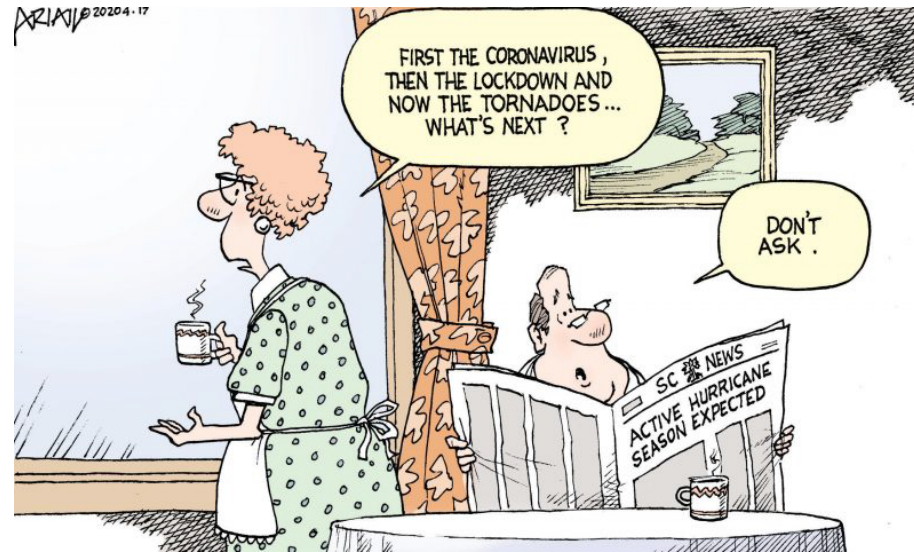


What Do We Do Next?



Applied Research Needs for Hazard Mitigation and Resilience

NASEM Resilient America Program
Workshop: Hazard Mitigation and Resilience Applied Research
Topics--Compounding and Cascading Events
May 31, 2022

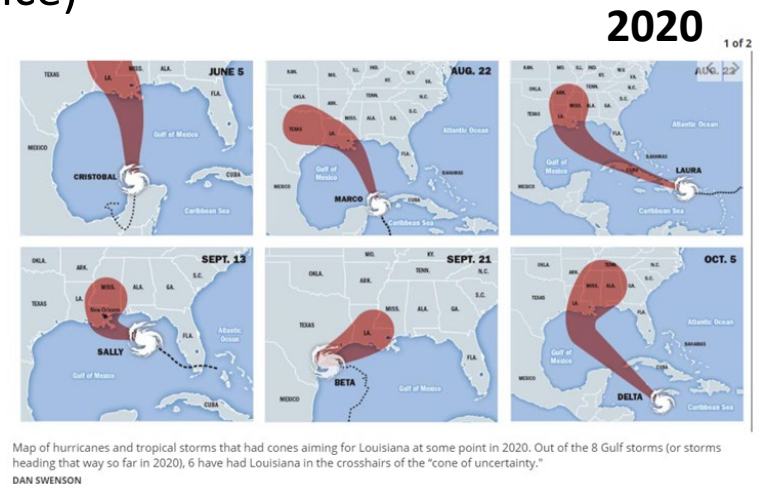
Susan L. Cutter
Hazards & Vulnerability Research Institute
Department of Geography
(scutter@sc.edu)



UNIVERSITY OF
SOUTH CAROLINA

CASCADES ARE THE NEW NORMAL

- Rapid succession of events hitting the same region as prior storms (Louisiana 2020, Western wildfires)
- Aging infrastructure
- Social unrest (mass shootings, police violence)
- Pandemic (COVID 19)



Cascading disasters are now the norm with consequences well beyond proximate location and time frame.

- ❑ Increasing exposure by combination of vulnerability and societal risk production
- ❑ Industrialization, globalization, technology generate more interdependency
- ❑ Increase in unintended consequences from localized everyday events (rain, heat, cold)

INEQUALITY AND INEQUITY IN DISASTER RISK

THE CONVERSATION

NATURAL DISASTERS

Natural Disasters by Location: Rich Leave and Poor Get Poorer

Each big catastrophe like a hurricane increases a U.S. county's poverty by 1 percent, 90 years of data show

By Leah Platt Boustan, Maria Lucia Yanguas, Matthew Kahn, Paul W. Rhode, The Conversation US on July 2, 2017



INVESTIGATIONS

Search The Thousands Of Disaster Buyouts FEMA Didn't Want You To See

March 5, 2019 · 5:44 AM ET

ROBERT BENINCASA



Why Does Disaster Aid Often Favor White People?

