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Urban Flooding Accelerates the Affordable Housing Shortage: A Case Study in Columbia, South Carolina

Mary Hannah Lindsay

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URBAN FLOODING ACCELERATES THE AFFORDABLE HOUSING SHORTAGE:
A CASE STUDY IN COLUMBIA, SOUTH CAROLINA
By

Mary Hannah Lindsay

Bachelor of Science
University of South Carolina, 2018

Submitted in Partial Fulfillment of the Requirements
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School of the Earth, Ocean & Environment
College of Arts and Sciences
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Accepted by:

Monica Barra, Director of Thesis

Susan Cutter, Reader

Dean Hardy, Reader

Cheryl L. Addy, Interim Vice Provost and Dean of the Graduate School

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ABSTRACT

The state of South Carolina stands at the corner where climate change and the housing crisis meet. The affordable housing stock across South Carolina continues to deplete as its major cities experience urban flooding events due to outdated and weakened infrastructure, compounded by an intensification of storm systems brought on by a changing climate. Lower income communities are forced to accept lesser living conditions and less resilient housing options because these options are more affordable. Renters are often met with more challenges when navigating disaster recovery compared to homeowners. Using a case study established in Columbia, South Carolina of the 1000-year rainfall event that occurred October 2015, this project is grounded in a qualitative inquiry centered around the experience of renters immediately following the flood and an evaluation of Columbia's flood mitigation efforts since 2015.

To inform this inquiry, tenants/landlords, community organizers, and legal aid professionals participated in semi-structured interviews. These interviews were supplemented with participatory observations from South Carolina Eviction Consortium meetings and document analyses spanning across dozens of news reports and disaster summary reports by national, state, and local agencies. With the support of this research, this thesis argues municipal response to urban flooding should take a "housing first" approach to ensure urban flooding's impact on the affordable housing stock is weakened

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LIST OF ABBREVIATIONS

ASCE.....	American Society of Civil Engineers
CDBG-DR.....	Community Development Block Grant – Disaster Recovery
DHEC.....	South Carolina Department of Environmental Health and Control
FEMA.....	U.S. Federal Emergency Management Agency
FIRM.....	Flood Rate Insurance Map
GLO.....	Texas General Land Office
HUD.....	U.S. Department of Housing and Urban Development
IA.....	FEMA Individual Assistance
IHP.....	FEMA Individuals and Households Program
IWC.....	City of Columbia’s Inclement Weather Center
LMI.....	Low-Middle Income
NFIP.....	National Flood Insurance Program
NLIHC.....	National Low Income Housing Coalition
SBA.....	Small Business Administration
SBGC-CRF.....	South Beltline and Gills Creek Community Relief Foundation
SC Appleseed.....	South Carolina Appleseed Legal Justice Center
SC Housing.....	South Carolina State Housing Finance and Development Authority
SCRLTA.....	South Carolina Residential Landlord-Tenant Act
SFHA.....	Special Flood Hazard Area

CHAPTER 1

INTRODUCTION

Project overview

As urban areas across the United States actively experience an intensification of short-duration extreme rainfall, flash floods continue to be the costliest and most dangerous environmental hazards (Cutter et.al, 2018; Jonkman and Kelman, 2005; Westra et.al, 2014). Flood events are particularly dangerous because they heed little warning and therefore shorten the response time. Along with other various types of weather events, flash floods are expected to endure anthropogenic intensification (Li et.al, 2022). A warming climate causes floods to onset more rapidly, shortening an already narrow window for response. Flooding will occur at an unprecedented level throughout the U.S., posing challenges to outdated flood risk measures and aging infrastructure (Pallathadka et.al, 2022). Floods devastate instantaneously, but even more so in urban centers with higher populations (Westra et.al, 2014).

Reflecting on the 1000-year rainfall event that occurred in October 2015 in Columbia, South Carolina, we learn just how devastating a flood can be. In 2015 as Hurricane Joaquin approached the coast of South Carolina; it encountered a unique weather system that unexpectedly brought more than 27 inches of rain to most of South Carolina (See Figures 1.1 and 1.2). This led to a deadly combination of flash and river flooding across the state, even though the hurricane never made landfall (Cutter et al., 2018; Phillips et al., 2018).

The severity of the floods was described in popular media as “one of the most prolific rainfall events in the modern history of the United States” (Wiltgen, 2015). Though the impact of the storm/rainfall event was felt across the region, Columbia, the state's capital, experienced an array of impacts to housing, infrastructure, and human life largely unexpected by local officials as Columbia rests 130 miles away from the coast (Cutter et.al, 2018; Phillips et.al, 2018). Six dams failed along the largest urban watershed, Gills Creek, which runs through Columbia. A 60-foot wide breach in the 100-foot wide Columbia Canal, which was in operation since 1896, endangered the drinking water supply for the entire city (Phillips et al., 2018). About 50,000 residents lost power at the height of the storm, which fortunately was restored to all residents within two days. Over a thousand residents evacuated due to flood risk, and the storm resulted in the death of nineteen people from drownings and car accidents (U.S. Department of Commerce, 2016). In total, the storm caused nearly \$2 billion in damages (NOAA, 2015). Disaster recovery is becoming unprecedently costly, and South Carolinians must continue to adjust (Correll et.al, 2021).

While coastal areas typically bear the brunt of a hurricane’s environmental, economic, and human damages, Hurricane Joaquin demonstrated that, in the right conditions, inland regions can experience equally severe impacts. Between October 2-5, 2015, an estimated 21.49 inches of rain fell on Richland County; the heaviest rainfall occurred early in the morning on October 4, 2015. In conjunction with Columbia’s buckling infrastructure, the result was a 1000-year rainfall event -- the occurrences of which are accelerating in frequency in Columbia and other urban centers in the United States. This classification signifies there is 0.1 percent chance of such an event happening

in a year. Only two years after Hurricane Joaquin, Hurricane Harvey brought unprecedented rainfall and flooding further inland to Houston, Texas, which lies around 50 miles from the coast. Like Hurricane Joaquin, Hurricane Harvey was similarly categorized as an unprecedented rainfall and urban flooding event associated with the characteristics of climate change, in particular warming atmospheric conditions and surface level ocean temperatures (Lieberknecht et.al, 2021).

Back in Richland County, where Columbia is located, over 10,000 homes experienced moderate to high-risk damage from the October 2015 flood, which was the most of any other county during the storm (U.S. Department of Commerce, 2016). This placed pressure on communities that were already experiencing the effects of a housing shortage. Housing tenure¹ is one of many factors contributing to social vulnerability during a disaster (Cutter et.al, 2003; Lee & Van Zandt, 2019). Aspects of social and physical vulnerability correlate with typical renter² characteristics, such as living in inadequate and/or unhealthy³ housing, being low-income, and having a limited control of resources (Lee & Van Zandt, 2019). Because renters do not own their homes, they lack ability and access to make any improvements to their home and legal standing to rebuild their homes following a disaster (Lee & Van Zandt, 2019). Renters already face housing problems outside of disaster, which are traced by the shortage of affordable housing⁴. The shortage reduces the availability of rental housing and constrains renters to limited areas

¹ Housing tenure refers to whether a household owns or rents a unit (Lee & Van Zandt, 2019).

² The terms renter and tenant are interchangeable throughout this text.

³ The National Center for Environmental Health determines inadequate housing to have moderate or severe physical problems, such as deficiencies in plumbing, heating, electricity, and general upkeep. By definition, unhealthy housing refers to exposure to toxins through poor air quality, rodents, and water leaks.

⁴ Housing becomes unaffordable when one spends more than 30% of their income on housing. One out of every four households in America spends closer to 70%. (NLIHC, 2021).

within urban centers (Lee & Van Zandt, 2019; Mehta et.al, 2020). Because rental housing is more likely to already be older, in poor condition, lacking in sanitation, less maintained, and located in areas prone to flooding, this places renters at a heightened disadvantage during disasters, especially floods (Mehta et.al, 2020).

