$271,039	\$6.2
West Virginia	\$3,165,210	\$2,795,077	\$55,902	\$1.3
Wisconsin	\$11,213,538	\$9,196,595	\$183,932	\$4.2
Wyoming	\$1,288,005	\$1,263,939	\$25,279	\$0.6

INFRASTRUCTURE RESILIENCE CHARGE BENEFITS

- **Progressive**, by surcharging property wealth protection.
- Would go directly back to making those insured assets **more resilient**.
- Could decrease **certain insurance premiums**. FEMA's community rating program will reward community-wide actions that lower risk by reducing flood insurance premiums 5% - 45%
- The investment can **seed a new industry** and support thousands of jobs

824

active Superfund sites according to the the Environmental Protection Act. Each storm brings the peril of releasing toxins, making these sites environmental and public health threats.⁵



INSTITUTIONALIZING EQUITY INTO THE PROGRAM

The surcharge could be instituted on the types of insurance that would broadly be impacted by climate, and not on lines such as workers compensation or medical malpractice.

It could also exempt the lowest income policy holders and affordable housing.

P& C Insurance: Written Premium Source	Vermont	Broadly supporting policy
YEAR: 2019		
Fire	\$32,092	\$32,092
Allied lines (accounts receivable, data-processing equipment, water damage and vandalism)	\$16,603	\$16,603
Crop Total	\$3,043	\$3,043
Multiple Peril Crop	\$3,041	\$3,041
Federal flood	\$4,634	\$4,634
Private Flood	\$586	\$586
Farmowners	\$15,600	\$15,600
Homeowners multiple peril	\$212,610	\$212,610
Commercial multiple peril Total	\$145,376	\$145,376
Comm'l Multi Pri (Liab)	\$55,325	\$55,325
Comm'l Multi Pri (Non-Liab)	\$90,051	\$90,051
Mortgage guaranty	\$12,409	\$12,409
Ocean Marine	\$3,871	
Inland Marine	\$49,736	
Medical professional liability	\$17,034	
Earthquake	\$28,697	\$28,697
Workers Comp. Total	\$187,591	
Workers' compensation	\$185,438	
Excess worker comp.	\$2,153	
Other liability Total	\$110,454	\$110,454
Oth Liab (Claims)	\$38,710	
Oth Liab (Occurrence)	\$71,744	
Products liability	\$6,387	
Automobile Total	\$473,912	\$473,912
Comm'l Auto Phys	\$28,590	\$28,590
Oth Comm'l Auto Liab	\$49,860	\$49,860
Oth Pvt Pass Auto Liab	\$186,550	\$186,550
Pvt Pass Auto Phys Damage	\$208,911	\$208,911
Aircraft (all perils)	\$1,624	
Fidelity (fraudulent acts)	\$3,550	
Surety (guarantor for project completion)	\$8,791	
Burglary and theft	\$646	
Boiler and machinery	\$5,259	\$5,259
Credit	\$2,755	
Warranty	\$8,818	
Agg. Write-ins for other lines/Other P&C	\$140,220	
Accident & Health Total	\$14,560	
Group A&H	\$12,971	
Grtd Renewable A&H	\$1,035	
Oth A&H	\$546	
	\$1,506,858	Total
1.5 percent surcharge	\$22,603	

COMMUNITIES ARE VOTING FOR ADAPTATION FUNDING

RECENT VOTER-APPROVED BALLOT MEASURES

YEAR	LOCALITY	AMOUNT	PURPOSE	STATUS
2022	New York	\$4.2 billion bond	Ecological and Climate Resilience	67.5%
2021	Denver, CO	\$40 million per year	Raised the city's sales tax by 0.25% to address climate - both mitigation and adaptation efforts. 50% of the fund is directed toward underserved communities	62.34%
2021	Maine	\$100 million bond	Municipal, regional and state infrastructure adaptation improvements that support public safety and emergency management and infrastructure resiliency	72%
2021	Virginia Beach, VA	\$567.5 million bond	Design and construction of flood mitigation measures as part of a comprehensive flood protection program	72.72%
2020	Key Biscayne, FL (Miami-Dade County)	\$100 million bond	\$40 million for mitigating the effects of sea level rise and flooding, \$23 million for protecting the beaches and shoreline, and more than \$35 million to harden and place infrastructure underground to withstand hurricanes.	56.55%
2018	California	\$4 billion bond	Environmental and recreational purposes	57.59%
2018	Harris County, TX	\$2.5 billion bond	Flood damage reduction projects	85%
2018	San Francisco Bay Area, CA	\$425 million bond	Seismic strengthening and flood protection projects for the hundred-year-old Embarcadero seawall and other critical infrastructure	82.7%
2017	Miami, FL	\$400 million	Sea-Level Rise and Flood Prevention, Roadways, Parks and Cultural Facilities, Public Safety and Affordable Housing	55%
2016	San Francisco Bay Area, CA	\$12 parcel tax to raise approximately \$25 million annually, or \$500 million over twenty years	San Francisco Bay: wetlands restoration to address clean water, pollution prevention, and habitat restoration	69%
2012	Rhode Island	\$20 million	Bond for environmental and recreational purposes	69.8%

QUESTIONS

Amy Chester, Director:

achester@rebuildbydesign.org

The logo for Rebuild By Design features the words "REBUILD", "BY", and "DESIGN" stacked vertically in a bold, white, sans-serif font. A vertical white line is positioned to the left of the text, extending from the top of "REBUILD" to the bottom of "DESIGN".

**REBUILD
BY
DESIGN**