The federal government often gives less help to Black disaster survivors than their white neighbors. That's a challenge for President Biden, who has vowed to fight both inequality and climate change.

Give this story



94

Los Angeles Times



CALIFORNIA



PG&E power outages bring darkness, stress and debt to California's poor and elderly



By Christopher Flavelle

Published June 7, 2021 Updated Oct. 27, 2021



Research Counts

November 13, 2017

Helping Those Most in Need First: Leveraging Social Vulnerability Research for Equitable Disaster Recovery

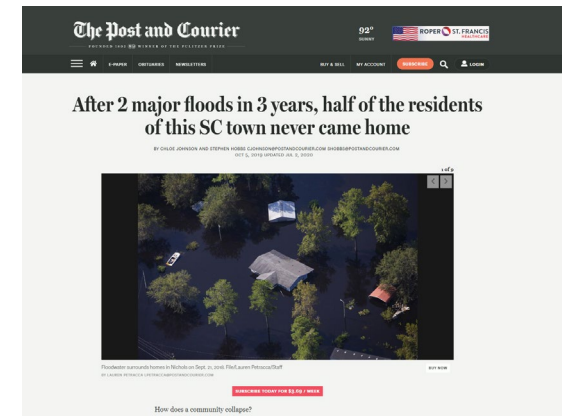
by Susan Cutter and Christopher Emrich



A decade after Hurricane Katrina, Diamondhead, Mississippi is still a patchwork of empty, overgrown lots. ©Hazards and Vulnerability Research Institute, 2015.

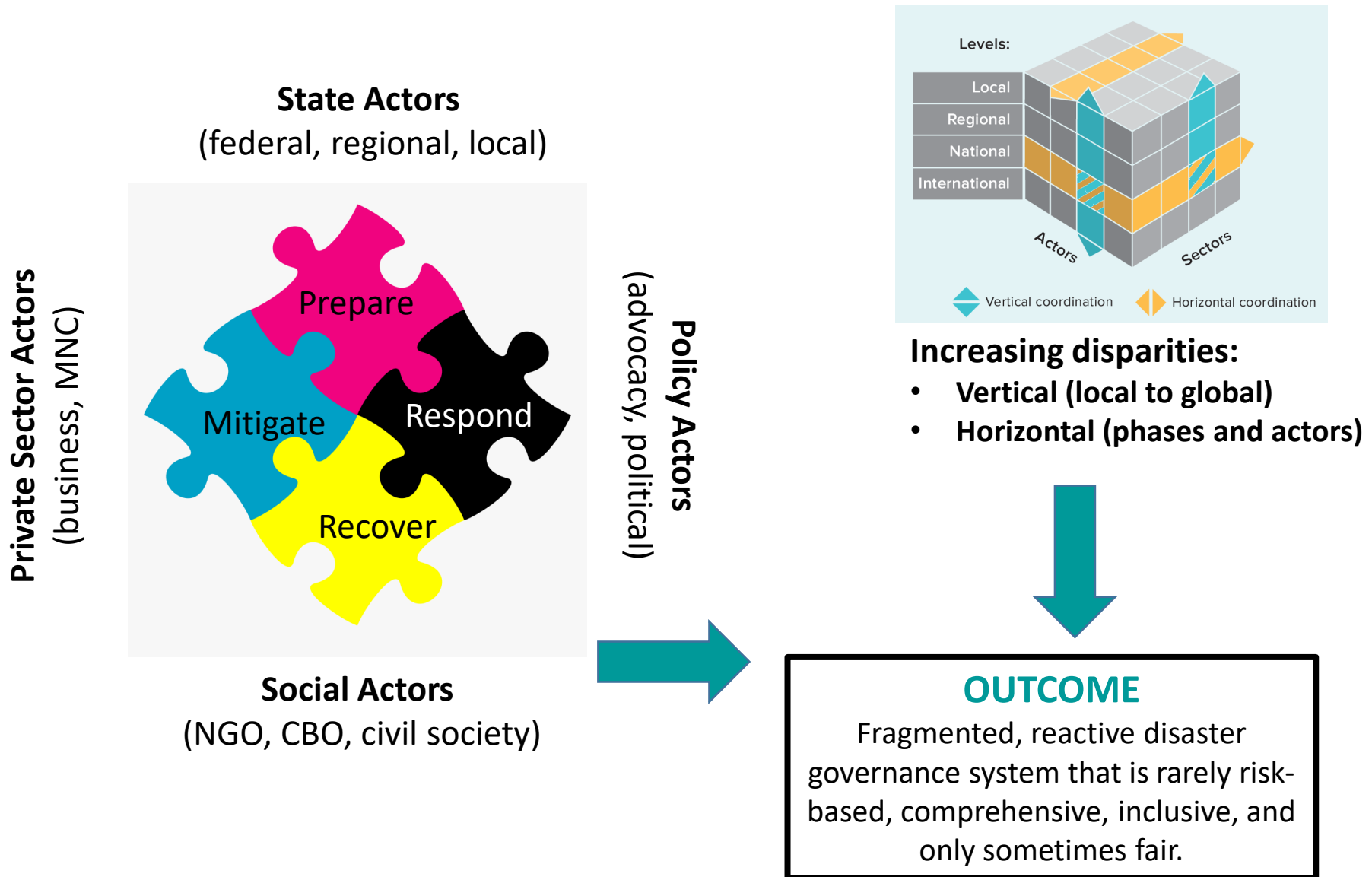
Inequality: uneven distribution of resources or risk (sameness)