In its 2015-2019 Consolidated Plan, the City of Columbia (2015) recognized itself to have a severe shortage of affordable housing before the flood. Columbia experienced a 13% population growth between 2000 and 2013. While the median household income increased 33% to \$41,344, the percentage of cost burdened renters increased by 39% and the percentage of cost burdened homeowners increased by 29%. Because both the percentage of cost burdened households and the median household income increased, this suggests the cost of housing also increased and the amount of affordable housing decreased. In 2015, an estimated 55% of renters were cost burdened in Columbia. When renters sacrifice to afford their cost of living, they are less likely to afford the costs of recovering from a flood.

Columbia has one of the higher rental populations compared to other cities in the state, but South Carolina lacks affordable housing statewide. This is evidenced partly by its eviction rates as they are among the highest in country (Princeton Eviction Lab, 2018). Because of the added financial stress after a disaster, eviction rates are evidenced to increase in the immediate aftermath of disaster (Raymond, et.al, 2021). Raymond et.al (2021) found South Carolina to follow this trend after the flooding in October 2015. Evictions occur due to a lack of affordable housing, and they can quantify a housing crisis. Rising housing costs and stagnant wages drive housing unaffordability in South Carolina. South Carolinians in urban and rural areas alike experience evictions at levels

as high as 38%, meaning nearly 38 out of every 100 tenants will experience eviction, compared to the national eviction filing rate of 8% (Princeton Eviction Lab, 2018). The Princeton Eviction Lab tracks eviction filings, only about a quarter of which will result in an actual eviction (Suddeall & Pascuiti, 2021). Loose tenant protections, cheap eviction filings for landlords, and a shortage of affordable and adequate housing are all factors that contribute to unusually high rates of eviction (Heiman, 2022; Immergluck et.al, 2020). The South Carolina State Housing Finance and Development Authority (SC Housing) completed a 2021 Housing Needs Assessment, which estimated 24% of all renters spend over half their income on rent. Columbia is the largest municipality located within Richland County (Figure 4.1). In 40 out of 46 counties, including Richland, the average renter cannot afford a two-bedroom apartment without becoming cost burdened. Richland County has an estimated 29.1% severely cost burdened renter population. In addition to eviction filings, these numbers further demonstrate the shortage of affordable housing in South Carolina.

The state of South Carolina stands at the corner where the housing crisis and climate change meet. In a state where there is a severe affordable housing shortage, South Carolinians will not be able to afford to lose more of the housing stock to flooding disasters (National Academies of Science, Engineering, and Medicine, 2019). This shortage is further quantified by the National Low-Income Housing Coalition (NLIHC), which estimates a shortage of rental homes both affordable and available for extremely low-income renters. The maximum income for a 4-person extremely low-income household across South Carolina is \$26,200. Those severely cost-burdened by housing will be more likely to experience housing instability and evictions (NLIHC, 2021). If

homes are not destroyed, they can still experience significant damages that may not immediately, if at all, receive the proper repairs (Correll et.al, 2021, Peacock et.al, 2015). This subjects lower-income residents to substandard housing when they may already be cost-burdened by housing (Lieberknecht et. al, 2021).

There is no sign of significant progress in Columbia's capacity for rainfall – on July 4th, 2022, parts of downtown Columbia received four inches of rainfall in one hour constituting another 1000-year rainfall event. Regarding this most recent event, Assistant City Manager for Columbia, Clint Shealy, noted the addition of stormwater retention ponds to hold rainwater in the Five Points area of Columbia and considered it a significant improvement. In reference to 1000-year rainfall events, Shealy said in a report by The State Newspaper, “there's certain levels of events you just can't design for” (Hughes, 2022). Still, the city has several multi-million-dollar projects planned to help divert overflowing stormwater away from residential and commercial areas. These projects include debris removal projects, retention ponds, and pipe improvements across the city (Hughes, 2022).

Such flooding events provoked a series of conversations among scientist and urban leaders about the relative preparedness for cities to prepare to adapt to the various environmental and human costs of climate change in the near- and long-term future (Neupane et.al, 2021; Peacock et.al, 2015; Shokry et.al, 2021). One important aspect of this is how best to allocate financial assistance and resources to residents displaced by the impacts of such storm events. The October 2015 flood received a major disaster declaration warranting aid and assistance from the Federal Emergency Management Agency (FEMA). Historically, emergency disaster assistance has largely been geared

towards homeowners in the form of various federal disaster funds and grants administered by FEMA which provide benefits, such as the ability to apply for FEMA trailers, to homeowners, but not renters (Dundon and Camp, 2021; Mehta et.al, 2020; Raymond et.al, 2021).⁵ FEMA disaster funds are only available to renters during a federally declared disaster. Renters' insurance does not typically cover damages experienced during a flood. While renters may also purchase flood insurance through the National Flood Insurance Program (NFIP), only an estimated 2% of renters nationwide participate in the program despite premiums being a fraction of flood insurance for homeowners (FEMA, 2018). Without community ties or a financial safety net, renters must bear the costs to replace personal property or to relocate after displacement.

Though renters are offered some forms of housing relocation assistance, it is usually temporary, and fails to account for the unique challenges that renters living in low-income or substandard housing face when disasters displace them temporarily or permanently from their homes (Emrich et.al, 2020). Studies conducted in states like California, New York, Florida, and New Jersey have found that housing stressors, such as eviction rates and shortages of affordable housing, hit peaks immediately after environmental disasters (Emrich et.al, 2020; Mehta et.al, 2020; Raymond et.al, 2021). Critical studies on the long-term impacts of Hurricane Katrina in New Orleans over the past decade have similarly demonstrated how disasters exacerbated preexisting inequalities that break down along the lines of income and race which, at least in the case of Katrina, lead to the permanent exodus of lower-income Black communities from New

⁵ Many western nations, including the U.S., are considered home ownership societies, in which homeowners are valued as citizens over tenants and thus receive better government assistance (Dawkins, 2020; Lima, 2021.)

Orleans and surrounding areas because of the shortage of affordable housing as well as access to work (Adams, 2013; Browne, 2015; Reid 2013; Roberts, 2019). In states like South Carolina that already experience distinct shortages in affordable housing coupled with lax legal protections for renters who encounter financial hardships, this situates renters to face fewer affordable options for housing, putting them increasingly at risk for eviction and its various economic, legal, and everyday challenges (Hatch, 2017).

To understand how access to safe and affordable housing is impacted by flooding, this thesis examined the policies and programs offered to renters in the wake of the unprecedented 1,000-year rainfall event that impacted Columbia, South Carolina, in October 2015. This thesis begins with a literature review of texts and theories around urban flooding and infrastructure, housing instability, and environmental justice, followed by content and discourse analyses on disaster overviews and guides to disaster assistance, and interviews with tenants and community leaders affected by the October 2015 flood and legal aid professionals. This study aimed to understand the extent of housing stress caused by the rainfall event in Columbia and what political solutions in practice aid, and in theory can aid, in alleviating that stress. I analyzed these policies in relation to the preexisting shortage of affordable housing in South Carolina to understand how an environmental crisis like the rainfall event of 2015 intersect with, and potentially exacerbate, the state's housing crisis.

Research questions and goals

Drawing upon analyses of the 2015 floods in Columbia, SC and policies and laws concerning affordable housing and disaster relief at the local and national levels, this thesis defined four key questions:

1. How do the rights of tenants compare to those of landlords in South Carolina?
2. In what ways does urban flooding increase housing stress⁶, specifically to tenants?
3. What have been the impacts to tenants short and long term, displaced by the 2015 floods in Columbia, South Carolina?
4. How can hazard mitigation and policy solutions alleviate housing stress during urban flooding events in South Carolina and beyond?

