Federal Reserve Bank *of* Atlanta

NO. 24–2 June 2024
COMMUNITY AND ECONOMIC DEVELOPMENT DISCUSSION PAPER

Risk and Resilience: How Weather-Related Disasters Impact Economically Marginalized Communities

Dontá Council
Adviser
Community and Economic Development
Federal Reserve Bank of Atlanta

Grace Meagher
Research analyst
Community and Economic Development
Federal Reserve Bank of Atlanta

Leah Cabrera
Former intern
Community and Economic Development
Federal Reserve Bank of Atlanta

Primary issue:
Across the Southeast, households and communities routinely grapple with the adverse economic consequences and increasing frequency and intensity of weather-related disasters. For historically underserved communities including low-income communities and communities of color, such risks represent a significant barrier to economic well-being and resilience.

Key findings:
By focusing on the perceptions of community development and resilience professionals in the region, the study examines and evaluates factors that may impede the ability of low-income communities and communities of color to prepare for and recover from weather-related disaster risks. A survey of professionals working with low-income communities and communities of color across the Southeast found a majority observe the immediate and long-term economic impacts of weather-related disasters such as hurricanes, flooding, and extreme heat. Persistent and emerging risks like rising sea levels and chronic drought further undermine communities' abilities to mitigate the effects of these events. The survey identified high utility costs, limited savings, lower credit scores, a lack of resilient housing in safe areas, unaffordable and inadequate insurance coverage, and insufficient funding for resilience measures as significant barriers hindering both individual and local economic preparedness for future disaster impacts. For organizations serving these communities, respondents also cite organizational constraints, such as lack of staff expertise in community vulnerabilities and translating knowledge into actionable strategies, as hindrances to effective community support.

Takeaways for practice:
Weather-related disaster risks can create new challenges or exacerbate existing ones for individuals, communities, and local economies, especially for low-income communities and communities of color. Community development and resilience professionals can play a vital role in overcoming economic barriers and enhancing disaster resilience by considering resilience strategies that include building organizational capacity within these communities, encouraging wealth building strategies for savings or improving credit scores, making housing more resilient, improving insurance accessibility and affordability, and incorporating community development in the resilience planning process.

The Federal Reserve Bank of Atlanta's Community & Economic Development (CED) Discussion Paper Series addresses emerging and critical issues in community development. Our goal is to provide information on topics that will be useful to the many actors involved in community development—governments, nonprofits, financial institutions, and beneficiaries. Find more research, use data tools, and sign up for email updates at atlantafed.org/commdev.

No. 02-24 • June 2024

Risk and Resilience: How Weather-Related Disasters Impact Economically Marginalized Communities

Abstract:

Weather-related disaster risks have adverse economic impacts for workers, households, and communities across the country. Low-income communities and communities of color tend to be at disproportionate risk to economic disruptions from weather-related disasters. Our team surveyed and interviewed professionals in the Southeast that work with or whose work impacts these marginalized communities across core issue areas relevant to community development, resilience, and disaster risk management in the nonprofit, public, and private sectors. Respondents and interviewees shared their perceptions of how weather-related disaster risks may be affecting the communities they serve as well as the work of their respective organizations. Findings suggest that while professionals working in underserved communities in the Southeast are generally aware of weather-related disaster vulnerabilities and some play active roles managing these risks, many lack necessary expertise and resources to feel prepared to navigate future disaster risks. For individuals, factors that contribute to their inability to prepare for and respond to disaster risks include lack of financial capacities (for example, savings, insurance) and lack of affordable housing. We provide insights into the potential role of the community development organizations and resilience professionals in responding to these needs.

JEL classification: Q54, H83, L31

Key words: weather-related disaster, disaster risk, resilience, climate change

DOI: https://doi.org/10.29338/dp2024-02

About the Authors:

Dontá Council is an adviser on the community and economic development team for the Federal Reserve Bank of Atlanta. His research focuses on disaster risks, community investment, household and consumer behavior, nonprofit management, and economic inequality. He holds a PhD in Public Administration and Policy from the School of Public Service at Old Dominion University.

Grace Meagher is a research analyst on the community and economic development team for the Federal Reserve Bank of Atlanta. She holds a master's degree in economics from The University of Alabama.

Leah Cabrera is a former intern on the community and economic development team for the Federal Reserve Bank of Atlanta. She pursued a dual master's degree, an MBA and master's in city and regional planning, at the Georgia Institute of Technology, graduating in May 2024.

Acknowledgments:

Special thank you to Cassandra Jean, Elizabeth Mattiuzzi, Patrick Pontius, Brittney Birken, Charly van Dijk, Mary Hirt, Julie Siwicki, Sergio Galeano, Sarah Miller, Lauren Offenberg, Ann Carpenter, Kathleen Peters, and Nancy Condon for their feedback and helpful comments. Additional thanks to Ann Carpenter and Karen Leone de Nie for their support and outreach efforts. The views expressed here are the authors' and not necessarily those of the Federal Reserve Bank of Atlanta or the Federal Reserve System.

Comments to the corresponding author are welcome at donta.council@atl.frb.org.

Section 1: Introduction

Individuals, communities, and local economies across the United States face increasing risks from weather-related disasters. The Southeast region is particularly vulnerable, with the Atlanta Fed's District (Florida, Georgia, Alabama, Mississippi, Louisiana, and Tennessee) experiencing a rising frequency and intensity of extreme weather events (Environmental Protection Agency 2021). Rising sea levels, intensifying hurricanes, and more frequent floods and droughts threaten not only the region's diverse ecosystems but also its diverse places and communities for human settlements (Hoffman et al. 2023). Weather-related disaster risk exposure has been shown to disproportionately impact underserved communities including low-income communities and communities of color (Lieberman-Cribbin et al. 2021). Direct physical risks from weather-related disasters exacerbate economic inequality due to disparate geographic location and adaptation capabilities (Avtar et al. 2021). This discussion paper expands our understanding of barriers and drivers of economic mobility and resilience in the Southeast. We gathered data across the Sixth District from regional experts and their organizations on how weather-related disasters in particular affect the low-income communities and communities of color they serve.

There is a growing interest in "resilience" amongst researchers and practitioners as a pathway and outcome to minimize the impacts of weather-related disaster shocks and stressors on workers and families living on lower incomes. While there are many definitions of resilience, we understand it as "the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables" (Holling 1973, 14). Resilience can apply to various dimensions, including social, ecological, economic, and institutional systems (Adger 2000). For example, strong social networks, which can be influenced by the built environment, have been shown to increase community resilience after a disaster (Carpenter 2015). Indeed, the concept of resilience is often used to characterize people or communities that endure and bounce back from shocks or stressors that cause disruptions to their lives or livelihoods. But though definitions of resilience often emphasize this feature of "bouncing back" to pre-disaster conditions, merely returning to a community's status quo may be insufficient to reduce their vulnerabilities to future shocks (Carpenter, Council, and Burnett 2021). By identifying barriers to resilience for weather- related disasters, communities and stakeholders may invest in resilience measures that contribute to the ability for low-income communities and communities of color to financially prepare for and recover from weather-related economic disruptions.

The Baseline Resilience Indicators for Communities (BRIC) measure factors such as environmental, institutional, housing infrastructure, and community capitals that lead to positive effects on community resilience. County level BRIC measures of economic resilience

tend to be higher in medium to large metropolitan areas compared to smaller or rural counties. For southeastern states, BRIC scores vary across dimensions. For example, patterns of high environmental resilience appear across coastal regions of Louisiana, Florida, and Georgia. However, these states rank low on social and housing resilience (Cutter, Ash, and Emrich 2014).

Research acknowledges the vulnerability of low-income communities and communities of color to disasters, but the opportunity remains for a deeper understanding of these vulnerabilities and risks and the specific barriers to resilience in the southeastern context by community development researchers and practitioners. Vulnerability, in the context of weather-related disasters, refers to the likelihood that an individual or group will be exposed to and adversely affected by an environmental hazard (Cutter 1996). Metrics like the Social Vulnerability Index (SoVI) offer valuable insights into population level vulnerabilities by empirically assessing factors that contribute to losses from disasters across states and counties, including dimensions of personal wealth, single-sector economic dependence, infrastructure dependence, race, and age (Cutter, Boruff, and Shirley 2003). SoVI indicators combined with various environmental hazard exposure data have been used to identify areas of elevated exposure. For example, counties in Louisiana and Florida with higher exposure to flooding or hurricane winds tend to measure higher or have elevated SoVI scores indicating lower capacity to manage disaster risks (Emrich and Cutter 2011). When accounting for multiple exposure hazards across southern states, coastal counties along the Gulf Coast tend to measure higher relative to inland counties on the SoVI index (Emrich and Cutter 2011).

In this exploratory study, we collected and analyzed data on weather-related disaster risks as well as barriers to achieving resilience in low-income communities and communities of color across six southeastern states. These states face unique challenges, such as a relatively higher percent of the population living in poverty and the elevated risks associated with rising sea levels and intense hurricanes. Survey respondents and interviewees worked with communities across Florida, Georgia, Alabama, Mississippi, Louisiana, and Tennessee. Survey outreach targeted professionals and organizations whose work impacts these communities.

Section 2: Southeast Context

The significance of weather-related disasters in the Southeast can be illustrated with a high-level assessment at the state and household levels. We briefly describe (1) characteristics that put southeastern states at risk of weather-related disasters, (2) the historical magnitude of weather-related disasters from the 1960s to 2010s, and (3) weather-related economic disruptions to southeastern households.

2.1 Southeastern Physical and Social Vulnerability

Physical and social characteristics, combined, put the Southeast region at disproportionate risk to weather-related disasters. Physical analyses establish that the Southeast region of the United States is at risk to weather-related disasters. While all Gulf Coast communities are at risk to flooding and hurricanes, exposure to flood risks tend to be concentrated in southwest Louisiana and southern Florida.(Shao et al. 2020). For some inland and coastal Southeast communities, patterns of physical infrastructure and land development also increase vulnerability to urban heat island effects (Hoffman, Shandas, and Pendleton 2020).

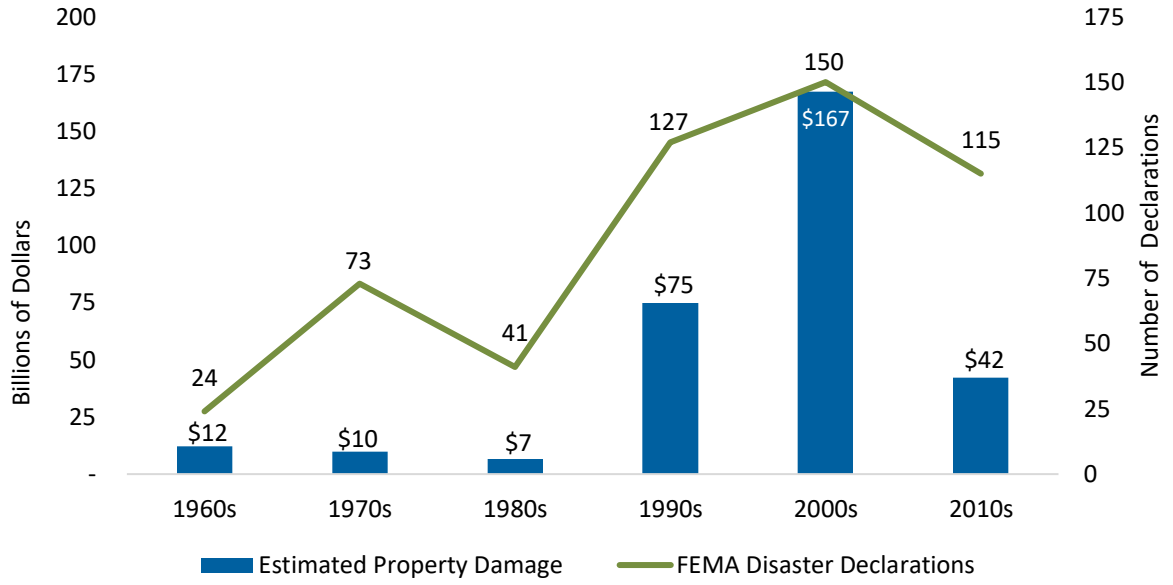
The Southeast also represents a diverse range of communities, each with its own unique vulnerabilities and capacities to respond to weather-related disaster, including a high concentration of people living in poverty and people of color. For example, compared to the national rate, the percent of the population living below the national poverty level is higher in Alabama, Florida, Georgia, Louisiana, Mississippi, and Tennessee and the percent of the population identifying as people of color is higher in Florida, Georgia, Louisiana, and Mississippi (Council, van Dijk, and Meagher 2023). While there have been advancements in mitigation, funding is most accessible to wealthier communities that are able to apply for disaster aid, leaving rural and other under-resourced communities at risk (Vilá et al. 2022).

2.2 Southeastern Estimates of Property Damage

For professionals and communities concerned about understanding the extent and distribution of disaster impacts, property damage is a key indicator and measure. Analyzing property damage within the context of a southeastern economy provides a starting point for detailing the financial losses associated with these disruptive events.

An analysis of University of Arizona Spatial Hazard Events and Losses (2023) data on total property damage by decade reveals that, collectively, southeastern states have consistently breached billion-dollar thresholds since the 1960s, with the most significant spikes in the 1990s and 2000s. For instance, in the 1960s, cumulative property damage reached approximately $12 billion. This figure then decreased in the 1970s ($10 billion) and 1980s ($7 billion) before surging again in the 1990s ($75 billion), the 2000s ($167 billion), and finally dipping in the 2010s ($42 billion) as seen in figure 2.2A.