Inequity: unfair, avoidable differences due to bias, governance (fairness)



Cutter, S. and C. Emrich, 2017.
<https://hazards.colorado.edu/news/research-counts/helping-those-most-in-need-first-leveraging-social-vulnerability-research-for-equitable-disaster-recovery>

CHALLENGES IN DISASTER GOVERNANCE



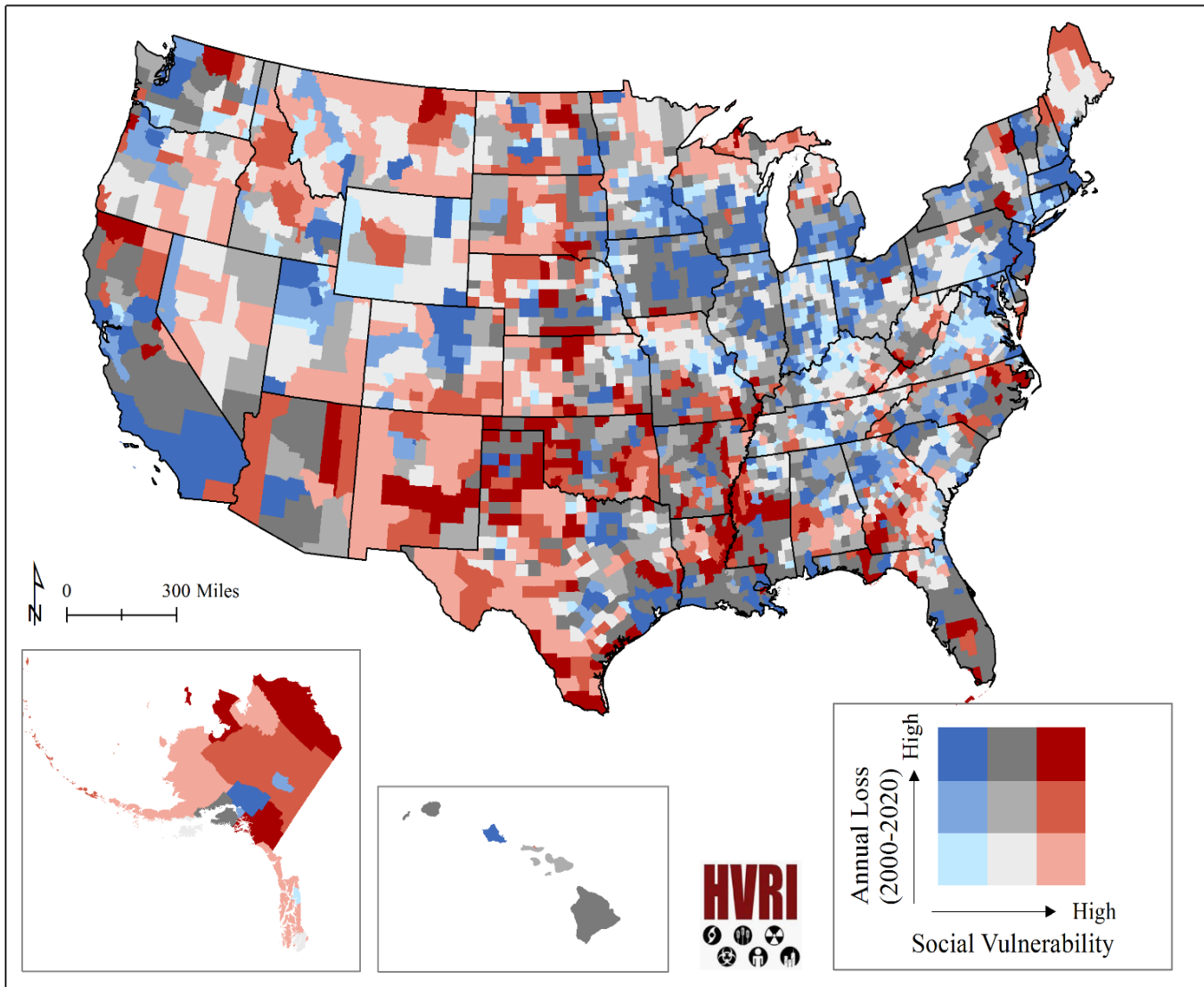
What does recovery mean?