My goals in this research were to analyze various legal mechanisms available to alleviate housing stress for tenants before and after disaster strikes; to understand the challenges tenants experience in experiencing an urban flooding event; and to understand the challenges local and state governments experience in responding to urban flooding events as they affect the housing stock. I used the 1000-year rainfall event and subsequent urban flooding brought on by Hurricane Joaquin as a case study in understanding the extent of emergency housing assistance, across subnational to national levels of government, as it is extended to tenants compared to homeowners. I was particularly interested in studying tenant housing assistance because of the extraordinary affordable housing shortage in Columbia and South Carolina. I identified the ease of access at which tenants, and what kind, can find alternative housing during disasters; can identify, apply for, and receive funds to support temporary and permanent relocation; and what rights to housing tenants have during a disaster. By accomplishing these research goals, I argue municipal response to urban flooding should take a “housing first”

⁶ Housing stress refers to when a household must pay more than 30% of its income towards housing costs (Quigley and Raphael, 2004).

approach, meaning that affordable, adequate, and safe housing should be a prioritized mitigation effort, as the threat to the housing stock from flooding continues to intensify.

By conducting interviews with tenants affected by the October 2015 flood in Columbia, I gained an understanding about the path to recovery as a tenant. Current literature implies renters may have a more difficult time obtaining assistance; therefore, I sought to research if tenants, overall, experienced challenges in recovering from the October 2015 flood and why that would be. To support this same query, I used my interviews with legal aid professionals who support tenants experiencing housing difficulties both post-disaster and in general. From these interviews, I gained insight around the complex matters that tenants face during disaster recovery and around the pathways to legal solutions for alleviating housing stress. This query was supported with an overview of Landlord-Tenant Law and Fair Housing Law in South Carolina, as it compares to other states, and guides to legal and financial assistance available for tenants during disasters (Hatch, 2021; SC Appleseed, 2018). Additionally, participant observations I conducted during meetings with the South Carolina Eviction Consortium support this query, as I learned more about housing issues specific to South Carolina from leading academic, government, and non-profit voices mobilizing to alleviate housing stress for tenants. Finally, using interviews with community leaders and analyzing disaster summaries from the October 2015 flood, I gained a deeper context of the event, specifically the challenges in responding to the flood itself in Columbia. These challenges include the delegation of immediate and long-term assistance to tenants,

tenants' preparation strategies and knowledge around floods, and the variation in tenants' leasing agreements⁷.

This research is first deliberated through a literary analysis of research spanning across the fields of urban flooding and mitigation, disaster recovery, environmental justice, and housing insecurity. My research preliminarily suggests an understudied intersection of these fields; therefore, I plan to shed light on the ways in which these fields of work overlap in the instance of the urban flooding event that took place in October 2015 in Columbia, South Carolina (Lee & Van Zandt, 2019). I build upon existing arguments that housing should be a priority to urban planners and environmental justice advocates. Likewise, I contribute to existing arguments that flooding, and other disasters undergoing anthropogenic intensification, should be prioritized to leaders advocating for housing justice.

⁷ Tenants may have leasing agreements with private landlords, property management companies, or a municipality. In South Carolina, tenants may not have lease agreements at all, as informal agreements are common in the state (South Carolina Housing, 2022). These variations cause difficulties in responding and recovery to disaster as a tenant, because there is not a “one-size fits all” approach.

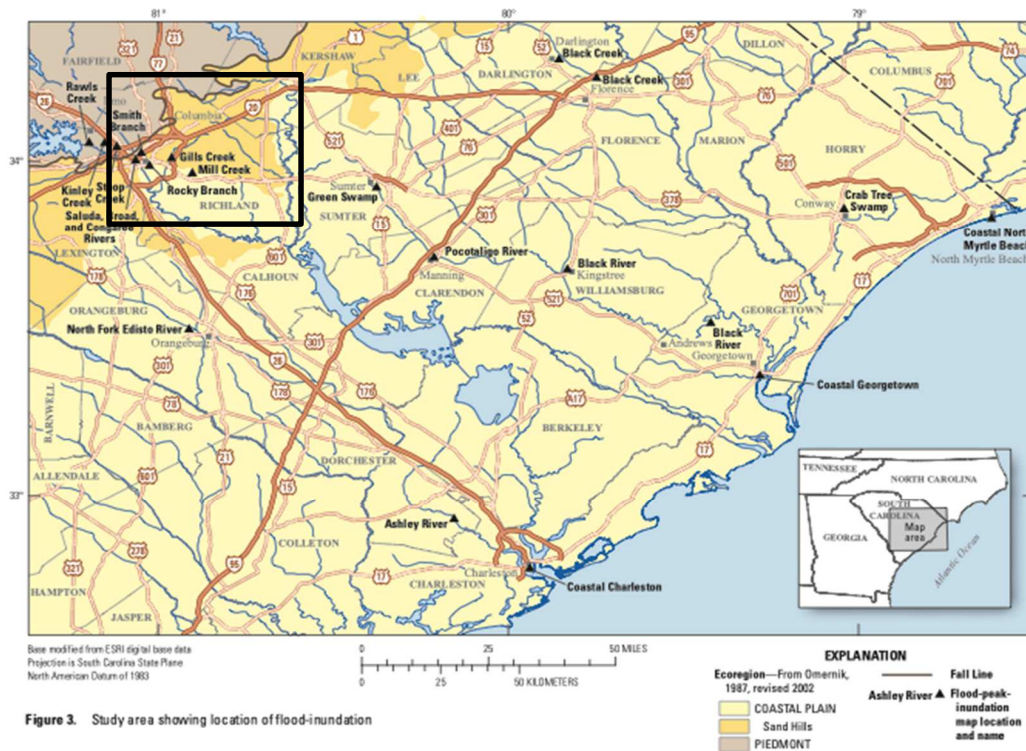


Figure 3. Study area showing location of flood-inundation

Figure 1.1: USGS flood-inundation map of selected areas affected by the flood of October 2015 in central and coastal South Carolina (Musser et.al, 2016)

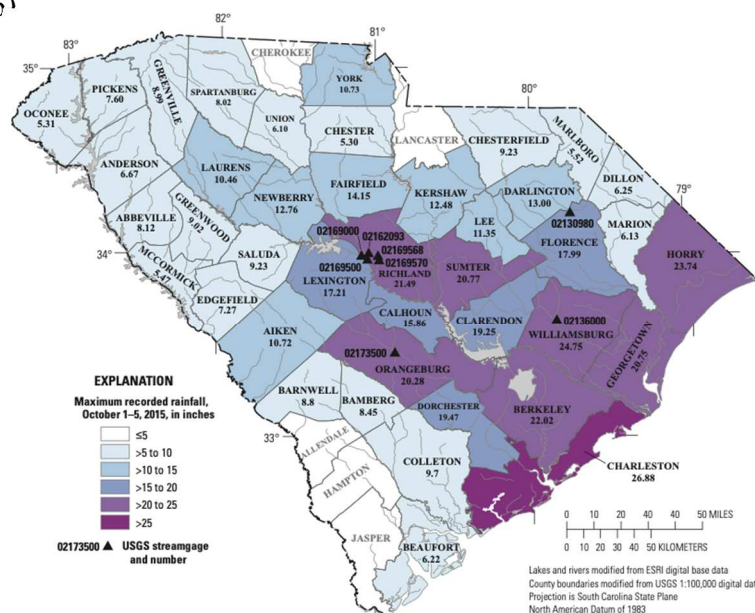


Figure 1.2: USGS map displaying counties in South Carolina with one or more National Weather Service or U.S. Geological Survey rainfall gauges recording more than 5 inches of rainfall for October 1-5, 2015 (Musser et.al, 2016).

CHAPTER 2

LITERATURE REVIEW

To inform and guide this research, I performed a review of literature spanning across several fields of work. First, I provide a summary of the increasing severity of flooding in urban areas, diving deeper into flood risk and the unequitable manner through which it is distributed across the urban landscape. I analyze decision-making at the municipal level to combat flood risk and I identify outcomes of green infrastructure on the affordable housing stock. Transitioning into an overview of housing insecurity in the U.S. and South Carolina, I distinguish the housing crisis as a disaster within its own realm and draw correlations between urban flood events and a depleting stock of affordable housing. Finally, I examine the obstacles of recovery, as disasters hit vulnerable populations the hardest, yet these populations experience the most challenges during disaster recovery. Throughout this literature review, I weave environmental justice works of literature to support my primary argument that, because urban flooding is destined to increase in severity and marginalized populations stand to bear the extent of the damage, urban and climate planners must prioritize housing in flood mitigation.