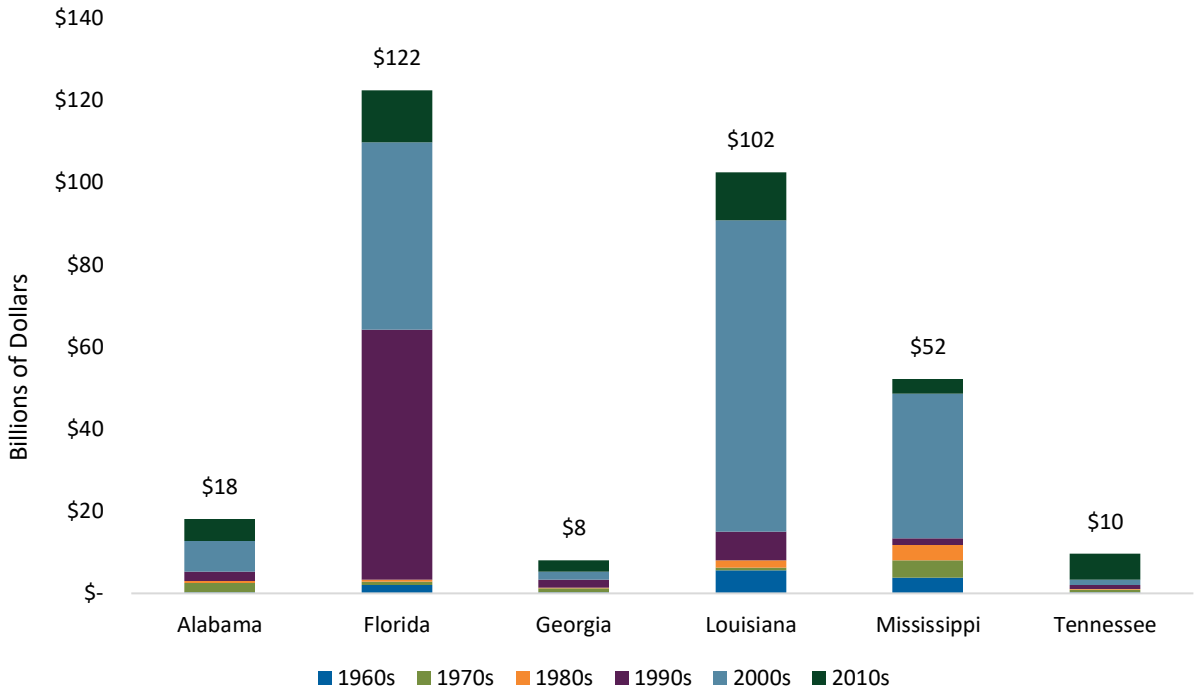
Figure 2.2A: Disaster-Related Property Damage Estimates and FEMA Disaster Declarations from 1960-2019, by Decade



Source: Spatial Hazard Events and Losses Database for the United States, administered by the University of Arizona, authors' calculations in 2021 Consumer Price Index adjusted dollars. FEMA Disaster Declarations, authors' calculations.

Across southeastern states, Florida and Louisiana have historically experienced high-impact weather-related disasters from 1960 to 2019. Florida stands out with estimated losses amounting to approximately $122 billion, followed by Louisiana at $102 billion and Mississippi at $52 billion (figure 2.2B).

Figure 2.2B: Disaster-Related Property Damage Estimates 1960–2019, by State



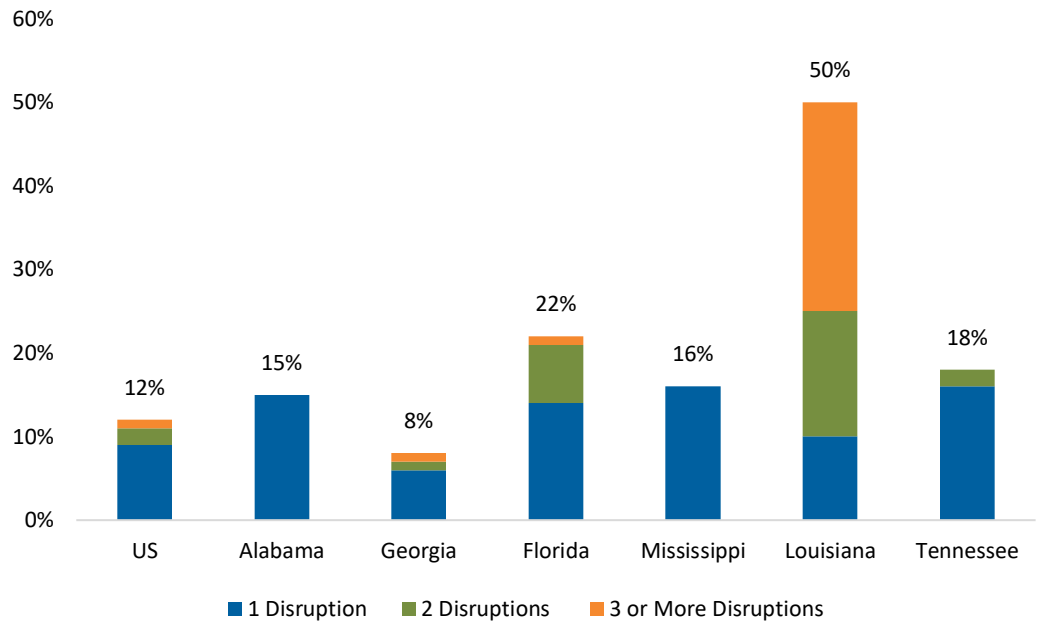
Source: Spatial Hazard Events and Losses Database for the United States, administered by the University of Arizona, authors' calculations in 2021 Consumer Price Index adjusted dollars

2.3 Weather-Related Disaster Disruption to Households

The Board of Governors of the Federal Reserve System's Survey of Household Economic Decision-making (2022) reveals that 12 percent of US households report experiencing at least one economic disruption due to disasters (figure 2.3A). Notably, many adults in southeastern states exhibit higher rates of disaster disruptions, exceeding the national rate of 12 percent. For instance, 50 percent of Louisiana adults, 22 percent of Florida adults, and 16 percent of Mississippi adults reported experiencing at least one such disruption (figure 2.3A).

Furthermore, southeastern adults report a higher occurrence of experiencing multiple economic disruptions from disasters. While the national share of adults who experience two disaster-related disruptions is two percent, a higher share of adults report this experience in Louisiana (15 percent) and Florida (seven percent). This trend continues for three or more disruptions with 25 percent of Louisianians reporting this experience, compared to the national average of one percent.

Figure 2.3A: Adults Experiencing One or More Disaster-Related Disruption in Prior 12 Months



Source: 2022 Survey of Household Economic Decision Making, authors' calculations.
Note: Data were not available for all states and disruption types.

2.4 Other Compounding Shocks and Stressors

In addition to weather-related disruptions, deep challenges persist for low-income individuals and individuals of color that impact their ability to fully participate in the economy. For example, the unemployment rate for Black workers has been almost double that of White workers since the early 1970s (US Bureau of Labor Statistics 2021). For southeastern communities, the COVID-19 pandemic exacerbated existing disparities for low-income communities and communities of color including access to affordable housing, sufficient wages to meet essential needs, unprecedented levels of debt, deepening mental and physical health disparities, and a lack of childcare for workers to participate in the labor market (Council, Carpenter, and Williams 2020).

Section 3: Methods and Data

This study centers on two key questions: 1) "What are the weather-related disaster risks to low-income communities and communities of color and to the organizations that serve them in the Southeast?" and 2) "What are the barriers to achieving resilience for low-income communities and communities of color and to the organizations that serve them in the Southeast?" To address these questions, we undertook a mixed-methods research approach.

First, we adapted a survey instrument deployed in the Federal Reserve Bank of San Francisco's community development professionals' study (Mattiuzzi and Hodge 2021). The revised survey was administered online between July and August 2023 and elicited 143 responses. In addition to the online survey, we conducted semi-structured interviews with community development professionals focusing on issues impacting low-income communities and communities of color in the Southeast. We conducted 20 interviews that provided additional, nuanced insights into respondents' perspectives and challenges.

Our outreach strategy for the survey encompassed emails to representatives of community and economic development organizations and social media posts, both encouraging widespread survey sharing. We targeted professionals in the six states served by the Federal Reserve Bank of Atlanta, including community development-focused organizations as well as organizations focused on resilience. Notes from the semi-structured interviews, totaling 25 interview subjects across 20 organizations, were coded to identify trends and themes. All interview participants were drawn from survey respondents.

The vast and diverse landscape of community development in the southeastern United States made random sampling untenable. Compiling a comprehensive list of all organizations who work in low-income communities and communities of color proved impractical due to resource limitations. Therefore, we employed a "targeted network sampling" approach, leveraging the expertise of our community development network. This method involves starting with a defined group of individuals—in our case, established contacts deeply engaged in community development across the region—and progressively reaching out to their professional networks based on their recommendations. This "snowball" technique allowed us to access voices and perspectives often missed by conventional sampling approaches (Gorard 2013).

While this method, like any non-probability sampling approach, cannot claim statistical representativeness of the entire population of community development organizations, it does provide a valuable, granular picture of diverse experiences and concerns in the Southeast. We mitigated potential selection bias by actively seeking out individuals and organizations beyond the primarily community development and disaster-focused issue areas, ensuring a broader range of perspectives were captured.

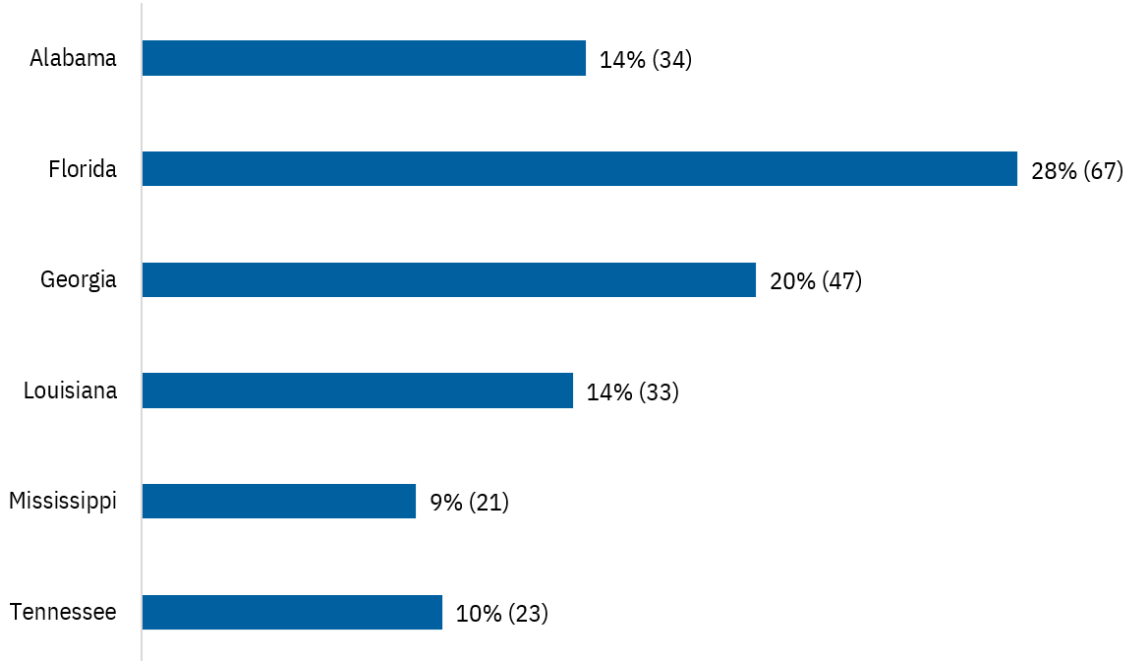
We provided survey respondents a list of options for each question and additional space to provide open-ended responses. Interview participants also provided commentary on the themes related to open-ended questions. Our findings are reported in the following sections and include respondent organization details, expectations of weather-related impacts and risks, levels of involvement with weather-related disasters, factors contributing to disaster risks, potential impacts of disasters on local economies, barriers to resilience, and perceptions of organizations involved in disaster resilience. These insights present valuable considerations for both policy and practice.

Section 4: Results

4.1 Respondent Organization Geography, Sector, and Mission

We received survey responses from professionals who work across many issue areas in all the states served by the Federal Reserve Bank of Atlanta (figure 4.4A). Some respondents selected multiple areas given their reach across multiple states. Over a quarter of survey respondents (28 percent) report their organization operating in Florida; 20 percent in Georgia, 14 percent in Alabama; 14 percent in Louisiana, 10 percent in Tennessee, and nine percent in Mississippi.