- Is recovery an outcome (recovery to what) or a process (inclusive decision making for entire community) or both?
- How do we insure equitable recovery given differential impacts, capacities, and needs?

Research Needs:

1. Systematic, evidentiary-based assessment of differential hazard impacts, capacities, and unmet needs
2. Long-term observation of disaster hot-spots (cascading/compounding and/or recurring events) to develop lessons learned (and unlearned) based on empirically-based evidence

ASSESS IMPACT INEQUALITY USING SOCIAL VULNERABILITY



Policy Options

- Mitigate risk and reduce vulnerability**
- Employ risk reduction measures to reduce loss—house elevation, levees, tornado shelters**
- Improve social conditions to reduce vulnerability—more education, jobs, health insurance**

ASSESSING SPATIAL IMPACTS VIA RELATIVE LOSSES

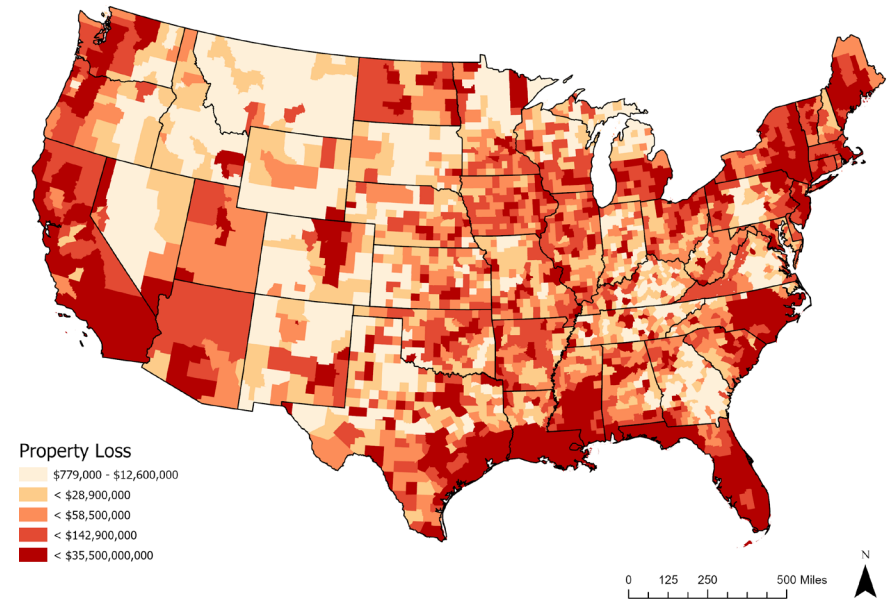
(Ratio property loss/county GDP)

“While the national capacity to absorb and recover from disasters is quite high, local capacities are often exceeded by singular large events or the cumulative impacts of smaller events, necessitating the influx of external aid to help these places recover from hazards.” (Ash et al. 2013).

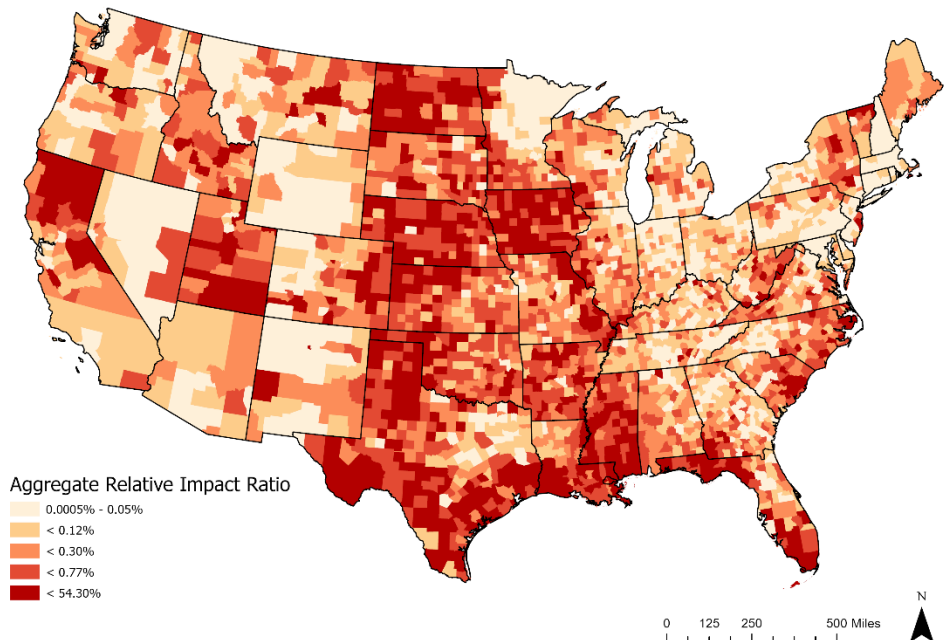
What is the capacity to absorb cumulative losses?