Urban flood risk

There is an anticipated increase in the frequency of pluvial flooding due to climate change and urbanization. Despite the potential loss of life and property, pluvial

(urban flooding) is considered understudied when compared to fluvial (riverine/stream flooding) (Kim et al., 2017; Li et al., 2022; Pallathadka et al., 2022; Westra et al., 2014). Current research indicates sub-daily, specifically hourly, extreme rainfall is more sensitive to local atmospheric temperature (Neupane et al., 2021; Rosenzweig et al., 2018; Westra et al., 2014). Pluvial flooding occurs because extreme rainfall events overwhelm drainage capacity and small catchments (Cutter et al., 2018; Tabari, 2020). Urbanization leads to more impervious surfaces, meaning when rain falls, it has nowhere to go and results in more runoff. In the southeast U.S. and among more humid regions, there is an anticipated decrease in lag time between the time it takes for a rainfall event to onset and a flood to occur because of a more saturated soil content compared to more arid regions (Li et al., 2022; Neupane et al., 2021). A decreasing lag time causes floods to become flashier. In urban areas with more concentrated populations and development, flash flooding stands to threaten both life and property (Rosenzweig et al., 2018). Specifically, the flashiness of pluvial flooding decreases response time and increases the difficulty in mobilizing an emergency response.

Pluvial flooding is thought to be understudied partly because there are already well-established methodologies for flood prevention. With technical and engineering solutions available, occurrences of pluvial flooding usually transpire because of the failure to install one or more of these methodologies (Rosenzweig et al., 2018). Any city's risk of flash flooding is predetermined by its past and present stormwater practices (Rosenzweig et al., 2018). In addition to stormwater management practices, land use changes and increases in the frequency of short-duration rainfalls events require the need for upgrades in stormwater infrastructure (Li et.al, 2022). Pluvial flooding is not always

perceived as an imminent threat and rather is perceived as more of a nuisance. This apathetic premonition can be held by both citizens and local officials and exists largely due to poor public outreach and education (Cutter et al., 2018). Research warns to not underestimate the effects of pluvial flooding, which are known to result in the loss of life, contaminant exposure, destruction of property, and disruption in patterns of transportation networks (Li et al., 2022; Neupane et al., 2021; Rosenzweig et al., 2018). Because pluvial flooding events are known to be shorter in duration and to onset in more centralized locations in urban areas, they are often excluded from flood frequency assessments because they can only be characterized with both high temporal and spatial resolutions (Rosenzweig et al., 2018). The record of pluvial flooding is often kept with municipal service requests or reports on social media. It is considerably difficult to translate a record so unreliable into mitigation approaches.

In addition to contributing towards the increase of pluvial flooding, rapid growth of urban areas is associated with an increasing social and economic inequality (Pallathadka et al., 2022). Simultaneously, research supports that communities of color experience a disproportionate impact of various disasters, including flooding. Residents with higher socioeconomic status are often able to select neighborhoods that meet their preferences and to prevent undesirable changes in land use (Koo et al., 2019). However, most of the research, which again focuses mainly on fluvial flooding, suggests minorities are more likely to have negative experiences with flooding. Therein lies the need to identify if similar trends exist in pluvial flood events (Immergluck & Balan, 2018; Koo et al., 2019; Wolch et al., 2014).

Research and municipalities consider green infrastructure (GI) as an approach to urban flooding (Immergluck & Balan, 2018; Wolch et al., 2014). In Columbia, South Carolina, an example of a green approach to infrastructure development is the restoration of the floodplain along parts of Gills Creek into its natural state and the development of green spaces (Huang et al., 2018; Immergluck & Balan, 2018). Homes affected by the October 2015 flood were bought by the city and county from homeowners and demolished to prevent them from flooding in the future and to create more a buffer between Gills Creek and other nearby residences. Not all homes that are purchased through buyout programs will turn into green spaces, but by returning land to its natural state, this helps establish a buffer between a floodplain and residential and commercial development. Many cities have deployed green infrastructure (GI) often with the intent of improving water quality rather than reducing water quantity, yet research implies the success of GI in doing both (Berke et.al, 2019; Heck, 2021; Pallathadka et al., 2022) . However, trends infer inequitable distribution and deployment of GI, which leaves vulnerable populations at a disadvantage by having access to fewer nearby GI rudiments despite having a greater flood risk (Immergluck & Balan, 2018; Berke et.al, 2019). Though GI approaches to circumvent urban flooding attempt to prioritize equity, they are limited in their ability to address the history of inequitable infrastructure in urban environments. Immergluck and Balan (2018) echoes criticism of sustainable development, arguing that social equity is the “ignored stepchild of the sustainability paradigm.” In other words, green investments are not always the problem, but rather GI agendas often underestimate the historical disinvestment of municipalities from disadvantaged communities (Heck, 2021). Research from a 2013 tree canopy study in

Atlanta suggests poverty and renter-occupied housing are associated with greater environmental inequity (Koo et.al, 2013). This finding suggests socioeconomically advantaged homeowners may have more political power to advocate for green infrastructure in their neighborhoods. Additionally, desirable GI elements attract higher housing prices for both homeowners and renters (Keenan et al., 2018; Shokry et al., 2022).

This phenomenon is described as climate or eco-gentrification, within which those with fewer resources are excluded from the long-term benefits of green investments (Keenan et al., 2018). Shokry et.al (2022) identifies this as the “green resilience paradox,” which entails that green investments increase resilience for some while exacerbating vulnerability to gentrification and displacement for others (Black et.al, 2013; Koch et al., 2017; Ranganathan & Bratman, 2021; Torabi et al., 2017). Research suggests socially and environmentally vulnerable communities that do receive green investments are simultaneously undergoing urban revitalization projects. Ranganathan & Bratman (2019, p.2) describes a critical view of climate and green resilience, noting the movement’s talking points of “community cohesion” and “building back better”; however, this emphasis tends to overlook structural inequalities that make certain groups more vulnerable to environmental threats in the first place. When planning for climate change, municipalities must take into consideration the historical context of marginalized groups within their communities when attempting to make wrongs right and to plan for future climate and flood risks (Heck, 2021; Pallathadka et al., 2022).

The extent to which green investments and urban revitalization interact with housing markets to exacerbate inequities remains underexplored. Next, this literature review walks further through interactions between housing affordability and flood risk.

Housing affordability and flood risk

De-gentrification in this context entails more affluent households flocking to areas with a lower flood risk, which increases the cost of living in those areas. Lower-income households are left in areas that have a lower cost of living, but a higher flood risk (Mehta et al., 2020; Peacock et al., 2015; Ratnadiwakara & Venugopal, 2020). Whereas gentrification displaces less affluent residents out of neighborhoods with lower flood risk, de-gentrification more so entrenches less affluent residents in areas with higher flood risk (Keenan et al., 2018). Gentrification is known to affect the affordable housing stock. Homeowners already living in changing neighborhoods did not experience the same barriers of entry that renters or new homeowners now face when attempting to live there (Williams, 2020).

What was once affordable may no longer be -- the Department of Housing and Urban Development (HUD) estimates a shortage of around 7.7 million affordable housing units. In terms of what is considered “affordable,” HUD recommends that individuals contribute no more than 30% of their incomes to housing (Buckley and Schwartz, 2012; Herbert et.al, 2018). Given this shortage, Americans must scrape the bottom of the barrel, often sacrificing affordable housing costs for substandard conditions that increase vulnerability to damage during these climate events (Heiman, 2022; Ratnadiwakara & Venugopal, 2020; Sampson et al., 2019; Willis et al., 2011).

Partly contributing to the shortage of affordable housing are changing demographics among renter and homeowner populations. Additionally, there is an overall increase in the number of high-income earning renters and homeowners. In its 2022 America's Rental Housing Report, the Joint Center for Housing Studies found that between 2010 and 2018, there was an increase of 2.8 million homeowner households, and 2.2 million of those homeowner households had incomes of \$200,000 or more. The same study found that between 2010 and 2018, those earning more than \$75,000 accounted for over 75% of the growth in tenants. During the same period, the rate of homeowner households bringing in less than \$150,000 decreased. Because homeownership is becoming increasingly limited to those with the highest incomes, more high-income individuals are choosing to rent instead.