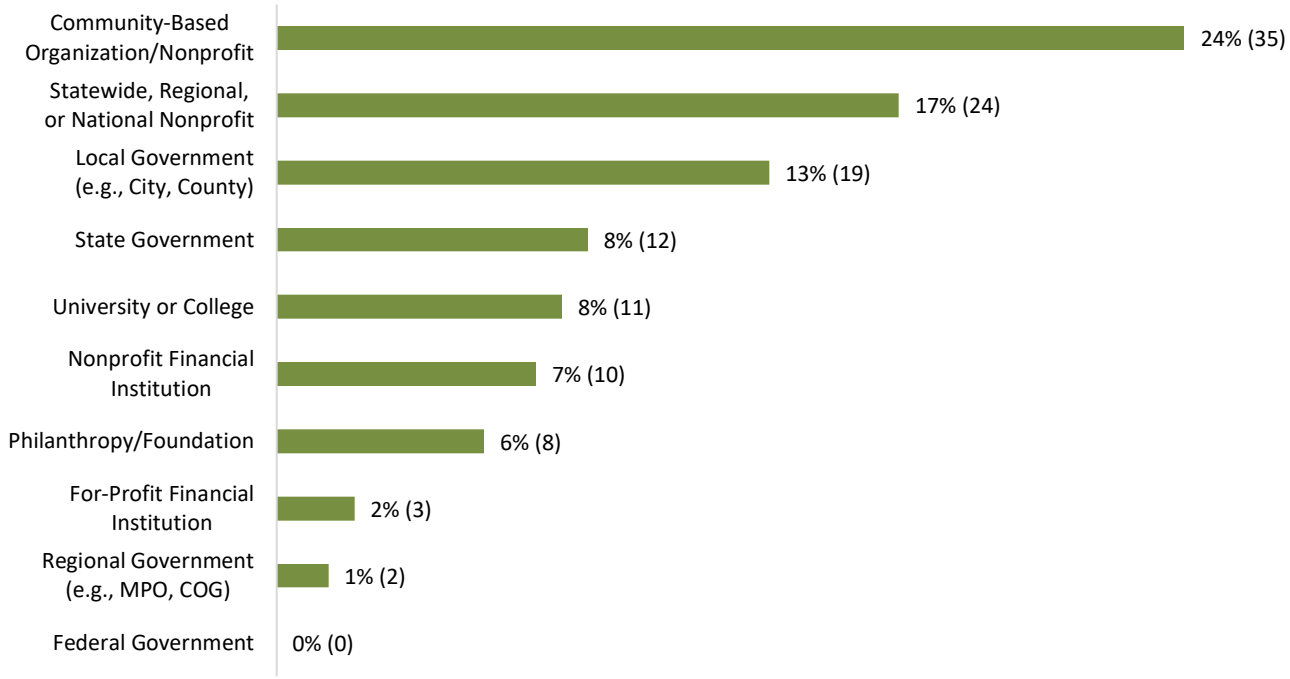
Figure 4.1A: Percentage (and Number) of Respondents by State



Note: Respondents could choose more than one option in response to "What state(s) does your organization primarily work in? Select all that apply." Roughly five percent of respondents selected the option "Other," indicating their organization primarily works in an area outside of the Atlanta Fed's six district states.

Source: Atlanta Fed's "Weather-Related Disaster Risk" Survey, authors' calculations.

Figure 4.1B: Respondent Organization Type

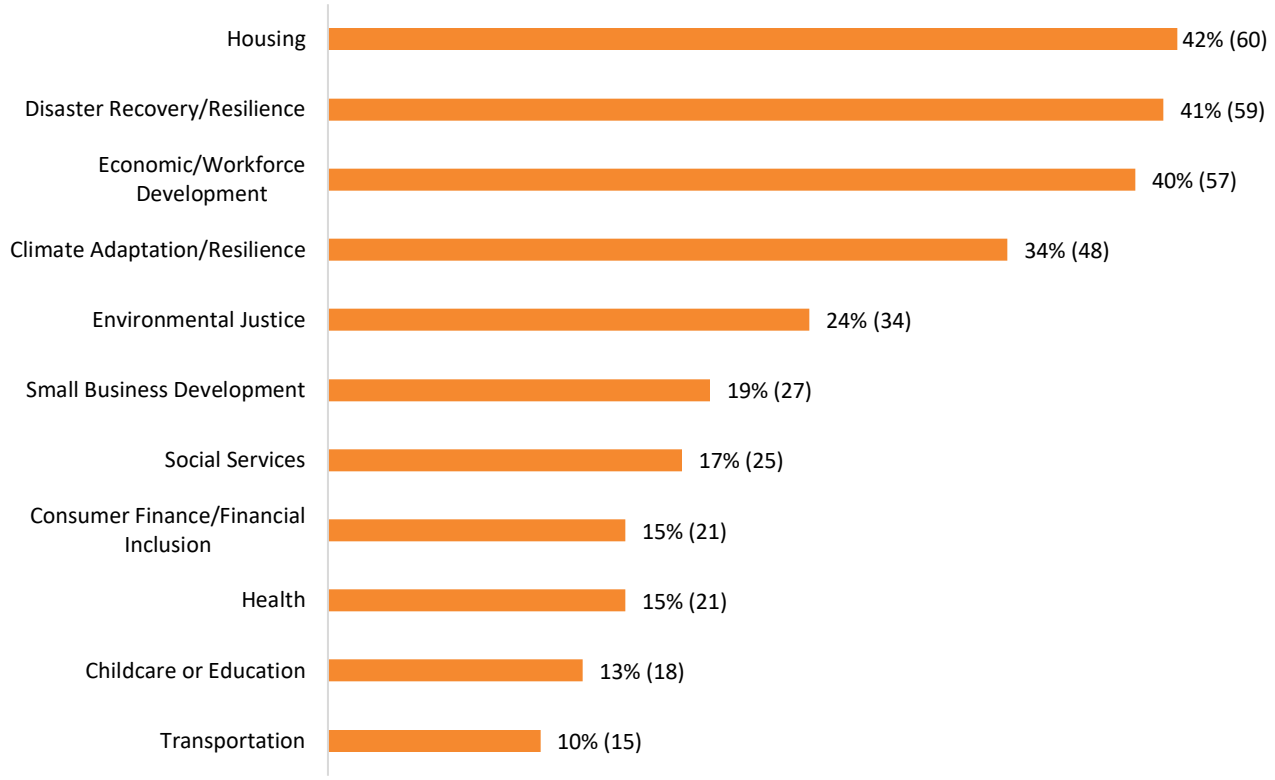


Note: Categories are exclusive. To the question "What type of organization do you work for? Please select one," 19 respondents (13 percent) selected "Other (describe)." Further discussion of their description of the type of organizations they work for is included below.

Source: Atlanta Fed's "Weather-Related Disaster Risk" Survey, authors' calculations.

The largest share of respondents works for nonprofit organizations; 24 percent are community-based organizations; and 17 percent are state, regional, or national in scope (figure 4.1B). An additional seven percent of respondents work for nonprofit financial institutions. A sizable share of respondents works for governments, with 13 percent working at the local level, eight percent working at the state level, and one percent working at the regional level. Some respondents indicated that the organization they work for did not fall into one of the listed categories. This group of respondents included individuals in private industries working with low- and moderate-income communities, consultants, and professionals who work in disaster and weather-adjacent fields.

Figure 4.1C: Respondent Organization Primary Focus Area(s)



Note: Survey respondents could choose more than one response to "What issue(s) does your organization primarily work on? Please select all that apply."

Source: Atlanta Fed's "Weather-Related Disaster Risk" Survey, authors' calculations.

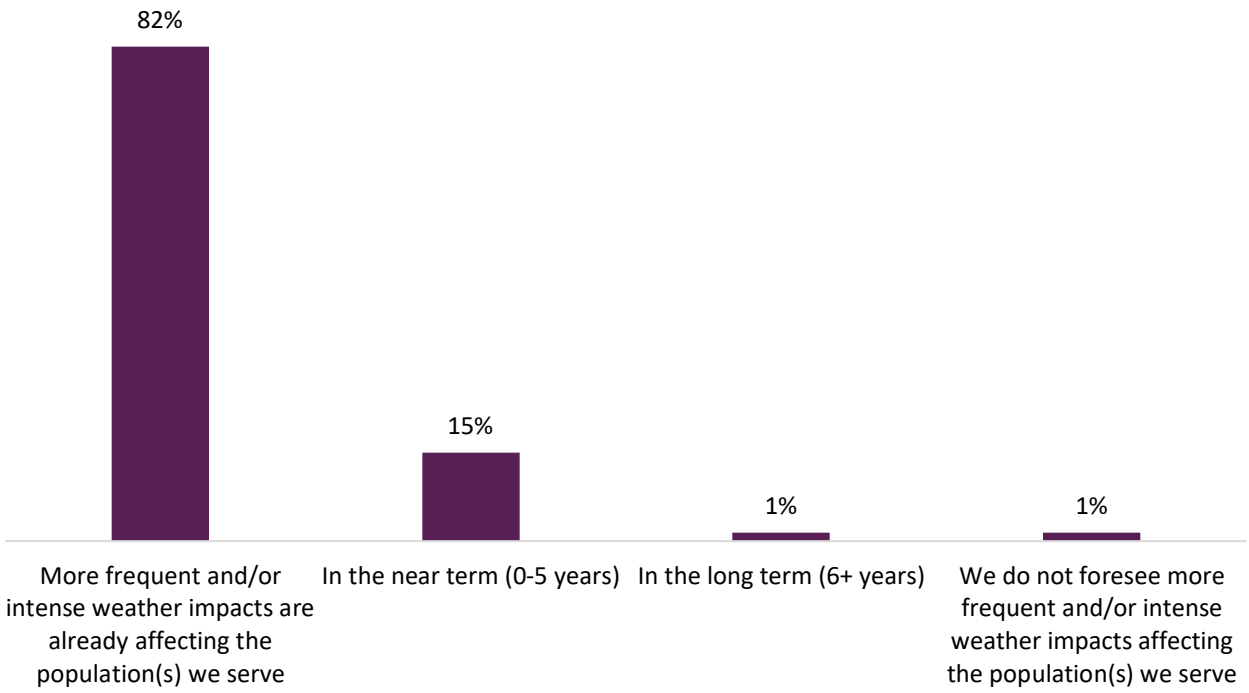
Respondents represented organizations working in diverse issue areas relevant to or impacting low-income communities and communities of color in the Southeast (figure 4.1C). Sixty-two percent of survey respondents reported more than one area in which their organization primarily works. Respondents indicated working in primary or traditional areas of community development including housing (42 percent), followed by economic/workforce development (40 percent), small business development (19 percent), social services (17 percent), consumer finance (15 percent, health (15 percent), and childcare or education (13 percent). Additional primary issue areas related to disaster and resilience work included disaster recovery and resilience (41 percent), climate adaptation (34 percent), and environmental justice (24 percent).

Roughly six percent provided additional write-in responses across a variety of focus areas including energy efficiency, parks and recreation, historic preservation, sustainability, insurance, water quality and management, criminal legal reform, social impact investing, racial equity, and environmental, governance, and social responsibilities.

4.2 Perception of Timeline for Community Weather-Related Disaster Risk

Survey respondents were asked to share their perceptions on the timeline of disasters impacting their community, if any (figure 4.2A). Most respondents view weather-related disasters as a current risk to the low-income communities and communities of color that they serve: 82 percent of respondents said that more frequent and/or intense weather-related disasters are already affecting the populations they serve. Fifteen percent of respondents expect their communities to be affected in the near term, while a very small share of respondents sees long-term impacts (one percent) and another small share does not foresee increasing weather impacts on their communities (one percent).

Figure 4.2A: Respondent Disaster Forecasting Time Frame



Note: The time frame in which respondents believe that frequent or intense weather-related disasters will affect their communities. Categories are exclusive.
Source: Atlanta Fed's "Weather-Related Disaster Risk" Survey, authors' calculations.

4.3 Most Impactful Weather-Related Disaster Risks to Community and Organization

Survey respondents were asked to rank the order of weather events that are most impactful to their community and organization to capture their perceptions of risk (Table 1). Respondents ranked the relative severity and significance attributed to eight different types of weather-related disaster, with 1 being the most impactful and 8 the least impactful. Notably, hurricanes and tropical storms hold the lowest mean ranking (2.4), suggesting a relatively higher perceived impact. Flooding and extreme heat are ranked at 2.7 and 3.6, respectively, indicating elevated levels of concern in the Southeast relative to other types of disasters.

Table 4.3.1: Respondent Ranking of Impactful Weather Events

	Mean Ranking
Hurricanes/Tropical Storms	**2.4**
Flooding	**2.7**
Extreme Heat	**3.6**
Storm Surge	**5.0**
Tornado	**5.0**
Sea-Level Rise	**5.4**
Drought	**5.6**
Fire	**6.5**

N = 140

Note: Rank based on authors' calculation of mean values. Three responses to this question were not considered in this analysis because they were incomplete.

Source: Atlanta Fed's "Weather-Related Disaster Risk" Survey, authors' calculations.