Source: Ash, K.D., S.L. Cutter, and C.T. Emrich, 2013. Acceptable losses? The relative impacts of natural hazards in the United States, 1980-2009, *Intl. J. Disaster Risk Reduction* 5:61-72.

Total Property Loss (1980 - 2020)



Relative Hazard Impact Ratio (1980 - 2020)



ELUCIDATE SOCIAL CASCADES



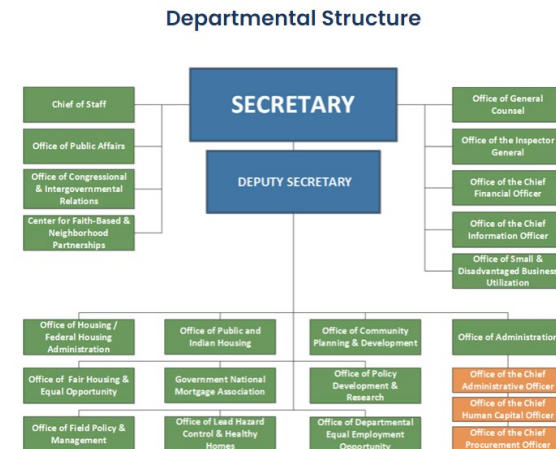
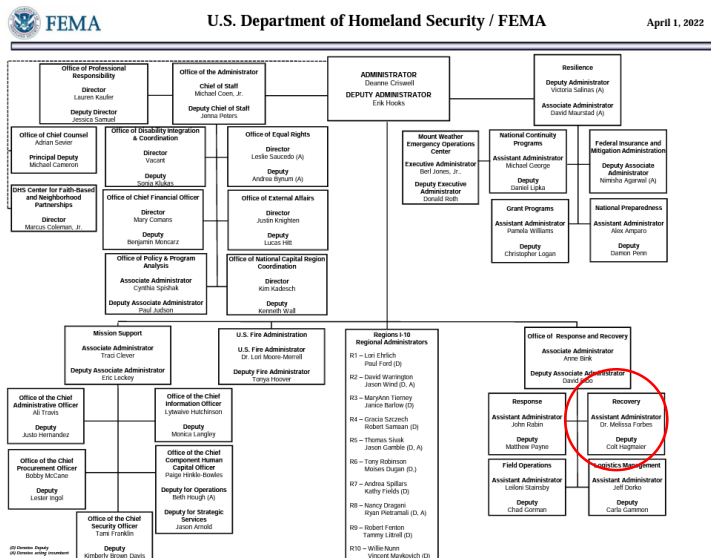
Hurricane Eta, Nov 3, 2020
Hurricane Iota, Nov 16, 2020
Puerto Cabezas, Nicaragua



- Cumulative social, cultural, economic, political effects of consecutive disasters in place or time
- Repetitive nature of events creates perverse multiplier effect reducing adaptive capacity
- Exposes pre-existing limits for response, mitigation, and longer-term recovery

Who is in charge of recovery?

- What local, state, federal agency should oversee disaster recovery?
- How do we track recovery and monitor success and over what time period?



Created in September 2020 as

1. Housing recovery after federally declared disaster
2. Mitigation against future flood risks
3. Resilience planning





Testimony

Before the Committee on Homeland Security, House of Representatives

For Release on Delivery
Expected at 10:00 a.m. ET
Wednesday, October 27, 2021

DISASTER RECOVERY

Efforts to Identify and Address Barriers to Receiving Federal Recovery Assistance

Statement of Chris P. Currie, Director,
Homeland Security and Justice



Report to Congressional Requesters

March 2019

DISASTER RECOVERY

Better Monitoring of Block Grant Funds Is Needed

GAO@100 Highlights

Highlights of [GAO-22-104039](#), a report to congressional requesters

Why GAO Did This Study

Disasters affect numerous American communities and cause billions of dollars of damage. Many factors affect individual and community recovery. Recently, federal actions have focused on equitable administration of federal recovery assistance.