While there are cities where the housing crisis runs more rampantly, these trends are widespread across the entire country. Developers and builders have taken note of this and have transitioned to taking over popular neighborhoods with high-cost apartments to attract high-income tenants (Fussell & Harris, 2014; Keenan et al., 2018; Weiss, 2019). This suggests lower-income renters are those most affected by the shortage of affordable housing, leaving them more likely to accept substandard living conditions and more exposed to higher flood risk (Haberle, 2018; Hersher, 2020; Ratnadiwakara & Venugopal, 2020). Urban flooding is a growing source of housing inequality; each flooding event threatens the remaining stock of affordable housing.

When considering renters' flood risk, it is important to also consider the interconnectedness of renters and members of marginalized communities. People of color are more likely to be renters – while more than 70% of white Americans own homes,

fewer than 50% of Black and Latinx Americans do (Heiman, 2022). This disparity exists for a multitude of reasons, from discriminatory housing to differences in median income. To further comprehend the systemization of racism in the U.S., we can explore Richard Rothstein's, a research associate with the Economic Policy Institute, *The Color of Law*. This text analyzes a piece of this relationship, providing multiple historical accounts showing segregation in the U.S. resulted from de jure practices by federal and local governments, rather than just simply de facto activities of the housing markets. The same policies that cause more people of color to rent also cause people of color to be overrepresented in areas with a higher flood risk (Fussell & Harris, 2014; Heiman, 2022; Tate et.al, 2021). Though there is never a zero percent chance of anyone's home flooding, there are compounding concerns for people of color and low-income renters during a flood (Willis et al., 2011). Protecting renters from flood damage is an environmental justice issue (Gray et.al, 2012). Urban planners must first prioritize renters of low-income and of color when planning for the next flooding event (Heiman, 2022). If these groups are prioritized, then all renters will benefit. This approach recognizes the intersections of diverse social, economic, and ecological concerns as they pertain to a community's safety, which is a core value of environmental justice advocates (Banzhaf et al., 2019; Heiman, 2022; Schlosberg & Collins, 2014; Schmeltz, 2021).

Because renters make up over half of the residents in most major American cities, the risk of urban flooding is even more significant to renters (Heiman, 2022). In general, there is a higher incidence of exposure to substandard housing conditions for low-income and minority renters compared to other renters. One in ten poor households live in inadequate housing. There is a greater tendency for rental properties to have health

harming conditions than owner-occupied homes – possibly because renters fear retaliation from landlords if they report any problems (Benfer & Gold, 2017; Peacock et al., 2015; Raymond et al., 2022; Tipple, 2005). A flood compounds these preexisting conditions and creates an array of adverse physical, mental, and financial affects (Azuma et al., 2014). Some of these effects include contaminated drinking water, mold and moisture, and the stress and trauma from having experienced a flooding event (Azuma et al., 2014; Jacobs, 2011). Renters bear such a disproportionate risk to these adverse effects because they have fewer legal and economic protections than homeowners.

Willis et.al (2011, p.226) indicates constrained housing choice often means lacking capacity to draw on additional resources when needed, which is crucial when recovering from a disaster. Contrastingly, Madajewicz (2020) measured vulnerability among homeownership after Hurricane Sandy in New York. The study ultimately found low to middle-income homeowners were less financially resilient than renters; while the recovery cost for homeowners was 2.4 times their annual per capita incomes, the recovery cost for renters was half their per capita incomes. However, the study explains that homeowners' recovery expenses were more significant because renters do not bear the cost of structural damages to their homes. Also, within this study, the low to middle-income homeowners have higher incomes than low to middle-income renters despite the incomes of both groups being close to equal on average. When picking up the pieces after a flood, renters face unique, and often more challenging, obstacles. The next section delves deeper into how scholarship perceives those obstacles and determines if renters are given a fair shot at recovery.

Disaster housing assistance

Poverty and politics are primary drivers of disaster vulnerability. Again, communities of low-income and of color are more likely to live and work in areas vulnerable to disaster and to occupy housing that is depleted because of its exposure to such disasters (Fothergill & Peek, 2004; Keenan et.al, 2018; Lee & Van Zandt, 2019). This vulnerability exists before, during, and after disasters strike. Without expendable income, it is more difficult to prepare for disasters and to evacuate with ease before the disaster strikes (Drakes et.al, 2021; Zhang & Peacock, 2009). Particularly vulnerable populations include the elderly, children, and anyone who possibly lacks mental and physical capacity to prepare for and react to disasters (Canton, 2019, p.68; Davlasheridze & Fan, 2017).

Renters and homeowners have different disaster assistance outcomes. It is important to note FEMA assistance is only available during a federally declared disaster. Most of the counties in South Carolina received that declaration after the October 2015 flood, meaning affected residents were eligible to apply for those funds. A national level assessment found that tenants have low assistance allocation and higher levels of social vulnerability, which aligns with earlier findings suggesting tenants are underserved by FEMA's Individual and Households Assistance Program (IHP) (Drakes et.al., 2021; Davlasheridze & Fan, 2017; Emrich et.al, 2020). The bulk of IHP is Repair and Replacement assistance, for which tenants are ineligible because those funds are distributed for the restoration and reconstruction of housing. Through FEMA, tenants can only apply for assistance to recover personal effects, medical expenses, and temporary living expenses. This explains why tenants have a lower assistance allocation compared

to homeowners. Though assistance through IHP is intended to be short-term, it was only found to occur in low levels in areas of higher social vulnerability, particularly in rural areas and the southeastern U.S. Repeated findings suggest that IHP and other disaster assistance programs should prioritize social disparities in allocation to assist those most vulnerable in recovery (Davlasheridze & Fan, 2017; Drakes et.al., 2021).

A difference in disaster outcomes based on socioeconomic characterizations became more apparent when Hurricane Katrina devastated New Orleans and the Gulf Coast in late August of 2005. When Katrina's floodwaters inundated 80% of New Orleans, the area that experienced the brunt of the flooding and damage was the predominantly African American Lower Ninth Ward (Breen, 2022; Byrnes, 2014; Roberts, 2018). In the case of Katrina, climate change exposed to the world the deep racial and socioeconomic inequality that New Orleanians already knew existed. The storm itself waged war on New Orleans, but the catastrophic emergency response that followed may have "overshadowed the storm itself" (Bullard and Wright, 2009, pg. 3; Davlasheridze & Fan, 2017).

After Katrina, there was a mass realization that people from all socioeconomic backgrounds could visibly see the power of a changing climate and how the most vulnerable populations are just one storm away from losing everything (Breen, 2022; Browne, 2015). It is true that New Orleans had preexisting conditions that gave way to the brunt of Katrina. These infrastructure issues that led to the worst of the flooding in New Orleans are not unlike those that also led to the extent of the flooding damage in Columbia. When challenged, the housing quality and urban infrastructure immediately buckled (Roberts, 2018).

In her text *Markets of Sorrow, Labors of Faith: New Orleans in the Wake of Disaster*, Anthropologist Vincanne Adams explained Katrina was so forceful that it impacted people of all races and classes. Adams examined how the response and recovery was not smooth for anyone, but it was especially difficult for people of color due to disparities engrained into disaster relief policy and processes (Adams, 2013). Though underserved before Katrina, minority populations in New Orleans received less government relief and less communication only perpetuating their vulnerabilities (Adams, 2013). For example, homeowners applying for assistance from FEMA due to extensive damage had to provide the deed to their home among several other forms of documentation. Heirs' property was very common among African Americans in the New Orleans area because it was common for the home to have been verbally passed down to them. Such an exchange made it difficult to ascertain a deed, and if it was located, it usually was in the name of the original owner (Adams, 2013). Without having the proper documentation, individuals were denied any FEMA assistance. Katrina made it clear, if it was not already, that disaster relief was systematically unintended for minorities (Breen, 2022; Roberts, 2018).