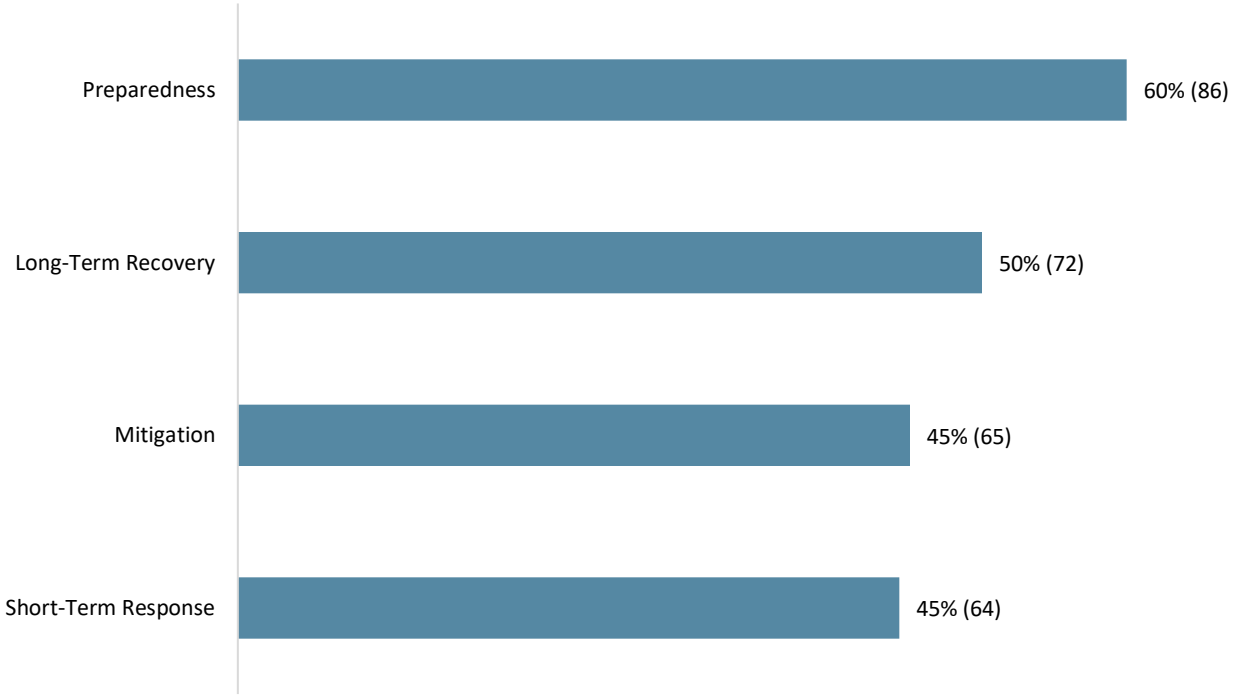
Interviewees and open-ended responses from some survey respondents also noted the impacts of low-attention flooding events that are not officially declared disasters by state or federal statute but that still create challenges for communities. Low-attention weather-related disasters are events—such as nuisance, stormwater, or tidal flooding—that cause disruptions to individuals and communities. Disruptions include the inability for residents to leave their neighborhood, traffic delays, or lost wages.

Respondents' high ranking of extreme heat aligns with previous findings. Prolonged periods of temperature extremes, both above and below average, pose significant health risks for families and workers. This is acute in urban areas, where development in part creates urban heat islands that can cause residents to experience discomfort, mortality, and illness (Nuruzzaman 2015).

4.4 Primary Role in Managing Weather-Related Disaster Events in Respondent Communities

Survey respondents were asked the primary role or roles that their organizations play in managing weather events in their communities (figure 4.4A). Disaster risk management, much like community resilience, is a collaborative and multi-sector effort. Organizations may play critical roles in supporting community resilience through four key phases: preparedness, mitigation, short-term response, or long-term recovery strategies and approaches ("National Disaster Recovery Framework, 2nd Edition" 2016). Preparedness involves proactive measures to minimize disaster impact. Mitigation focuses on long-term reduction. Short term-response centers on the immediate actions during a disaster, and long-term recovery focuses on the extended periods of rebuilding and restoration of community.

Figure 4.4A: Organizational Role(s) in Managing Weather-Related Risk.



Note: Survey respondents could choose more than one response. Responses indicating "Not sure" or "None or N/A" are not included in the figure.

Source: Atlanta Fed's "Weather-Related Disaster Risk" Survey, authors' calculations.

A majority of respondents see themselves as playing a preparedness role (60 percent) in managing weather-related risks in their communities, indicating a proactive approach to disaster risk management. In an open-ended response, one respondent expressed confidence that they would play a coordinating role in the preparedness and short-term recovery phases. This respondent also expected to play other roles including mitigation and long-term recovery roles and providing affordable housing. However, limitations exist for some organizations engaging in preparedness activities. One community development banker whom we interviewed noted challenges with providing qualifying capital investments for Community Reinvestment Act (CRA) credit pre-disaster given current regulatory guidance, which limits investments to federally declared disaster areas and primarily focuses on long term recovery. Some of these concerns might be addressed in the changes to CRA which were announced in October 2023 (Keenan, Mattiuzzi, and Council 2024).

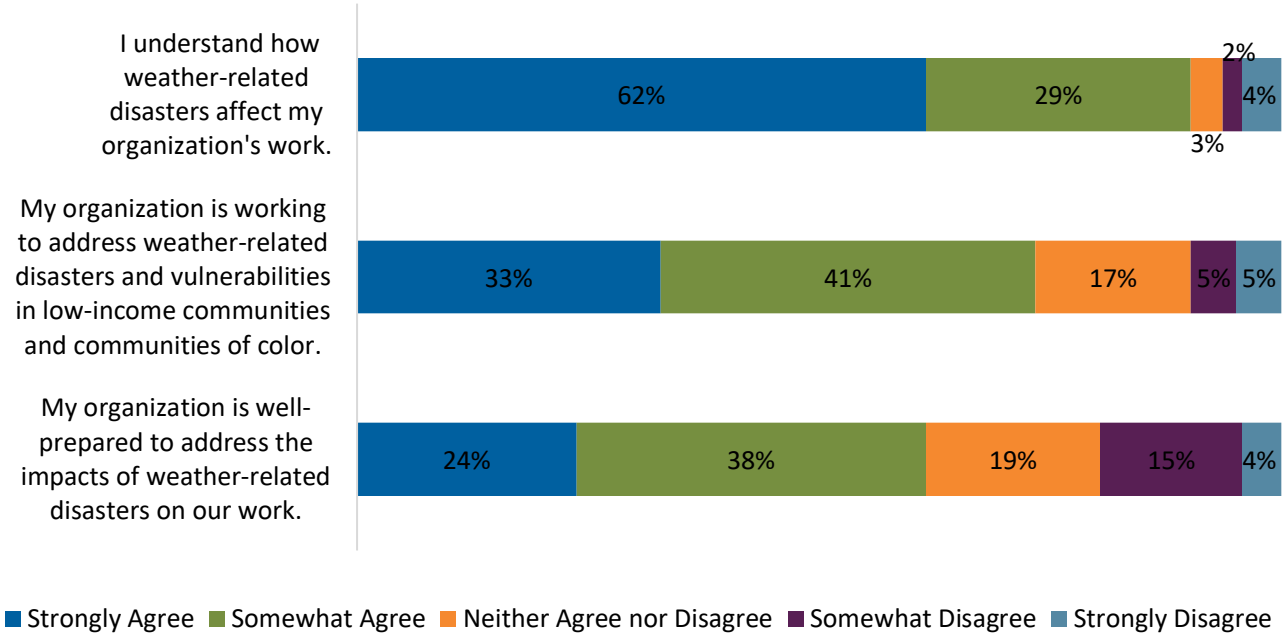
Although not all organizations have a role in disaster risk management, five percent of respondents were not sure what role they play or would play, which may highlight the need for additional awareness and education regarding the disaster management process. Nine percent of respondents did not see themselves carrying out or performing any of these roles.

4.5 Understanding and Preparing for Weather-Related Disasters by Organization and Community

Survey respondents were asked to share their understanding of weather-related disaster vulnerabilities to and levels of preparedness for weather-related disasters both at the organizational level and in their communities. Figures 4.5A and 4.5B present respondents' self-reported levels of agreement.

A majority of respondents (62 percent) strongly agreed that they understand how weather-related disasters affect their organization's work (figure 4.5A). Over a third of respondents (33 percent) also strongly agreed that their organization is working to address weather-related disaster vulnerabilities in their communities, and 41 percent somewhat agreed. However, only 24 percent of respondents strongly agreed to feeling well-prepared to address the impacts of weather on their organization's work, and 38 percent somewhat agreed. Fifteen percent somewhat disagreed, and four percent strongly disagreed that their organization is well prepared to address the impacts of weather-related disasters on their work.

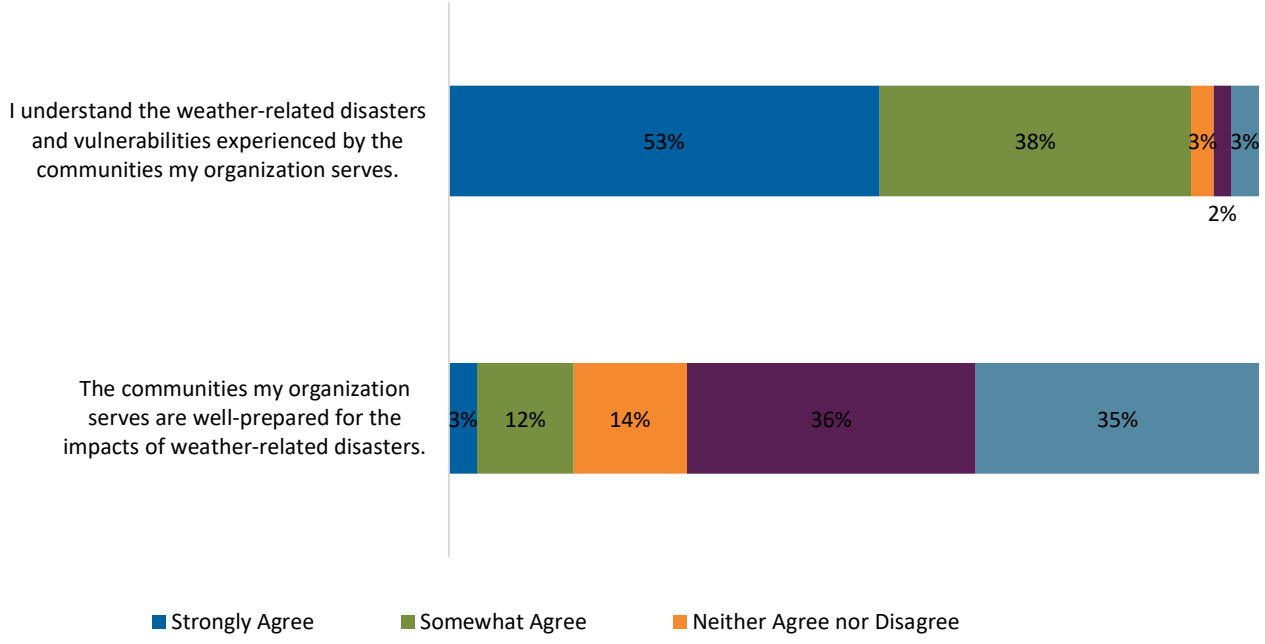
Figure 4.5A: Perceived Organizational Impact and Preparedness



Source: Atlanta Fed's "Weather-Related Disaster Risk" Survey, authors' calculations.

A significant proportion of respondents strongly agreed (53 percent) or somewhat agreed (38 percent) that they understand the vulnerabilities experienced by the communities they serve (figure 4.5B). This indicates a high level of awareness and knowledge within the community.