Members of Congress asked GAO to report on the impact of federal disaster recovery programs on various societal groups. This report addresses (1) research findings on recovery outcomes related to select federal programs, (2) research findings and recovery stakeholder perspectives on participation in select federal recovery programs, and (3) the extent to which federal disaster recovery agencies have taken actions to identify and address potential access barriers and disparate outcomes.

GAO conducted a literature review to summarize key research findings and interviewed state, tribal, and nonprofit recovery stakeholders to gain their perspectives. GAO analyzed program documentation and interviewed federal program officials from the six federal programs selected because of their historically large obligations for disaster recovery.

What GAO Recommends

GAO recommends that FEMA, HUD, and SBA lead an interagency effort to develop (1) a plan to ensure use of comprehensive information and (2) processes to identify and address access barriers and disparate outcomes. FEMA and SBA concurred. HUD did not agree or disagree with the recommendations, but officials stated they would work with federal recovery partners on these issues.

View [GAO-22-104039](#). For more information, contact Chris Currie at (404) 679-1875 or CurrieC@gao.gov

December 2021

DISASTER RECOVERY

Additional Actions Needed to Identify and Address Potential Recovery Barriers

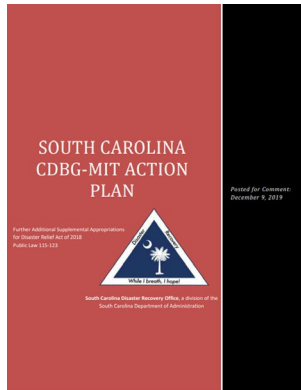
What GAO Found

Limited research exists on the relationship between disaster outcomes and the six federal recovery programs included in this GAO review: the Federal Emergency Management Agency's (FEMA) Individual Assistance and Public Assistance programs, National Flood Insurance Program, and Hazard Mitigation Grant Program; the Small Business Administration's (SBA) Disaster Loan program; and Housing and Urban Development's (HUD) Community Development Block Grant-Disaster Recovery. The design of the nine available studies did not allow GAO to draw conclusions about causal relationships between federal disaster recovery programs and overall recovery outcomes. Of the studies that were available, GAO grouped the findings into two categories: (1) socioeconomic outcomes and (2) community resilience outcomes. Our review of socioeconomic studies suggested that outcomes of disaster assistance for individual programs may be uneven across communities. This review also suggested that federal programs may enhance community resilience and prevent flood-related fatalities for vulnerable residents.

Limited research exists on the relationship between participation in select federal recovery programs and individual, community, and program characteristics. However, GAO found that some studies and stakeholder perspectives provided insight into the relationships between socioeconomic, demographic, community, and programmatic characteristics and participation. For example, a study of counties in one state found greater levels of flood mitigation in communities with larger tax revenues and larger budgets for emergency management. In addition, officials representing states said larger cities can hire a third party to manage disaster recovery, but small towns and rural areas may lack resources to contract for disaster recovery services. Similarly, an official representing tribal nations told GAO that not all tribal nations have sufficient funding to develop emergency management departments, which can be a barrier to accessing federal resources. Further, representatives from voluntary organizations told GAO that conditions of socioeconomic vulnerability—such as lower-income households or homelessness—may present barriers to participating in federal recovery programs.

Some of the six federal recovery programs in this report have taken some actions that could help officials identify and address potential access barriers and disparate outcomes. However, programs lack key information—data and analysis—that would allow them to examine patterns and indicators of potential access barriers and disparate recovery outcomes. Moreover, the programs have not taken action to determine (1) the universe of data needed to support this kind of analysis; and (2) sources and methods to obtain those data when the programs do not already collect them, including overcoming key challenges. These programs also lacked routine, interagency processes to address such barriers within or across recovery programs on an ongoing basis. Systematic efforts to collect and analyze data, and routine, interagency processes to address any identified access barriers or disparate outcomes, would help ensure equal opportunity to participate in disaster recovery in a meaningful way. Such actions would be consistent with the National Disaster Recovery Framework and recent governmentwide equity initiatives.