Within the context of disaster relief, Reid (2013) examines characterizations of deservingness among disaster survivors. Further, Reid explains, Katrina survivors were perceived as either deserving victims or undeserving cheats (Reid, 2013). Particularly, Reid argues FEMA rental assistance programs were best fit for disasters survivors living in single nuclear family households and with personal financial safety nets. In general, U.S. welfare programs, including disaster relief, have been designed to enforce a family ethic that subordinates people of color (Reid, 2013). Outside of this narrowly cast net,

disasters survivors are investigated and forced to wait on assistance, which only prolongs the road to recovery. With such wide variation in disasters and vulnerable populations, there is not a “one size fits all” approach to disaster response or recovery. This insufficient and misguided response only further festers vulnerability (Canton, 2019, p.68; Koch et.al, 2017). Often, emergency operation plans are produced without a developed capacity to effectively implement them. Too few properly trained emergency personnel and insufficient policy formulation complicates both disaster prevention and reaction in the U.S (Kahan, 2015).

The weak spots of emergency management in the United States became blatant during and after Katrina, which led to a realignment of U.S. emergency management efforts towards environmental and climate disasters (Kahan, 2015; Rivera et.al, 2022). FEMA has been criticized for shortchanging the same communities of color and of low-income that environmental disasters hit so hard. This inequity is partly so exacerbated because FEMA’s emergency assistance heavily favors property owners, which leads to the focus of restoring majority white areas with more valuable infrastructure and homes (Drakes et.al, 2021; Koch et.al, 2017; Rivera et.al, 2022; Ryder, 2017). While communities of color and of low-income are hit the hardest by disaster, they are systematically the least likely to recover from it (Breen 2022; Ryder 2017).

The intersections of housing and flood events is an underexplored field of research. To guide this research, this literature review gathered and summarized key findings from both fields to demonstrate those intersections. Simultaneously, though there have been case studies on the 2015 October flood, none specifically examined the challenges renters experienced during the process of disaster recovery. In that, this

literature review confirms the need for this thesis project to further examine this intersection within the bounds of this case study.

CHAPTER 3

METHODOLOGY

My primary goal in this research was to examine the unique challenges renters face when recovering from urban flooding events. I used the major rainfall and inland flood caused by Hurricane Joaquin as a case study in understanding the extent of emergency housing assistance, across subnational to national levels of government, as it is extended to tenants compared to homeowners. Additionally, I shone a spotlight on the history of infrastructure in Columbia and its flood mitigation efforts since October 2015. Without significant progress, Columbia's urban flooding will continue to overwhelm the city's affordable housing stock and exacerbate racial and economic inequality.

The primary method of research was document analysis with the supplemental support of semi-structured interviews and participant observations. For document analysis, I selected a wide variety of documents that focus on hazard mitigation, landlord-tenant laws, and disaster recovery reviews from Hurricane Joaquin and the flooding it caused. Additionally, I examined a wide variety of local, state, and national popular media to further contextualize and ground the case study. Once I reviewed the documents and popular media, I analyzed them to add context to the flood itself and to better inform myself on tenant rights and the state of housing insecurity in South Carolina.

I also conducted five semi-structured interviews that were guided by interview protocols. Interview participants were anonymized with pseudonyms. Semi-structured interview protocols (found in Appendix A) include specific, yet open-ended questions. Additionally, I conducted participant observations with a group of housing professionals across the state of South Carolina. While this research aims to highlight the tenant's experience during disaster, participants from other backgrounds were recruited as well, such as emergency responders and legal professionals. Through the transcriptions of those interviews and the field notes taken from those observations, I conducted descriptive and in-vivo coding in the first two rounds of coding. Descriptive coding summarizes a topic in a word or phrase, whereas in-vivo coding summarizes a topic using language and terminology used directly by participants (Saldana, 2013). In the third round of coding, I utilized versus coding and distinguish the conflict between tenants and landlords. Versus coding helps to establish binary terms that identify conflict between or across systems, and is commonly used in policy studies (Saldana, 2013).

Research questions

Four primary research questions guide this research:

- 1) How do the rights of tenants compare to those of landlords in South Carolina?
- 2) In what ways does urban flooding increase housing stress, specifically to tenants?
- 3) What have been the impacts to tenants short and long term, displaced by the 2015 floods in Columbia, South Carolina?
- 4) How can hazard mitigation and policy solutions alleviate housing stress during urban flooding events in South Carolina and beyond?

Participants

The site selected for this case study is the City of Columbia, South Carolina, which is in Richland County. This site was selected based on four primary factors: flood inundation, housing tenure, housing insecurity, and urban setting. Additionally, I have lived in Columbia since August of 2015 and first handedly experienced with the major rainfall event caused by Hurricane Joaquin in October of 2015. I have more familiarity with local affected neighborhoods and a deeper connection to the storm's victims.

In total, I conducted five interviews; two tenant interviews, one landlord interview, one litigation attorney interview, and one community organizer interview. Tenant interview participant recruitment occurred through two local neighborhood groups on Facebook and through listings on GoFundMe, a crowd-funding charitable website. Additionally, some tenants were contacted after learning of their experiences through an interview with a community organizer. Twenty tenants were contacted, which resulted in two tenant interviews. The bulk of interview scouting was dedicated to initiating contact with tenants, but only two tenant participants were able to schedule and complete an interview. One tenant provided the contact for their landlord during the time of the flood, and I interviewed their landlord over the phone to learn of their experience with the City of Columbia buyout program.

Neighborhood contacts were established through the South Beltline-Gills Creek Community Relief Foundation, which began as a grassroots effort and all-volunteer group to help the community rebuild and recover from the October 2015 flood. The foundation was dissolved in 2018 after its physical location was closed, but its Facebook page is still actively monitored. A founding member of SBGC-CRF was interviewed for

this project. A few emergency management professionals were contacted, but no contacts produced interviews.

In August of 2021, I was invited as a participant of the South Carolina Eviction Researchers Consortium, which is a group of professionals, including bureaucrats, non-profit employees, and academics, who specialize in housing insecurity and evictions across the state. I conducted three participant observations of these hour-long meetings. From this group, I recruited interview subjects from the Consortium and completed one interview with a litigation attorney with South Carolina Appleseed Legal Justice Center who specializes in Landlord-Tenant law.

Interview coding

When I began the first round of coding (the initial coding), I used a combination of both in vivo and descriptive coding. Again, in vivo coding involves deriving codes from the data itself, which could be phrases or terms. Codes derive from participants, not from the researcher. Descriptive coding code by topic of conversation (Saldana, 2013). After the initial coding and establishing early themes, I completed a second round of coding, again using descriptive coding to establish sub-categories of those early themes. The early themes established were: 1) “The Power of Water”, 2) “No Man Is an Island,” and 3) “The Perfect Storm”. The first theme details how disasters, particularly flooding, can compound other societal issues, specifically housing. Simultaneously, water has the power to bring people together in unexpected ways. The second theme details how society benefits when everyone has adequate housing, and that society must rely on the comfort and company of each other to survive. The sub-categories that emerged under this theme are disaster response and housing insecurity. The third theme that emerged

details some of the key drivers of housing insecurity in South Carolina, but also the factors that make disaster recovery difficult for tenants. The sub-categories that emerged under this category are 1) informal lease agreements, 2) recovery, and 3) displacement and relocation.

After establishing these themes, I conducted a third round of coding primarily to help answer my second and third research questions. For this round of coding, I used versus coding, which helps to identify in “dichotomous or binary terms the individuals, groups, social systems, organizations, phenomena, processes, concepts etc. in direct conflict with each other (Saldana, 2013, pg. 137)”. The focus of versus coding is on patterns that reveal that conflict or an injustice. This round of coding revealed conflicts between tenants vs. landlords, the fourth theme, which reflects the power imbalance noted between landlords and tenants themselves, but also the imbalance that is systemic to the South Carolina justice system in the protections of landlords compared to those of tenants.

CHAPTER 4

FINDINGS

Looking back to look forth

There is no indication that urban areas will experience fewer flooding events in the future. Cities and counties must take a hard look at serious infrastructure overhauls to prevent future catastrophes (Patel, 2021). While some efforts have been made to combat urban flooding in the state, South Carolina received a D+ overall rating by the South Carolina Section of the American Civil Engineering Society (ASCE, 2021). This suggests the mitigation efforts taken after the flood were not adequate or have not occurred as quickly as existing infrastructure continues to debilitate.