Figure 4.5B: Perceived Community Vulnerabilities

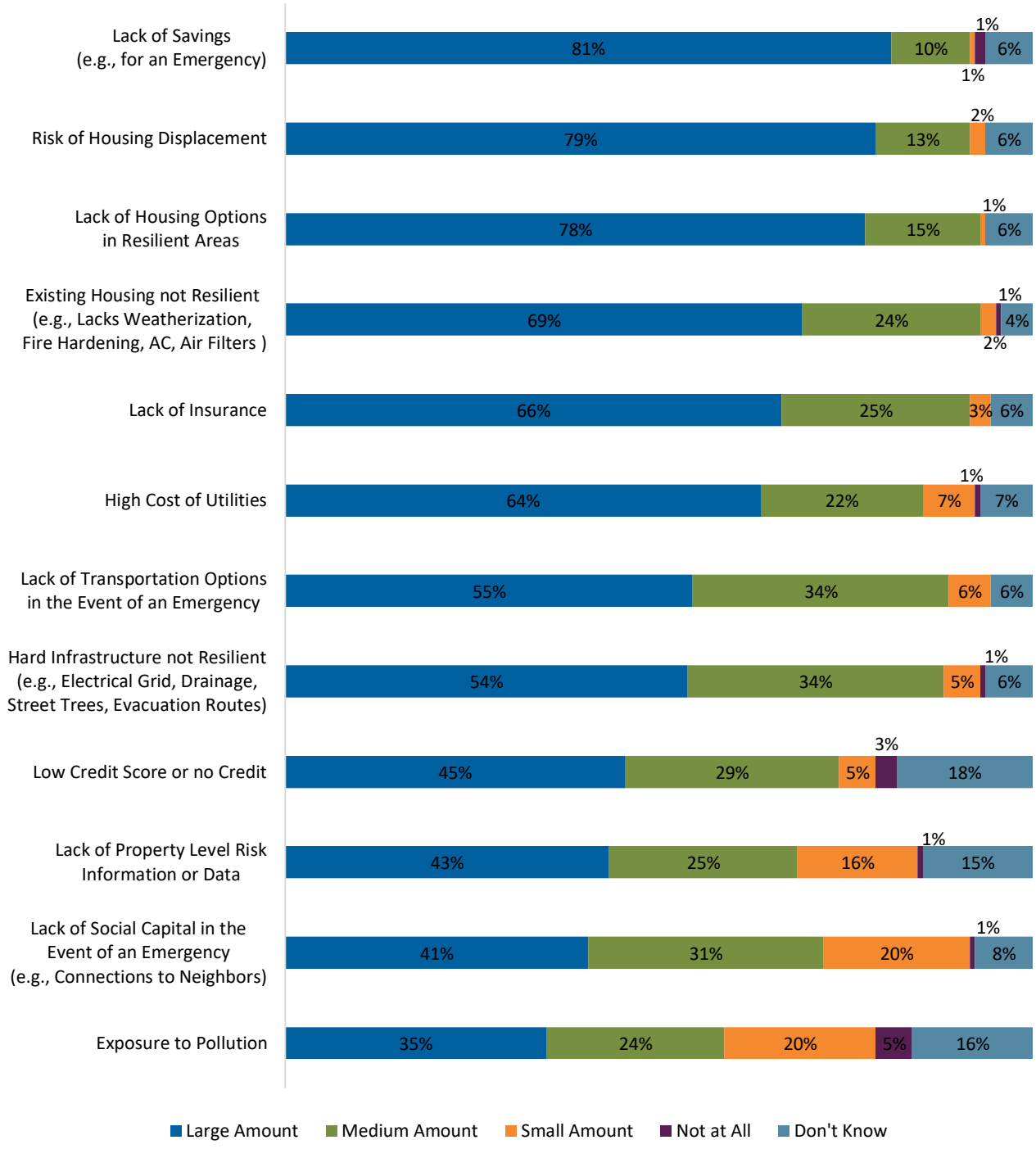


However, only three percent of respondents reported strongly agreeing that their communities are prepared for the impacts of weather-related disasters, and 12 percent somewhat agreed. Notably, a majority of respondents strongly disagreed (35 percent) or somewhat disagreed (36 percent) with the statement. Based on these survey results, there is an apparent gap between the professional's understanding of their communities' vulnerabilities and the levels of preparedness for communities in the face of ongoing weather- related shocks and stressors. This highlights an opportunity to bridge the knowledge- preparedness divide between community development organizations and the populations they serve and to translate understanding into concrete measures that help safeguard communities against weather-related disaster risks.

4.6 Perceived Contributors to Weather-Related Disaster Risks for Individuals

To understand perceived factors contributing to ability to prepare for and respond to disaster risks for individuals, survey respondents were asked how much various physical risks, resources, and information constraints contribute to weather-related disaster risk for individuals in the communities they serve (figure 4.6A).

Figure 4.6A: Perceived Contributors to Weather-Related Disaster Risks for Individuals



Source: Atlanta Fed's "Weather-Related Disaster Risk" Survey, authors' calculations.

Lack of savings was cited as the largest contributing factor to weather-related risk for the communities served by respondents' organizations. Eighty-one percent of respondents reported seeing the lack of savings for an emergency as a large contributor, while 10 percent reported that the lack of savings is a medium contributor. In an open-ended response, one respondent specifically raised concerns about elderly residents, who face a higher risk of involuntary relocation due to inadequate home maintenance in coastal and inland regions. According to this respondent, vulnerability is further compounded by their limited savings, leaving them ill-equipped to cope with the financial strain of severe weather events.

The risk of housing displacement after a disaster (79 percent) was cited as a large contributor to weather-related disaster risk for individuals in the Southeast (figure 4.6A). A similarly large share of respondents (78 percent) cite a lack of housing options in resilient areas as a large contributor to their weather-related risk. This issue is acute in the Southeast, based on recent data. States across the Gulf South, including Florida, Mississippi, and Louisiana, have relatively high shares of federally assisted low-income rental housing at risk of negative impacts from weather-related events (Aurand et al. 2023). Additionally, 69 percent of respondents see the lack of resilience of existing housing (for example, proper weatherization) as a large contributor to communities' weather-related disaster risk.

Adequate insurance is important for communities in areas at high risk for weather related disasters, protecting property and belongings and facilitating post-disaster recovery. Over half of respondents (66 percent) identified a lack of insurance as a large factor in their community's ability to prepare for and cope with weather-related risks. Notably, many respondents and interview subjects expressed concern about the sharp rise in property insurance costs over the past two years, calling for policy intervention to address this growing barrier. One open-ended response noted the need to acknowledge that the increasing costs of homeowners insurance and home maintenance costs makes housing unaffordable. Another respondent said that housing insurance is attainable only for individuals with a substantial amount of cash or access to substantial lines of credit, which is unrealistic for many low-income residents.

Sixty-four percent of respondents identified high-cost utilities as a large contributor to weather-related risk. For example, one survey respondent shared in an open-ended response, "People are buying homes that don't have much insulation, seeing energy bills going to $300-400." For low-income or low-wealth households, rising costs associated with cooling and heating homes, often necessary to maintain family health, may strain household budgets.

Spatial variation in city and neighborhood characteristics also plays a role. Studies of Baltimore, Atlanta, Detroit, Los Angeles, New York City, and other global cities show that areas with high concentrations of impervious surfaces like blacktop or that are deficient in tree canopy can contribute to increased energy consumption, disproportionately impacting low-income communities (Huang and Cadenasso 2016; Chakraborty et al. 2019).

More than half of respondents (55 percent) view the lack of transportation options during an emergency as a large contributor to weather-related risk for the communities they serve.

Similarly, a majority of respondents (54 percent) see the lack of resilient infrastructure as a large contributor to weather-related risk for their communities. Respondents who serve rural communities shared in open-ended responses that their community capacity to harden their infrastructure ultimately weakens their resilience in the face of weather-related disasters.

Close to half of respondents (45 percent) see individuals with no credit score or a low credit score as a significant factor contributing to weather-related risks to their communities. This is supported by the literature, as many higher-income Americans use credit to cope with emergencies (Stavins 2021). Challenges exist for consumers accessing credit to strengthen the resiliency of their homes through home repairs, retrofitting, and other adaptive approaches to reducing their physical risk. For example, one respondent mentioned that access to credit has been a challenge for their consumers across Georgia and Florida who are seeking to make resiliency improvements such as installation of wind hazard materials for windows, energy-efficient HVAC systems, and other assistive technologies. However, 18 percent of respondents were least familiar with this factor, marking "Don't know" to the question of how much no credit score or a low credit score contributes to risk for individuals in the communities they serve.

Forty-one percent of respondents see a lack of social capital as an important contributor to weather-related risks for the communities they serve. Survey respondents shared that social networks and relationships are critical sources of capital for preparing communities for weather-related disasters. However, many residents may lack relationships where they can garner resources to reduce adverse impacts. One respondent shared, "Individuals don't lack social capital outright, but connections to others as under-resourced as oneself are not the most helpful in these scenarios."

Thirty-five percent of survey respondents indicated exposure to pollution significantly exacerbated weather-related risk. Respondents and interviewees expressed concern about pollution-exposure risks to communities from hazardous waste sites that have not been remediated. One respondent shared their concern about the high concentration of such sites near high-poverty communities. Sixteen percent of respondents indicated no knowledge of the amount that pollution contributes to individuals' risk.

Risk communication and information barriers

Survey respondents and interviewees shared insights on their experiences regarding risk communication and information barriers contributing to poor weather-related disaster preparedness in the communities they serve. They noted insufficient warning systems, lack of access to disaster preparedness education, language barriers, and lack of weather-related disaster data as contributing to elevated risk.

Housing-related vulnerabilities

Many survey respondents called for enhanced construction standards and innovation in the housing market, especially as part of long-term recovery strategies. Comments included: "more funding for home modifications," "affordable multifamily housing retrofits," "funding to make

rebuilding of low-income housing more resilient," and "housing design and site construction needs to become future proofed."

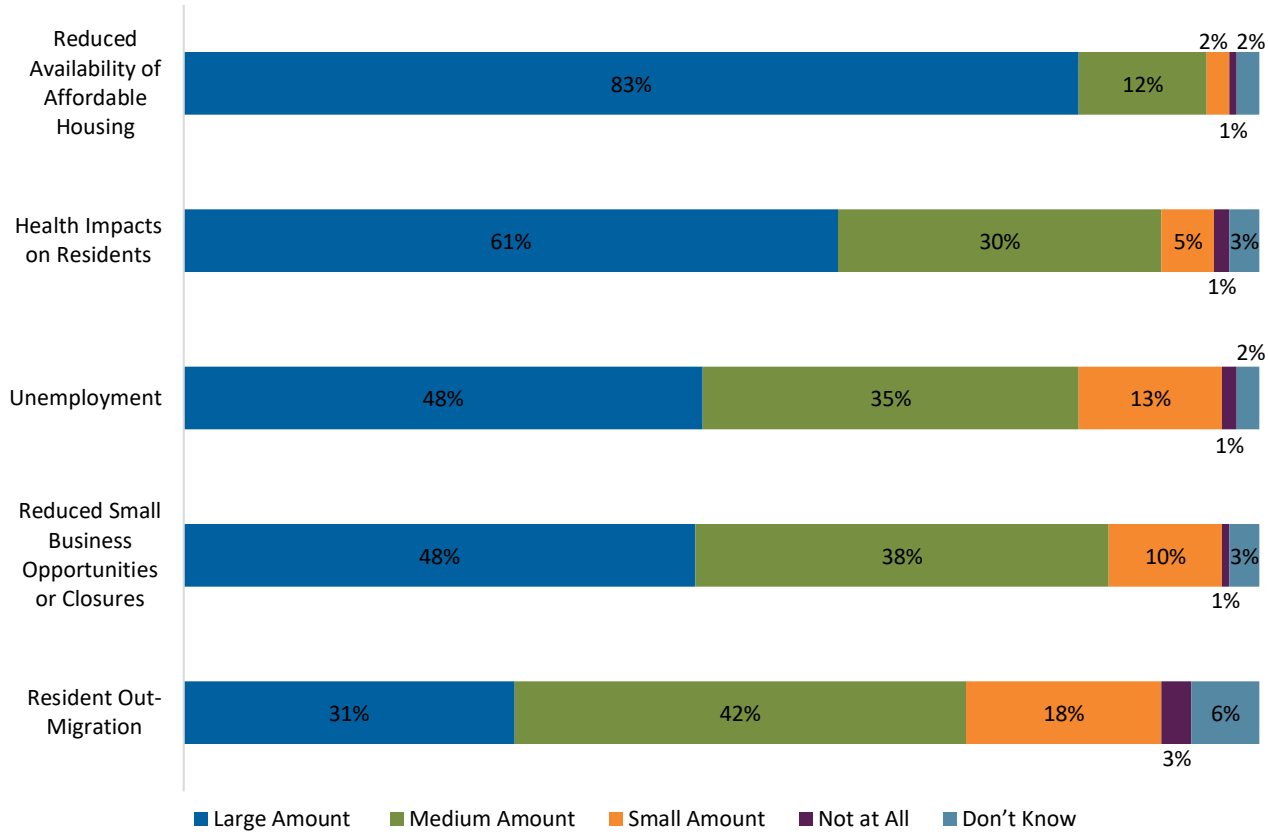
Weather-proof infrastructure helps keep housing affordable. Some research has found that, as of August 2023, American renters were grappling with record-high cost-burden levels (Joint Center for Housing Studies 2023). Several survey respondents noted that when individuals and families are forced to allocate a substantial portion of their income toward housing costs, they have reduced cash flow for other necessities including food and transportation, leaving the household less financially stable and resilient overall.

Survey respondents, especially from smaller cities, mentioned heirs' property issues as contributing to weather-related risk. Heirs' property is a type of ownership where multiple people inherit a piece of real estate, such as a family home, without a clear legal title or a formal agreement. Several respondents shared that heirs' property can prevent access to programs that improve the condition of the home and can hinder access to relief funding after a disaster. Lower-income, low wealth communities in the Southeast have faced historical discrimination and legal barriers that may have impeded their access to the legal estate planning that would prevent the formation of heirs' property and reduce the risk of involuntary loss (Stein and Carpenter 2022).

4.7 Perceived Contributors to Weather-Related Disasters for Local Economies

Survey respondents were asked about their perceptions of the role of weather-related disasters risks to local economies based on the factors presented in figure 4.7A. Approximately 83 percent of respondents said they perceive weather-related disasters contributed a large amount to the reduction of available affordable housing in their local economies. For example, when high winds, flood events, or other hazards cause damage to or destroy homes, constraining existing housing supply in the short and long term, the reduced supply may increase housing costs. Lower-income families and workers may also face a loss of wages due to business disruptions after a disaster. Open-ended survey responses described challenges for residents resulting from low housing stock after a disaster. For example, one survey respondent shared that when disasters occur in their communities, a large influx of people come to the community to help with repairs, which further limits the affordable and available housing stock for lower-income resident workers. In return, limited affordable housing may affect the availability of businesses to retain workers and provide services.

Figure 4.7A: Perceived Factors Contributing to Weather-Related Disaster Risks for Local Economies



Source: Atlanta Fed's "Weather-Related Disaster Risk" Survey, authors' calculations.

A significant portion of respondents (61 percent) reported weather-related disasters as having a large impact on the health of residents in the communities they serve, while 30 percent perceived a medium impact. For example, workers in non-climate-controlled environments—including agriculture, construction, hospitality, and service delivery workers— may be at higher risk of heat-related illness. The state of Louisiana notes that approximately a quarter of its workforce is at risk of heat-related illness ("Louisiana Climate Action Plan" 2022).