EXAMPLE: HUD's (CDBG-MIT) PROGRAM



Supports mitigation needs and disaster resilience in affected communities (CDBG-DR recipients) from 2015-2017 disasters

SOUTH CAROLINA= \$157,590,000

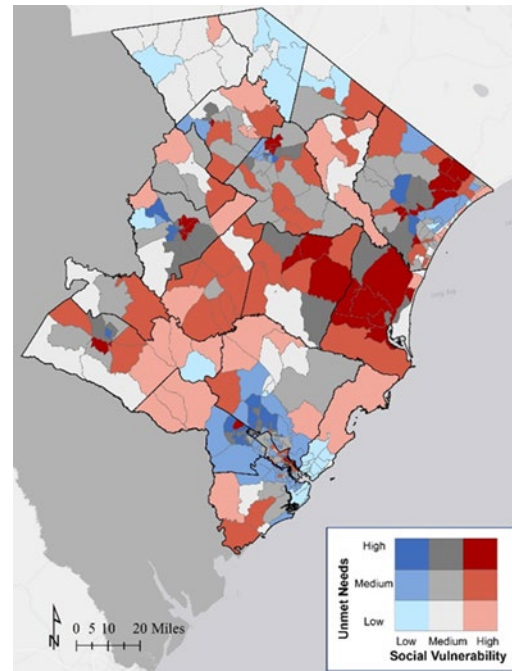
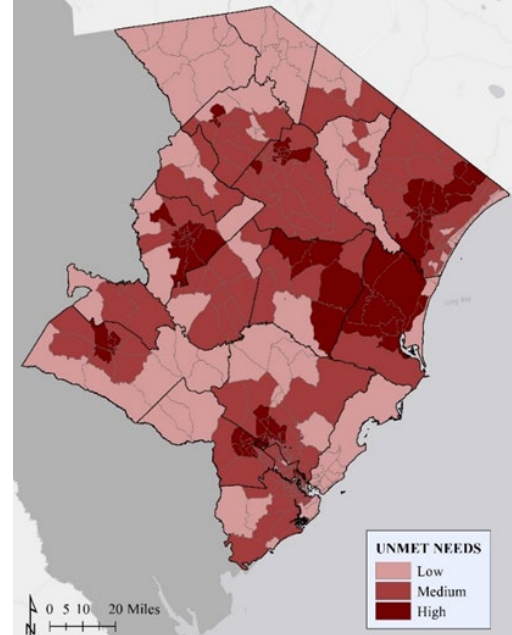
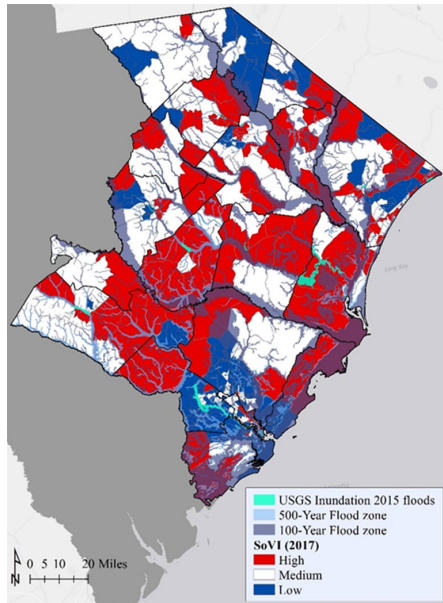
Action Plan based on mitigation needs assessment and method of distribution of funds

Mitigation needs assessment:

- Risk profiles of South Carolina and HUD-Defined most impacted and distressed areas (MID)
- Critical lifelines potentially at risk
- **Social vulnerability**

No Guidance on how to do this!

HUD's Disaster Impact and Unmet Needs Assessment Kit not updated from 2013.

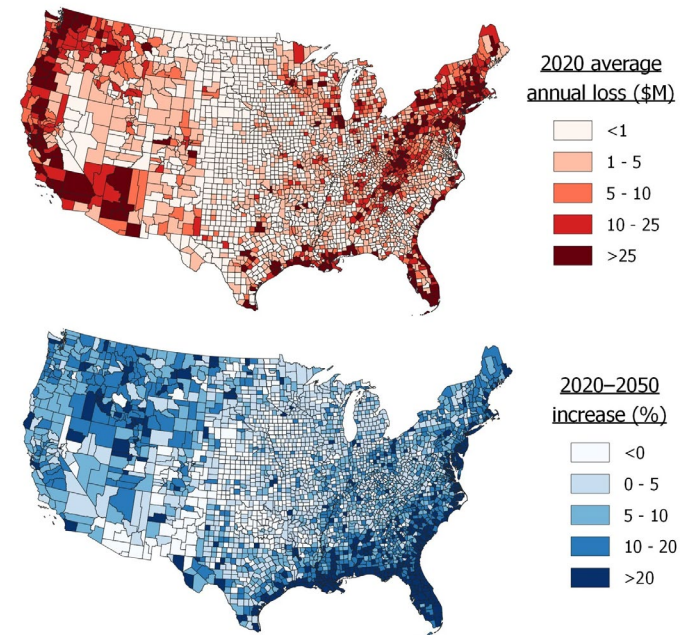


What shall we focus on?