This chapter begins with a setting and historical overview of infrastructure in Columbia and describes the failures that contributed to the flooding in 2015. Next, this chapter describes the flood's immediate aftermath for Columbia residents, primarily within the South Kilbourne Neighborhood near downtown Columbia, as they picked up the pieces and began navigating the road to recovery. Specifically, this section sheds light on the modes through which renters experience recovery differently than homeowners, and, within those differences, experience more unique challenges. Finally, through a critical lens, this chapter examines long-term efforts by the City of Columbia and Richland County to mitigate flood risk. In those mitigation efforts, municipalities must find a balance between reducing residents' flood risk and safeguarding the stock of affordable housing. Without this exerted effort, vulnerable populations, including

renters, find themselves occupying substandard homes within communities with higher flood risk (Jacobs, 2013).

South Kilbourne neighborhood

This project highlights disaster recovery as experienced by residents within the South Kilbourne neighborhood, which falls adjacent to Gills Creek as it runs through downtown Columbia. As revealed through this project's findings, many communities along Gills Creek were in ruins following the October 2015 flood. However, compared to other neighborhoods, such as Lake Katherine, South Kilbourne hosts a more mixed population in terms of inherent vulnerabilities. This community was more varied in housing tenure, city/county jurisdictions, and age compared to others. Additionally, most of the participants who volunteered for this project either lived or volunteered within this community. Upon further inspection, this neighborhood experienced some troubles in navigating disaster recovery because it fell on the border between the City of Columbia and unincorporated Richland County. In recovery efforts, this made it difficult for residents to know what local officials to contact for help.

In the City of Columbia's 2015-2019 Consolidated Plan -- NA-15 Disproportionately Greater Need: Housing Problems (2015), cost burden is recognized as the most common housing trend across Columbia and South Carolina. Within Columbia, 35% of all households are cost burdened by housing, meaning that 11,069 renters and 3,860 homeowners contribute more than 30% of their income to housing. Further, over 7,000 Low/Moderate Income (LMI) households experience one or more housing

problem⁸. The City of Columbia lists housing problems as substandard housing (units lacking complete plumbing or kitchen facilities), severe overcrowding (units with more than 1.51 people per room), overcrowding (units with 1.5 people per room), and moderate (housing costs more than 30%) to severe cost burden (housing costs more than 50% income). In Columbia, 419 LMI renters live in housing without plumbing or a kitchen; 210 LMI renters experience crowding; 215 LMI renters experience severe crowding; 435 LMI renters share a moderate cost burden; 6,105 LMI renters share a severe cost burden; and 850 LMI renters have zero/negative income.

The City of Columbia compared both renter and owner-occupied units in five most impacted areas along Gills Creek in their Community Development Block-Grant Action Plan (CBDG-DR) (2016) – Lake Katherine, Central Gills Creek, Wildcat Creek, Lower Gills Creek, and Penn Branch. Across all of Columbia, there were an estimated 502 renter-occupied units damaged – 451 of which were LMI households. The average personal property loss for all renter-occupied units was \$2,133. South Kilbourne falls within the bounds of Lower Gills Creek (Figure 4.4), which was estimated to have 94 most affected rental homes out of 134 across all five most impacted areas. Of these 94 households, 83% were LMI households.

⁸ The 2016 Area Median Income for the City of Columbia is \$64,100, thus the Extremely Low-Income range (0-30%) is \$0 - \$19,230, the Very Low-Income range (30-50%) is \$19,231 - \$32,050, and the Low Income range (50-80%) is \$32,051 - \$51,280 (City of Columbia, 2016).

Within Lower Gills Creek, there were 16 most affected owner-occupied homes out of 174 across all five most impacted areas – 24% were LMI households. 79 of 174 most affected owner-occupied households were within the Lake Katherine area – 26.6% were LMI households. Within Lower Gills Creek, LMI households sustained 85.2% of the area’s personal property loss. In terms of demographics within Lower Gills Creek, most of the residents are non-Hispanic (89%) and Black (58%).

Gills Creek Watershed

It is no coincidence communities along Gills Creek experienced such vast amounts of damage from the October 2015 floods. Very few cities are equipped to handle the amount of rainfall that instigated the flooding in October 2015. Over the weekend, 21 inches of rain fell on Columbia – 16 inches fell within just 6 hours (Mizzell et.al, 2016; Sasana et.al, 2017). FEMA conducted a Dam Failure Assessment that reported 49 state regulated dams, one federally regulated dam, two sections of the Columbia Canal, and many unregulated dams failed across the state which resulted in the true catastrophe (FEMA, 2016). After the worst of the storm passed, some areas in Columbia were an entire 11 feet underwater (Jacobs, 2017; Mizzell et.al, 2016; Underwood, 2021).

Columbia exists largely because of its massive river systems, which were used as navigation centers dating back to the 18th century. Three major rivers, the Broad, the Saluda, and the Congaree, merge in the middle of the city. South Carolina is also known for its diverse geology, having both rocky piedmont to the northwest and all sandy plains running along its coast (Jacobs, 2017); Mizzell et.al, 2016). This distinction complicates dam construction, particularly in Columbia where the two types of sediment meet. Columbia is also home to the state’s largest urban drainage basin, Gills Creek Watershed.

Simultaneously, Gills Creek is one of the state's most polluted urban waterways. Along Gills Creek exist 23 dams, which create 70 miles of streams and lakes (Underwood, 2021).

These dams date back to the mid-1900s when real estate developers capitalized off Columbia's waterfront property, which translated into higher property costs than for landlocked property (Jacobs, 2017). To create lakes along Gills Creek, developers constructed multiple 13-30 feet wide recreational, earthen dams. Many of the dams along Gills Creek are considered high-risk. Though they are considerably small, a breach can lead to fatal losses because of how much development surrounds them and is below the dams downstream. Richland County, which contains most of the dams along Gills Creek Watershed, best estimated 10,000 homes experienced damage in a 2016 CDBG-DR Action Plan. This coincides with the number of FEMA Individual Assistance applicants who received damage estimates – around 8,744 homeowners and 1,269 renters (Richland County, 2016).

When the dams were first built and for many years after, there was not much development at the northern part of Gills Creek (Jacobs, 2017). The development of highways and residential neighborhoods removed this buffer that once slowed down stormwater. Even considering the dams along Gills Creek were not built with the intention of withstanding floods, the storm likely would have caused a well-maintained watershed to collapse under pressure. Two dams along Gills Creek, Lake Katherine and Forest Lake Dam, failed in the 1940s and were rebuilt/repared under military supervision. Lake Katherine was one of the dams that was overtopped during the 2015 flood, but Forest Lake barely managed to withstand the flooding. Given the state of the

dams after the storm, it would not take a major rainfall event to cause significant flooding (FEMA, 2016; Mizzell et.al, 2016).

Like most of the country's dams, South Carolina's dams are primarily state regulated, yet privately owned. Dams in South Carolina are regulated by the South Carolina Department of Environmental Health and Control (DHEC)'s Bureau of Water through DHEC's Dams and Reservoirs Safety Program. DHEC inspects dams and maintains lines of communication between the state and the dam owners (Jacobs, 2017). In 2010, the program only had two employees and a budget of \$144,600. After the floods, the program had a budget of \$1.1 million and 14 employees (Jacobs, 2017). Before and after, the program primarily received federal funding through FEMA grants. With an expanded bandwidth, the program worked more closely with dam owners and homeowner associations to have a closer handle on maintenance and to create emergency plans for the dams. Dam restoration is ultimately the responsibility of the dam owner, but the repair process can cost upwards of several hundred thousand dollars. Some dams were repaired, and others permanently breached. As of early 2019, 13 dams remained unrepaired across South Carolina's Midlands but did not pose any threats to the surrounding areas at the time (FEMA, 2016; Underwood, 2021).