Nearly half (48 percent) of survey respondents identified weather-related disasters as a major contributor to unemployment in their local economies. Open-ended responses also indicated employment and labor force issues. Many survey respondents recalled the adverse economic impact of the COVID-19 pandemic on industries, including hospitality, tourism, logistics, and retail. While some industries have bounced back, interview subjects noted that workers with lower incomes struggle to keep up with housing affordability and are working more than one job to meet their essential needs. Several survey respondents and interview subjects also highlighted challenges to labor market participation and employment supply in coastal communities, particularly in the wake of recent hurricanes. Two survey respondents noted difficulties with worker retention in counties affected by Hurricane Ian. Concerns focused primarily on retaining health care workers, particularly staff for Level 1 trauma centers. One interviewee pointed out that rising housing costs in the aftermath of the hurricane led to longer commute times for health care workers employed by larger hospitals outside the affected areas.

Additional open-ended comments related risks to local economies and noted limited workforce diversification and the overreliance on certain industries and employers. For example, one respondent reported, "[My community] is dependent on tourism and logistics. If a disaster compromises our historic squares, tree canopy, and/or riverfront, we will lose a significant economic engine. Likewise, if roads and ports are closed due to damage, that could grind our economy to a halt."

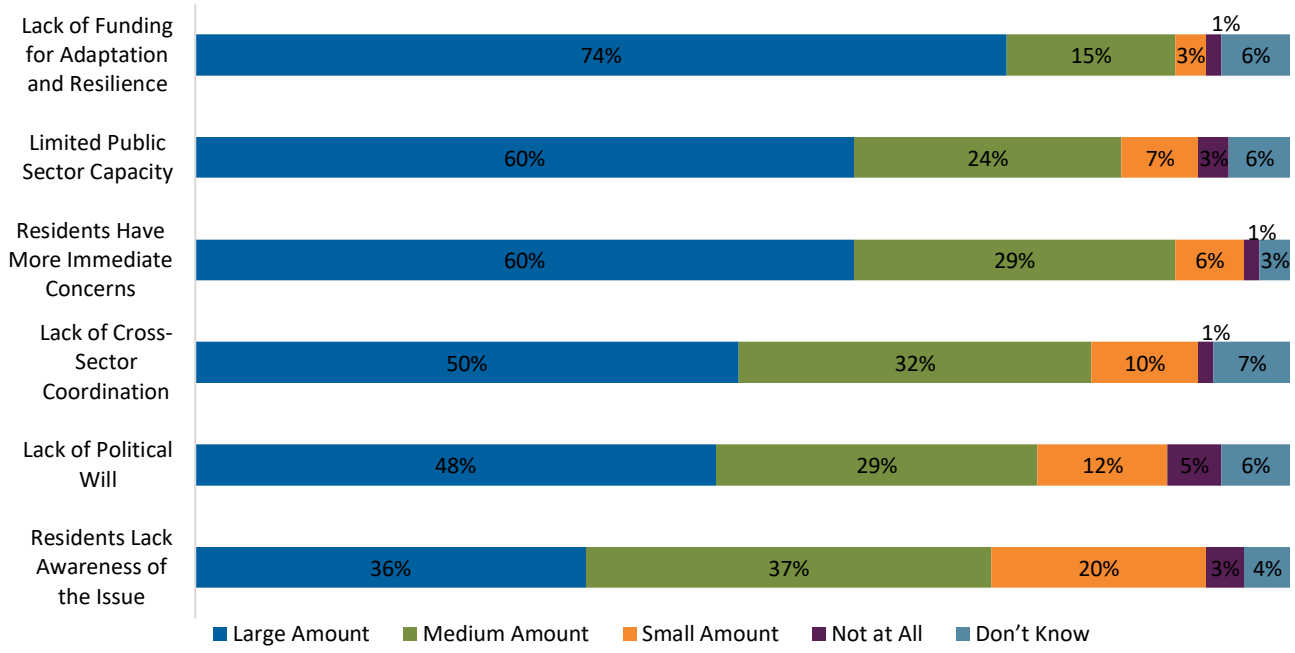
Nearly half (48 percent) of survey respondents indicated that disasters significantly reduce small business opportunities or lead to closures. Several survey respondents in open-ended comments expressed concern about the vulnerability of small businesses, particularly their limited ability to weather the financial impact of business interruptions caused by weather-related disasters. For example, early childcare providers who operate from their homes face potentially devastating disruptions if their residences are physically threatened by hurricanes or floods.

Almost a third of survey respondents (31 percent) connect weather-related disasters to increased out-migration that, in turn, negatively affects local economies. Survey respondent comments suggest that housing and insurance markets influence out-migration. One respondent noted a shift towards higher-end construction replacing non-compliant housing after disasters, implying displacement of some residents. Another highlighted the soaring costs of insurance following disasters, making it unaffordable for some residents and dissuading newcomers.

4.8 Perceived Limits on Community Resilience and Organizational Involvement in Resilience Efforts

To assess factors limiting resilience in their communities and their organization's involvement in resilience efforts, survey respondents were asked how much resource, capacity, and other factors limit weather-related disaster resilience efforts in the communities they serve. They were also asked how involved various organizations are in efforts to reduce weather-related disaster risk for low-income communities or communities of color. Figures 4.8A and 8.8B present some of this data.

Figure 4.8A: Perceived Factors Limiting Weather-Related Disaster Resilience for Communities



Source: Atlanta Fed's "Weather-Related Disaster Risk" Survey, authors' calculations.

A significant majority of survey respondents (74 percent) believe that a lack of funding for adaptation and resilience activities contributes a large amount to limiting such activities in their community. Open-ended responses and interviewee responses highlighted the need for increased resources for a variety of initiatives, including retrofitting, weatherization, and infrastructure improvements. Several survey respondents and interviewees emphasized the

inequitable distribution of funding, noting that low-income communities often receive a disproportionately small share of available resources.

Beyond funding, respondents indicated a belief that limitations within the public sector and overall cross-sector coordination are contributing to the limiting of disaster resilience efforts in their communities. Eighty-four percent of survey respondents said that limited public sector capacity contributes a large or medium amount to limiting disaster resilience efforts, while 82 percent of survey respondents indicated that a lack of cross-sector coordination contributes a large or medium amount to limiting such resilience efforts.

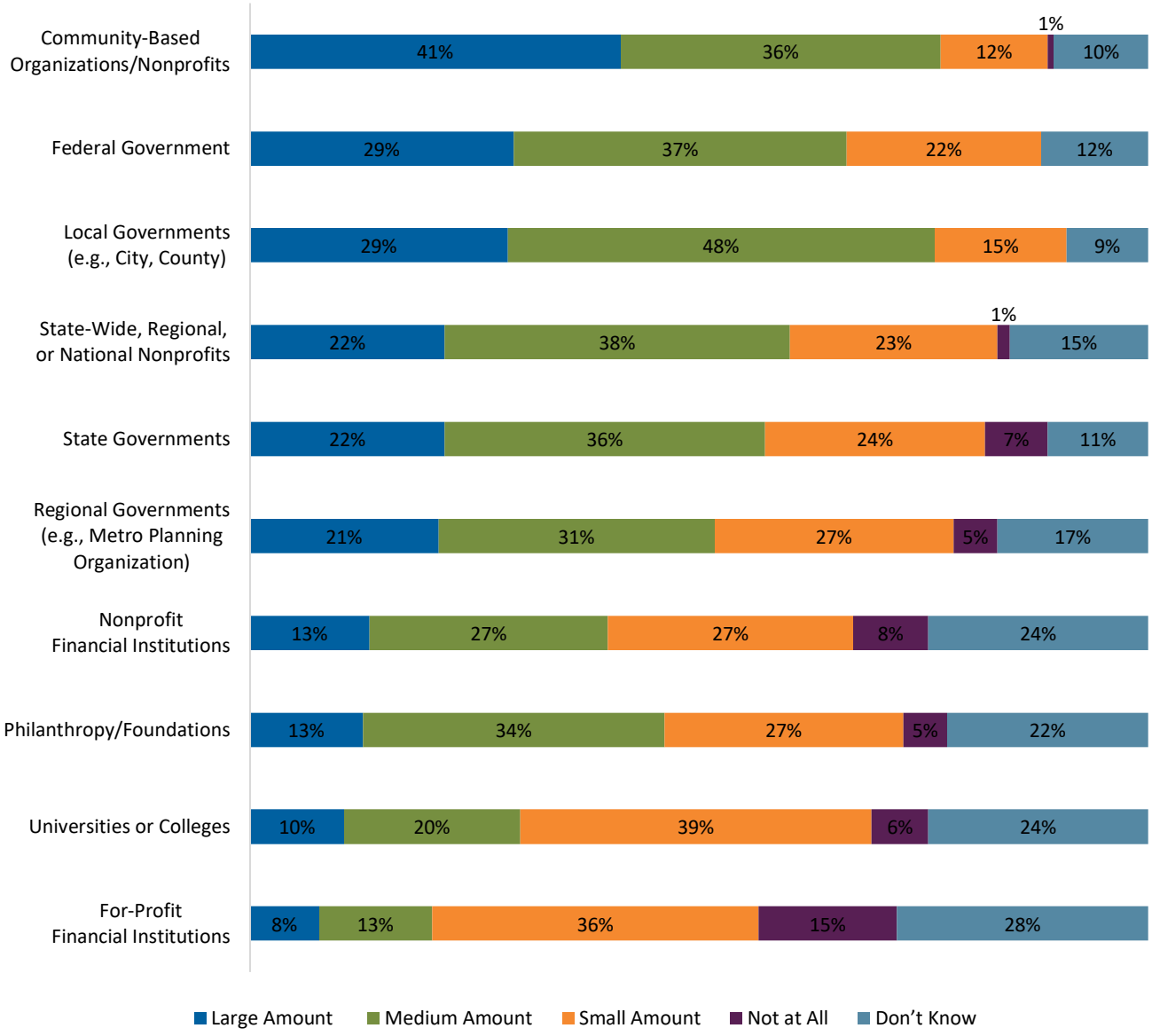
Almost half of survey respondents (48 percent) indicated that a lack of political will limits weather-related disaster resilience activities a large amount. Several respondents and interviewees mentioned the existence of political will to enhance resilience in their communities; however, persistent budget constraints faced by cities and other municipalities limit action.

Fewer survey respondents believe that resident awareness is a primary obstacle in pursuing weather-related disaster resilience activities. Only 36 percent of survey respondents said they consider residents lacking awareness of the issue to be a large limitation to disaster resilience efforts, lower than any of the potential limiting factors presented to respondents in the survey. While survey respondents indicated that residents in their communities are aware of the issue, many believe that residents have more immediate concerns; sixty percent of survey respondents indicated that residents having more immediate concerns contributes a large amount to the limiting of disaster resilience efforts.

Additional comments

In addition to the previously identified barriers to achieving resilience, open-ended responses highlight the challenges posed by a lack of public-private partnerships (PPPs) in rural communities, limited public sector capacity, and inadequate data and information available to public officials. In addition, respondents noted concern about persistent health and access to health care and transportation in both rural and urban regions. These factors hinder the ability of communities to effectively plan and implement resilience strategies. Moreover, respondents noted perceived structural racism and legacy discrimination, which further exacerbate the vulnerability of communities of color to weather-related disasters.

Figure 4.8B: Perceived Organization Involvement in Resilience Work



Source: Atlanta Fed's "Weather-Related Disaster Risk" Survey, authors' calculations.

Survey respondents indicated that community-based organizations and nonprofits are leading the way in reducing weather-related risk for the communities respondents serve. Forty-one percent of respondents said that community-based organizations and nonprofits are involved a large amount in reducing such risk, and an additional 36 percent considered them to be involved a medium amount.

Across other scales of government, federal, state, and regional governments were believed to be less involved than local governments, with 66 percent, 60 percent, and 52 percent of respondents, respectively, reporting large or medium involvement. Fewer than half of respondents see other types of community development organizations—including nonprofit financial institutions, philanthropic organizations, universities or colleges, and for-profit financial institutions—as having a large or medium amount of involvement.

More broadly, a sizable share of respondents indicated that they don't know the extent to which various types of organizations are involved in resilience work. Respondents were comparatively more aware of the involvement of local organizations, nonprofits, and government organizations than they were of the involvement of financial institutions, philanthropy, and universities. Twenty-eight percent of respondents indicated that they did not know the involvement of for-profit financial institutions in resilience work, the highest of the presented organization types. Conversely, only nine percent of respondents don't know the involvement of local government. This suggests a high level of variation in awareness and visibility of an organization's involvement, or lack of involvement, in resilience activities, depending on the organization's type.

Section 5: Policy and Practice Relevance

Community development and resilience professionals may support community resilience through a variety of approaches. Below is a discussion of some of the themes from our findings relevant to policy and practice professionals working on issues directly affecting lower income communities and communities of color in the Southeast.

5.1 Building Organizational Capacity to Prepare Communities

While some respondents said they take on roles in managing weather-related disasters within local ecosystems, organizational limitations exist across many of the public and nonprofit agencies we surveyed.