- Is it better to take an all-hazards approach to mitigation or a single-hazard approach?
- Should we focus more on human perceptions and behavior or structural mitigation measures or the driving factors behind recovery inequities?
- Does the NFIP create or reduce flood risk?

Research Needs:

1. More engagement with research community to translate ALL facets of flood research into practice
2. Provide more research access to data on repetitive loss and severe repetitive loss (while protecting PII)
3. Post-audit evaluation of NFIP program and all of its elements at various spatial scales



Source: Wing, O.E.J. et al. 2022. Inequitable patterns of US flood risk in the Anthropocene, *Nature Climate Change* 12: 156-162.

Moving Forward*

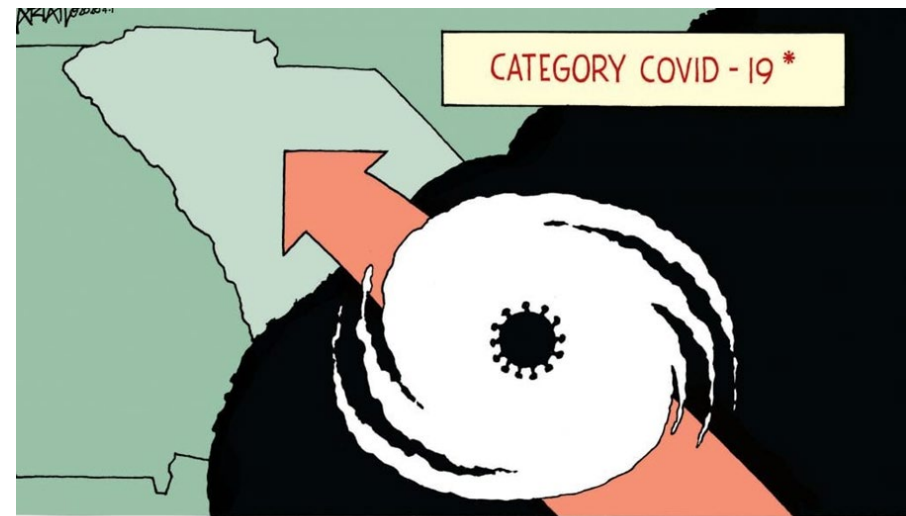
➤1. Establish long term Resiliency and Vulnerability Observatory Network to “...provide policy makers, and society with the knowledge and predictive understanding necessary to reduce the vulnerability associated with natural hazards and enhance the resiliency of individuals and communities”
www.nehrp.gov/pdf/ravon.pdf

➤2. Solve the governance bifurcation of recovery by providing a formal legislative or legal structure for disaster recovery and resilience (aka the Stafford Act). Disaster Recovery Reform Act of 2018 only apply to FEMA not long term recovery by HUD.

➤3. Reform and reauthorize the NFIP.
Set reauthorization timing to 10 years to allow reforms to take place.

➤4. Support more social and behavioral science to provide the evidentiary basis for disaster mitigation and resilience policy/practice. Create and fund a FEMA Office of Applied Research.

*Cutter, S.L. and C.B Rubin, 2020. Glancing backward while moving forward, Chapter 10 (pp. 233-252) in C.B. Rubin and S.L. Cutter (eds.), *U.S. Emergency Management in the 21st Century: From Disaster to Catastrophe*, Routledge.



* A METAPHOR WE MIGHT TAKE MORE SERIOUSLY .



“Today’s flood will become tomorrow’s high tide” —Margaret Davidson



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» Hazards Vulnerability & Resilience Institute

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HVRI Data and Resources

Research

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Hazards Vulnerability & Resilience Institute

The Hazards Vulnerability & Resilience Institute (HVRI) is an interdisciplinary research and training center focused on the development of spatial analytical information, data, methods, and application for integrating hazard and climate information to advance equitable planning and management and adaptive capacity in communities as they respond to disaster risks and climate change. In addition to basic research, HVRI engages with practitioners and communities to foster resilience and facilitates local, state, and federal efforts to improve emergency preparedness, planning, and recovery by providing technical assistance and translational products to foster evidentiary based policy and practice.

HVRI Out and About

Upcoming Events



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scutter@sc.edu

HAZARD DOC Blog: <https://hazarddoc.wordpress.com/>



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