Proactive measures to address existing gaps in disaster preparedness may contribute to more effective disaster resilience response efforts. Respondents share commitments towards building organizational capacity to promote community resilience by attending

emergency management training, conducting vulnerability assessments, and developing new partnerships that promote resilience for low-income communities and communities of color. However, investments in human capital and training are often constrained by budget. Philanthropic organizations and other funders may play a role in supporting targeted capacity building efforts by organizations engaged in resilience preparation to better meet the needs of communities at risk to disaster impacts. For example, one philanthropic organization serving southeastern states focuses some of their grantmaking efforts towards building the operational capacity of community organizations led by women and leaders of color to advance resilience in underserved communities ("Hive Fund Impact Report" 2023).[1]

5.2 Lack of Savings and Wealth Inequality Exacerbating Weather-Related Disasters

In Southeast communities confronting disaster risks, lack of savings emerged as a significant concern, with 91 percent of respondents identifying it as a large or medium contributing factor in managing risks for individuals. This finding highlights the importance of having enough financial resources to withstand and survive a disaster, particularly for under-resourced communities. For example, in Atlanta, a city susceptible to extreme weather such as urban heat island effects (Stone et al. 2013), a recent study focused on Atlanta households revealed that White Atlanta households hold 46 times more wealth than Black Atlanta households (Camardelle and Bethea 2023), thus making Black households more vulnerable to disaster risk.

The historical convergence of racial wealth has stagnated over the past seven decades. Although the White-to-Black wealth ratio narrowed from 60:1 after the Civil War to 10:1 in 1920 (Derenoncourt et al. 2022), it has remained largely unchanged since then. At the current rate of progress, closing this gap entirely would take nearly two centuries. Research suggests that disaster events exacerbate these disparities, further widening the wealth gap along racial lines (Howell & Elliott 2018). Unequal access to short-term disaster recovery aid for people of color contributes to these inequities (Drakes et al. 2021). Furthermore, limited credit access can hinder low-income consumers from making critical preparedness and resilience investments through home retrofitting and rehabilitation. A study of Hurricane Harvey recovery efforts showed a positive correlation between communities' access to disaster recovery credit assistance and increased home values (Malmin 2023).

5.3 Weather-Related Disaster Risks and Housing Resilience

Our survey identified lack of affordable and weatherized homes as a problem for low-income communities, highlighting the need for solutions in the housing sector to better handle

[1] The Federal Reserve Bank of Atlanta does not provide funding for grants or participate in the funding decisions.

challenges related to weather-related disasters. Notable issues respondents shared include not having enough funds for adaptation and adaptation investment for underserved communities, limits in lending programs that focus on weather resilience, and outdated building codes. Survey respondents also noted the risks of people being displaced from their homes and not having resilient housing options, which they perceive as contributing significantly (79 percent and 78 percent, respectively) to the disaster risks faced by these communities. To break this cycle, respondents shared the need to develop more affordable and resilient housing. They also pointed to the need for updated building codes, drawing inspiration from the successful changes made after Hurricane Andrew in Florida, which reduced wind-related property losses by 72 percent since their adoption in 2001 (Simmons, Czajkowski, and Done 2018).

High energy burdens and utility costs can also pose significant challenges to housing affordability and resident safety and well-being, the survey shows. These factors are particularly impactful for people in rental properties, where control over property improvements generally rests with landlords or owners. Limitations in resident ability to make changes to a property can create obstacles to implementing measures that could decrease energy costs, such as installing energy-efficient HVAC systems, adding insulation, or undertaking other similar upgrades. However, innovative partnerships—like the one between the Solar and Energy Loan Fund, a community development financial institution, and the Atlanta Housing Authority—are emerging to address this issue.

5.4 Lack of Insurance and Insurance Literacy Exacerbating Weather-Related Disaster Risks

Insurance can provide a source of liquidity to local communities during disaster recovery, reducing lags in rebuilding or relocation for residents and businesses. Insurance costs and availability are top of mind for survey respondents and their communities, with 91 percent viewing a lack of insurance as contributing a large or medium amount to communities' ability to prepare for and recover from weather-related disasters. A common theme that emerged from survey responses and interviews is the unattainable costs of property insurance, which is often required for homeowners who hold a mortgage with a lender. The high cost of insurance in many areas leaves many homeowners without proper coverage, making them more vulnerable to future weather-related risks.

Interviewees emphasized the urgency of the need to understand and address protection gaps for individuals who are uninsured or underinsured against the effects of weather-related disasters. A protection gap refers to the discrepancy between the total economic losses incurred from a specific event, like flooding, and the amount covered by

insurance policies. To bridge these gaps and enhance community resilience, innovative insurance models such as parametric insurance have been proposed (Kousky, Wiley, and Shabman 2021). Unlike traditional insurance, which requires individual claims, parametric insurance triggers automatic payments based on predetermined event thresholds. This approach address protection gaps and may bolster community resilience in the face of increasingly frequent and severe weather events.

5.5 Enhancing Specificity of Resilience in Community Development and Disaster Risk Management

Community development and disaster risk management are distinct policy domains with networks of multiagency and multisector efforts. Community development fosters the economic well-being and resilience of low-income communities and communities of color. While disaster risk management has traditionally resided within the domain of local government professionals, many individuals working across community development and resilience fields increasingly see themselves as active contributors to managing weather-related risks for their communities. This is reflected in our survey findings, where a significant number of respondents identified one or more roles they play in managing such risks.

However, the lack of a clear and widely adopted definition of "resilience" and consistent frameworks for its implementation often hinders effective collaboration, cooperation, and coordination across community development and disaster management sectors. This is further underscored by the nine percent of respondents who do not perceive themselves as playing any role in preparedness, mitigation, response, or recovery, potentially highlighting the need for cross-sectoral education and training initiatives for both community development and disaster risk professionals. Existing and past efforts that facilitate collaboration and disaster resilience amongst organizations and professionals at local, state, and national scales include local Voluntary Organizations Active in Disasters (VOADs) such as the VOAD of Coastal Georgia which was established in 2017 (United Way of Coastal Georgia, n.d.) and the Rockefeller Foundation's 2013 to 2019 "100 Resilient Cities" initiative which transitioned to the Resilient Cities Network.

Section 6: Conclusion

Based on our survey and interview results, community development and resilience professionals and communities in the southeastern United States are acutely aware of their vulnerability to weather-related disasters, and most actively seek solutions. However, respondents said significant limitations hinder their preparedness efforts. They identified hurricanes, flooding, and extreme heat as posing the most immediate threats, while chronic stressors like persistent drought jeopardize the economic viability of workers and regions.

Barriers to achieve resilience exist at the organization, individual, community, and local economy levels. Primarily, barriers to building organizational capacity include lack of funding and disaster expertise. For individuals, barriers to achieving resilience include limited savings, lack of housing resilience, and lack of insurance. Given the complex interplay of ecological, built, and social systems that influence disaster and weather resilience in the region, further research on these organizational and individual level barriers and on effective people- and place-based risk management and resilience strategies is crucial.

References

Adger, W. Neil. 2000. "Social and Ecological Resilience: Are They Related?" *Progress in Human Geography* 24 (3): 347–64. https://doi.org/10.1191/030913200701540465.

Aurand, Andrew, Dan Emmanuel, Kelly McElwain, and Cate Asp. 2023. "Natural Hazards and Federally Assisted Housing." https://preservationdatabase.org/wp-content/uploads/2023/11/Natural-Hazards-and-Federally-Assisted-Housing.pdf.

Avtar, Ruchi, Kristian Blickle, Rajashri Chakrabarti, Janavi Janakiraman, and Maxim Pinkovskiy. 2021. "Understanding the Linkages between Climate Change and Inequality in the United States." *FRB of New York Staff Report*, no. 991. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3961093.

Board of Governors of the Federal Reserve System. 2022. Survey of Household Economic Decision Making. Retrieved on December 3, 2023, from https://www.federalreserve.gov/consumerscommunities/shed_data.htm

Camardelle, Alex, and Jarryd Bethea. 2023. "Building A Beloved Economy: A Baseline and Framework for Building Black Wealth in Atlanta." Atlanta Wealth Building Initiative. https://buildblackwealth.info/.

Carpenter, Ann. 2015. "Resilience in the Social and Physical Realms: Lessons from the Gulf Coast." *International Journal of Disaster Risk Reduction* 14: 290–301. https://www.sciencedirect.com/science/article/pii/S2212420914000739.

Carpenter, Ann, Dontá Council, and Jasmine Burnett. 2021. "Understanding How Community Resilience Can Inform Community Development in the Era of COVID." In *COVID-19: Systemic Risk and Resilience*, edited by Igor Linkov, Jesse M. Keenan, and Benjamin D. Trump, 345–57. Risk, Systems and Decisions. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-71587-8_19.

Chakraborty, Tirthankar, Angel Hsu, Diego Manya, and Glenn Sheriff. 2019. "Disproportionately Higher Exposure to Urban Heat in Lower-Income Neighborhoods: A Multi-City Perspective." *Environmental Research Letters* 14 (10): 105003. https://iopscience.iop.org/article/10.1088/1748-9326/ab3b99/meta.

Council, Dontá, Michelle Covi, Wie Yusuf, Joshua Behr, and Makayla Brown. 2018. "The 'New Normal' of Flooding in Portsmouth, Virginia: Perspectives, Experiences, and Adaptive Responses of Residents and Business Owners in Low to Moderate-Income Communities." Old Dominion University. https://digitalcommons.odu.edu/odurc-presentations/15.

Council, Dontá, Charlene van Dijk, and Grace Meagher. 2023. "Climate-Related Risks and Disasters: Implications for Financial Stability and Inclusion." *Atlanta Fed Partners Update* (blog). 2023. https://www.atlantafed.org/community-development/publications/partners-update/2023/01/17/climate-related-risks-and-disasters-implications-for-financial-stability-and-inclusion.

Cutter, Susan L. 1996. "Vulnerability to Environmental Hazards." *Progress in Human Geography* 20 (4): 529–39. https://doi.org/10.1177/030913259602000407.

Cutter, Susan L., Kevin D. Ash, and Christopher T. Emrich. 2014. "The Geographies of

Community Disaster Resilience." *Global Environmental Change* 29: 65–77. https://www.sciencedirect.com/science/article/pii/S0959378014001459.

Cutter, Susan L., Bryan J. Boruff, and W. Lynn Shirley. 2003. "Social Vulnerability to Environmental Hazards." *SOCIAL SCIENCE QUARTERLY* 84 (2). https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=462723ad16de7f9ae0914ec5d0b7958594ef8ba8.

Derenoncourt, Ellora, Chi Hyun Kim, Moritz Kuhn, and Moritz Schularick. 2022. "Wealth of Two Nations: The US Racial Wealth Gap, 1860-2020." National Bureau of Economic Research. https://www.nber.org/papers/w30101.

Drakes, Oronde, Eric Tate, Jayton Rainey, and Samuel Brody. 2021. "Social Vulnerability and Short-Term Disaster Assistance in the United States." *International Journal of Disaster Risk Reduction* 53: 102010. https://doi.org/10.1016/j.ijdrr.2020.102010.

Emrich, Christopher T., and Susan L. Cutter. 2011. "Social Vulnerability to Climate-Sensitive Hazards in the Southern United States." *Weather, Climate, and Society* 3 (3): 193–208. https://journals.ametsoc.org/view/journals/wcas/3/3/2011wcas1092_1.xml?tab_body=fulltext-displayhttps://journals.ametsoc.org/view/journals/wcas/3/3/2011wcas1092_1.xml?tab_body=fulltext-display.

Environmental Protection Agency. 2021. "Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts." *EPA 430-R-21-003* 10: 1.

Gorard, Stephen. 2013. "Research Design: Creating Robust Approaches for the Social Sciences." *Research Design*, 1–232. https://www.torrossa.com/gs/resourceProxy?an=5019190&publisher=FZ7200.

"Hive Fund Impact Report." 2023. https://static1.squarespace.com/static/5d6d29ecf8d59d00010ff612/t/65820ced167828252b18b4f0/1703021818790/Hive+Fund+Impact+Report+2023_DIGITAL.pdf.

Hoffman, Jeremy, Claudia Brown, Kathie Dello, Pamela Knox, Aranzazu Lascurain, Carl Mickalonis, Gary Mitchum, et al. 2023. "Chapter 22 : Southeast. Fifth National Climate Assessment." US Global Change Research Program. https://doi.org/10.7930/NCA5.2023.CH22.

Hoffman, J. S., V. Shandas, and N. Pendleton. 2020. "The Effects of Historical Housing Policies on Resident Exposure to Intra-Urban Heat: A Study of 108 US Urban Areas." *Climate* 8 (1). https://doi.org/10.3390/cli8010012.

Holling, C. S. 1973. "Resilience and Stability of Ecological Systems." *Annual Review of Ecology and Systematics* 4 (1): 1–23. https://doi.org/10.1146/annurev.es.04.110173.000245.

Howell, Junia, and James R. Elliott. 2018. "As disaster costs rise, so does inequality." *Socius* 4. https://doi.org/10.1177/2378023118816795.

Huang, Ganlin, and M. L. Cadenasso. 2016. "People, Landscape, and Urban Heat Island: Dynamics among Neighborhood Social Conditions, Land Cover and Surface Temperatures." *Landscape Ecology* 31 (10): 2507–15. https://doi.org/10.1007/s10980-016-0437-z.

Joint Center for Housing Studies. 2023. "The State of The Nation's Housing." Harvard University.

https://www.jchs.harvard.edu/sites/default/files/reports/files/Harvard_JCHS_The_State_of_the_Nations_Housing_2023.pdf.

Keenan, Jesse M., Elizabeth Mattiuzzi, and Donta Council. 2024. "Bridging Community Investment and Resilience in the Community Reinvestment Act." In *What's Possible: Investing Now for Prosperous Sustainable Neighborhoods*, 287–301. United States: Federal Reserve Bank of New York. https://www.newyorkfed.org/medialibrary/media/outreach-and-education/climate/whats-possible-investing-now-for-prosperous-sustainable-neighborhoods.pdf#page=287.

Kousky, Carolyn, Helen Wiley, and Len Shabman. 2021. "Can Parametric Microinsurance Improve the Financial Resilience of Low-Income Households in the United States?: A Proof-of-Concept Examination." *Economics of Disasters and Climate Change* 5 (3): 301–27. https://doi.org/10.1007/s41885-021-00088-1.

Lieberman-Cribbin, Wil, Christina Gillezeau, Rebecca M. Schwartz, and Emanuela Taioli. 2021. "Unequal Social Vulnerability to Hurricane Sandy Flood Exposure." *Journal of Exposure Science & Environmental Epidemiology* 31 (5): 804–9. https://www.nature.com/articles/s41370-020-0230-6.

"Louisiana Climate Action Plan." 2022. State of Louisiana. https://gov.louisiana.gov/assets/docs/CCI-Task-force/CAP/Climate_Action_Plan_FINAL_3.pdf.

Malmin, Natasha P. 2023. "How Access to Federal Recovery Credit Assistance Influences Future Wealth Trajectories after a Natural Disaster: The Case of Hurricane Harvey." *International Journal of Disaster Risk Reduction*, 104131. https://www.sciencedirect.com/science/article/pii/S2212420923006118.

Mattiuzzi, Elizabeth, and Eileen Hodge. 2021. "Climate-Related Risks Faced by Low-and Moderate-Income Communities and Communities of Color: Survey Results." *Federal Reserve Bank of San Francisco Community Development Research Brief* 3. https://www.frbsf.org/community-development/wp-content/uploads/sites/3/climate-related-risks-faced-by-low-and-moderate-income-communities-and-communities-of-color-survey-results.pdf.

"National Disaster Recovery Framework, 2nd Edition." 2016. US Department of Homeland Security.

Nuruzzaman, Md. 2015. "Urban Heat Island: Causes, Effects and Mitigation Measures-a Review." *International Journal of Environmental Monitoring and Analysis* 3 (2): 67–73. https://www.researchgate.net/profile/Md-Nuruzzaman-12/publication/283507719_Urban_Heat_Island_Causes_Effects_and_Mitigation_Measures_-A_Review/links/563c573708ae34e98c485eb0/Urban-Heat-Island-Causes-Effects-and-Mitigation-Measures-A-Review.pdf.

Shao, Wanyun, Nida Pino Jackson, Hoehun Ha, and Terence Winemiller. 2020. "Assessing Community Vulnerability to Floods and Hurricanes along the Gulf Coast of the United States." *Disasters* 44 (3): 518–47. https://doi.org/10.1111/disa.12383.

Simmons, Kevin M., Jeffrey Czajkowski, and James M. Done. 2018. "Economic Effectiveness

of Implementing a Statewide Building Code: The Case of Florida." *Land Economics* 94 (2): 155–74. https://le.uwpress.org/content/94/2/155.short.

Solar Loan and Energy Fund. 2021. "SELF Launches New Loan for Energy Efficiency Upgrades on Low-Income Rental Properties." 2021. https://solarenergyloanfund.org/self- launches-new-loan-for-energy-efficiency-upgrades-on-low-income-rental-properties/.

Stavins, Joanna. 2021. "UNPREPARED FOR FINANCIAL SHOCKS: EMERGENCY SAVINGS AND CREDIT CARD DEBT." *Contemporary Economic Policy* 39 (1): 59–82. https://doi.org/10.1111/coep.12477.

Stein, Sarah, and Ann Carpenter. 2022. "Heir's Property in an Urban Context." https://ageconsearch.umn.edu/record/316788/.

Stone, Brian, Jason Vargo, Peng Liu, Yongtao Hu, and Armistead Russell. 2013. "Climate Change Adaptation Through Urban Heat Management in Atlanta, Georgia." *Environmental Science & Technology* 47 (14): 7780–86. https://doi.org/10.1021/es304352e.

United Way of Coastal Georgia. n.d. "Voluntary Organizations Active in Disaster (VOAD)." https://uwcga.org/?gad_source=1&gclid=EAIaIQobChMIlerRu4KVhgMVzF5HAR0FcwPBEAAYASAAEgJNMvD_BwE.

US Bureau of Labor Statistics. Retrieved on April 30, 2024. https://www.bls.gov.

University of Arizona, Spatial Hazards Events and Losses Database for the United States. Retrieved on November 1, 2023. https://cemhs.asu.edu/sheldus.

Vilá, Olivia, Gavin Smith, Bethany Cutts, Samata Gyawali, and Samiksha Bhattarai. 2022. "Equity in FEMA Hazard Mitigation Assistance Programs: The Role of State Hazard Mitigation Officers." *Environmental Science & Policy* 136: 632–41. https://www.sciencedirect.com/science/article/pii/S1462901122002350.

Zhou, Yan, and J. Marshall Shepherd. 2010. "Atlanta's Urban Heat Island under Extreme Heat Conditions and Potential Mitigation Strategies." *Natural Hazards* 52 (3): 639–68. https://doi.org/10.1007/s11069-009-9406-z.

Appendix: Survey Instrument

Weather-related disasters affect everyone. In 2022, the National Oceanic and Atmospheric Administration (NOAA) identified 18-billion-dollar disaster events across the United States, including hurricanes, tornadoes, and other severe weather events. Over one-third of those events impacted states across the Southeast. Given past trends, disasters may continue to increase or intensify and may create or exacerbate vulnerabilities in households, businesses, and communities. Weather-related disasters can also lead to financial hardship or unfavorable economic conditions.

The Federal Reserve Bank of Atlanta (Atlanta Fed) is interested in hearing from professionals that work in lower income communities in Florida, Georgia, Alabama, Mississippi, Louisiana, and Tennessee about disaster adaptation and resilience activities to address risks related to weather disasters. This is part of our commitment to listening and learning so we have a complete picture of how disaster risk is affecting our District.

This survey takes about 15 minutes to complete. Responses will be aggregated and anonymized. The results will be shared with Federal Reserve and community development stakeholders and will help inform the Atlanta Fed Community and Economic Development team's work promoting economic mobility and resilience.

1. What state(s) does your organization primarily work in? Select all that apply.

☐ Alabama
☐ Florida
☐ Georgia
☐ Louisiana
☐ Mississippi
☐ Tennessee
☐ Other

2. Within these states, are there particular cities, counties, tribal areas, or metropolitan regions that your organization focuses on? Please list.

_____

3. What type of organization do you work for? Please select one.

☐ For-profit financial institution
☐ profit financial institution
☐ Community-based organization or nonprofit
☐ Statewide, regional, or national nonprofit
☐ Philanthropy or foundation
☐ Local government (for example, city or county)
☐ Regional government (for example, MPO or COG)
☐ State government
☐ Federal government
☐ University or college
☐ Other (describe below)

_____

4. What issue(s) does your organization primarily work on? Please select all that apply.

☐ Childcare or education
☐ Climate adaptation or resilience
☐ Consumer finance or financial inclusion
☐ Disaster recovery or resilience
☐ Economic or workforce development
☐ Environmental justice
☐ Health
☐ Housing
☐ Small business development
☐ Social services
☐ Transportation
☐ Other (describe below)

_____

5. When, if ever, do you think more frequent or intense weather-related disasters will affect the communities you serve?

☐ More frequent or intense weather impacts are already affecting the population(s) we serve.
☐ In the near term (zero to five years).
☐ In the long term (six plus years).
☐ We do not foresee more frequent or intense weather impacts affecting the population(s) we serve.

6. Please rank the order of weather events that are most impactful to your community and organization. Reorder by dragging each item vertically.

Drought
Extreme heat
Fire
Flooding
Hurricanes or tropical storms
Sea-level rise
Storm surge
Tornado
Other: _____

7. What is the primary role(s) that your organization plays in managing the above weather events in your community or communities? Please select all that apply.

☐ Preparedness
☐ Mitigation
☐ Short-term response
☐ Long-term recovery
☐ Not sure
☐ None or no answer
☐ Other: _____

The next set of questions is about your perceptions of weather-related disasters in your organization.

8. Please select your level of agreement with the following statements:

	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree
My organization is working to address weather-related disasters and vulnerabilities in low-income communities and communities of color.	○	○	○	○	○
I understand how weather-related disasters affect my organization's work.	○	○	○	○	○
My organization is well-prepared to address the impacts of weather-related disasters on our work.	○	○	○	○	○

The next set of questions is about your perceptions of weather-related disasters in the communities you serve.

9. Please select your level of agreement with the following statements:

	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree
I understand the weather-related disasters and vulnerabilities experienced by the communities my organization serves.	○	○	○	○	○
The communities my organization serves are well-prepared for the impacts of weather-related disasters.	○	○	○	○	○

10. Please share any additional thoughts you may have on why you agree or disagree with any of the above statements:

_____

The next set of questions is about weather-related disaster risk to individuals in your communities.

11. To your knowledge, how much do each of the following factors contribute to weather-related disaster risk for **individuals** in the communities you serve?

	Not at All	Small Amount	Medium Amount	Large Amount	Don't Know
Lack of Savings (e.g., for an Emergency)	○	○	○	○	○
Low Credit Score or No Credit	○	○	○	○	○
High Cost of Utilities	○	○	○	○	○
Exposure to Pollution	○	○	○	○	○
Lack of Housing Options in Resilient Areas	○	○	○	○	○
Risk of Housing Displacement	○	○	○	○	○
Lack of Insurance	○	○	○	○	○
Lack of Property Level Risk Information or Data	○	○	○	○	○
Existing Housing not Resilient (e.g., Lacks Weatherization, Fire Hardening, AC, Air Filters)	○	○	○	○	○

Hard Infrastructure not Resilient (e.g., Electrical Grid, Drainage, Street Trees, Evacuation Routes)	○	○	○	○	○
Lack of Transportation Options in the Event of an Emergency	○	○	○	○	○
Lack of Social Capital in the Event of an Emergency (e.g., Connections to Neighbors)	○	○	○	○	○

12. Please share any thoughts you may have on how or why any of the above factors contribute to weather-related disaster risk for individuals in communities you serve, and please list any factors not listed above:

_____

The next set of questions is about weather-related disaster risk to your local economies in the communities you serve.

13. How concerned are you about weather-related disasters contributing to the following risks for **local economies** in the communities you serve?

	Not at All	Small Amount	Medium Amount	Large Amount	Don't Know
Unemployment	○	○	○	○	○
Reduced Small Business Opportunities or Closures	○	○	○	○	○
Resident Out-Migration	○	○	○	○	○
Health Impacts on Residents	○	○	○	○	○
Reduced Availability of Affordable Housing	○	○	○	○	○

14. Please share any thoughts you may have on how or why weather-related disasters contribute to the above risks for local economies in the communities you serve, and please list any risks not listed above:

_____

The next set of questions is about limitations to pursuing weather-related disaster resilience efforts in the communities you serve.

15. To your knowledge, how much do each of the following **factors limit weather-related disaster resilience efforts** in the communities you serve?

	Not at All	Small Amount	Medium Amount	Large Amount	Don't Know
Lack of Funding for Adaptation and Resilience	○	○	○	○	○
Limited Public Sector Capacity	○	○	○	○	○
Lack of Cross-Sector Coordination	○	○	○	○	○
Residents Lack Awareness of the Issue	○	○	○	○	○
Residents Have More Immediate Concerns	○	○	○	○	○
Lack of Political Will	○	○	○	○	○

16. Please share any thoughts you may have on how or why any of the above factors limit weather-related disaster resilience efforts in communities you serve, and please list any other factors not listed above:

_____

17. To your knowledge, how involved are the following types of organizations in efforts to reduce weather-related disaster risk for low-income communities or communities of color in the communities you serve?

	Not at All	Small Amount	Medium Amount	Large Amount	Don't Know
For-Profit Financial Institutions	○	○	○	○	○
Nonprofit Financial Institutions	○	○	○	○	○
Community-Based Organizations/Nonprofits	○	○	○	○	○
Statewide, Regional, or National Nonprofits	○	○	○	○	○
Philanthropy/Foundations	○	○	○	○	○
Local Governments (e.g., City, County)	○	○	○	○	○
Regional Governments (e.g., Metro Planning Organization)	○	○	○	○	○
State Governments	○	○	○	○	○
Federal Government	○	○	○	○	○
Universities or Colleges	○	○	○	○	○

18. Please list any organization types not listed above that are involved in efforts to reduce weather-related disaster risk in communities you serve:

_____

19. Please describe any efforts that are underway in the communities you serve to identify or address weather-related disaster risk faced by low-income communities or communities of color:

    _____

20. Are there any changes or additions to current efforts (or lack thereof) to increase the resilience of low-income communities or communities of color that you would like to see?

    _____

21. If you are interested in being contacted for a follow-up interview, please share your email address here. Again, your survey responses will be aggregated and anonymized, and your individual responses and contact information will not be shared outside of the Atlanta Fed Community and Economic Development team.

    _____