Columbia Canal

While simultaneously combatting floods from broken dams along the Gills Creek Watershed, debris in the flooded Broad River broke through a section of the Columbia Canal. This breach compromised the water supply for 188,000 people (Feit, 2020). Three days after the first breach, a second occurred before temporary repairs reinforced the first breach. The canal first opened in 1824, which allowed ships to safely navigate through

Columbia's system of rivers (Marsh, 2015). As Columbia grew in population, the canal became the main source of the city's drinking water (Kuenzie, 2016). To supply that water, the pumps in the canal need to meet a minimum water level to be operational. The breach allowed for more water to enter surrounding waterways, contributing to major flooding citywide (Stucker, 2016; Feit, 2020; Laird, 2022b).

It is true the canal held for 124 years, but it could not withstand the dramatic levels of flooding that occurred (Marsh, 2015). The canal reportedly passed an inspection with the Federal Energy Regulatory Commission just seven weeks before it breached (Kuenzie, 2016). As far as city officials were concerned, the infrastructure was not outdated or at risk of a breach (Fancher, 2022; Stucker, 2016). As more unprecedented storms occur due to climate change, more unprecedented infrastructure failures occur, and city officials should not question if infrastructure will fail, but when. Major engineering errors were found as the canal dried up. Small cracks and fissures between the 1896 waterworks building's foundation and the granite footings essentially imploded, which ultimately led to the first breach of the levee (Stucker, 2016).

An overhaul of the canal's structure remains a priority to city officials because the city's water supply relies on it. In 2018, a permanent fix for the canal's infrastructure was estimated at \$169 million (Fancher, 2022; Laird, 2022b). Sixty feet of the canal's eroded embankment is still currently patched with a temporary rock dam. An estimated half of the city's water supply relies on this temporary dam (Fancher, 2022). There are several steps to the infrastructure improvements – the most crucial of which is the installation of a stand-alone water supply intake, so the city's water supply is not reliant on water flow of the canal. The improvements are funded through a combination of funding from

FEMA and HUD (Feit, 2020). As of early September 2022, officials anticipate work to complete by 2025. The decade-long timeline is not remiss to Columbia residents.

Frustration was felt citywide by both officials and residents. Columbia Water points to a lengthy uphill battle through “years of red tape” (Fancher, 2022). To ensure federal funding remains secured for the project, officials treaded lightly to prevent any missteps that could result in reduction or loss of those funds (Fancher, 2022; Feit 2020).

After the storm: Housing and recovery challenges

The City of Columbia CDBG-DR Action Plan also states because rental populations are more “mobile” than homeowners, renters are “better equipped” to navigate the aftermath of a post-catastrophic event (2016, p.20). This statement contradicts the city’s own assessment of its LMI renter population. While it is true renters only suffer personal property loss while homeowners experience real property loss, the city’s own assessment found 89.8% of all affected renter-occupied units were LMI households. Compared to other households, LMI households, who are already cost-burdened by their housing, do not have funds readily available to find alternative housing or to replace personal property without aid. Moreso than contradicting itself, the city’s statement also contradicts two decades’ worth of literature that establishes renters as a socially vulnerable population during environmental hazards (Cutter et.al, 2003; Emrich et.al, 2020; Mehta et.al, 2020; Peacock and Zhang, 2010; Raymond et.al, 2021.)

During the disaster recovery period, variations in the experiences of renters and landlords (homeowners) prevailed as major theme throughout the project. It was clear before this project began that challenges tenants faced during disaster recovery were different in nature from challenges homeowners face. This project painted a clearer

portrait as to why those differences exist in the first place, and what was distinct about the experiences of these groups in the aftermath of the 2015 Columbia floods. The following sections examines media accounts, state and federal agency reports, and interviews with Columbia residents to unpack these differences in a greater depth.

Displacement and community aid in Columbia

The worst of the flooding in Columbia occurred early on October 4, 2015. Some residents woke to knee-deep flood waters inside their homes, which would soon be completely submerged (Holleman, 2016). One of the tenants interviewed for this project, Bryan, noted it was only a matter of minutes between water accumulating in his backyard and water overflowing from the sinks and toilets in his home on California Street (Figure 4.4). Bryan provided his account of the flooding's onset:

It was just more than drizzling until 2am. Then around 2:30, it was raining harder, but not bad at all. Then we decided we were going to bed. Then very soon after, it started really raining. My other roommate and his girlfriend got home at 2:55, then it was a torrential downpour. We went to bed but weren't asleep yet. I heard my roommate's girlfriend say, "Oh my god, look at the rain." Then at the same time, the other roommate went to the bathroom and water was coming out of the toilet and then onto the floor. We were like, "Oh, that's not good." We turned off the water in the bathrooms, and at that point water had gotten up to a foot outside. We started to move the important stuff up onto counters just in case. In 15 minutes, water was all the way up onto our front porch, which was 4 steps. We also went and moved our cars when there was two feet of water. Once it was on the porch, we decided to leave. We all grabbed our immediate necessary stuff, but now water was up to our waists. We got our dog out to one of the cars, but then we realized that our neighbor, who was an older woman, was probably still asleep. Her house was higher than ours, but we went to check on her, but then the water was up to our chests. We had to hold onto each other as we walked to her house. We grabbed her and her cats and moved her to a neighbor's house that was on stilts. Andrew [one of Bryan's roommates] had to carry the cats, and I carried the woman. By that time, the water was above our heads by the time we got back to the car. We were swimming, not just wading. It was rough and very fast moving. It happened within 15 minutes between us saying we should leave to when water over our heads...

After the rainfall subsided, housing was the top concern for most residents whose homes were flooded (Wilks, 2015a). Because the flooding onset so quickly, some residents whose homes flooded escaped on foot, leaving their vehicles behind as they waded and swam to dry land. This left many residents searching for the immediate needs of secure housing and transportation. The best-case scenario for displaced residents was to stay with family and friends for a few days. If they had the financial means, some opted for extended-stay motels in the area. Another tenant interviewed for this project, Shauna, lived with her family in public housing on Downing Street. She awoke to her daughter calling for her from the other room, and when she stood up, the water was knee-length in her bedroom. Shauna chose to not evacuate because she did not know of shelters to accommodate her daughter's special needs, but then she had no choice but to flee with her family. They stayed at a hotel the first night, but the hotel had no electricity or clean water for its guests. Around 900 residents across the state camped in temporary shelters as they awaited the floods to subside and searched for the steps towards recovery. The Red Cross reported 4,786 overnight stays at temporary shelters between October 3rd-7th.

The closest shelters to communities around Gills Creek were located at A.C. Flora and Dreher High Schools, both about three miles from the South Kilbourne neighborhood, and were reportedly full by 8pm on October 4th, 2015. In the weeks following the storm, there were an estimated 32 shelters across the state taking in displaced residents (Elmore & Jackson, 2015; Luscombe, 2015). In a crunch, Columbia officials asked Transitions, a shelter near downtown, to open its doors to evacuees in addition to the houseless population it already supported. Columbia also owns and

operates the Inclement Weather Center (IWC), which usually only opens to houseless populations beginning in November. The IWC offered temporary housing to an estimated 300 evacuees and houseless individuals when other local and emergency shelters were full. Transitions had no water pressure from October 4-6th, which meant there was no ability for its occupants to use the bathroom or to shower. Shelters relied on emergency drinking water distribution in the following week. Some of those displaced remained in temporary housing or shelters for several months because of the lack of available permanent housing in Columbia after the storm (Columbia Daily Herald, 2015; Luscombe, 2015; Reeves & Bynum, 2015).

While some residents like Shauna could not, and would not, go back to their flooded residences, some residents—both homeowners and renters—opted to return to their homes without the assurance that those homes were safe to occupy. Some even chose to not leave their homes in the first place. Community organizers reported instances of residents being afraid to leave their homes in the immediate aftermath due to dangerous conditions such as toxic floodwaters, various debris, and looters (Reeves & Bynum, 2015; Shaw, 2015). Additionally, local emergency officials instructed residents in some areas of Columbia to not leave their homes for three days, despite many residents lacking clean water and electricity (Holleman, 2016; Love, 2015). A volunteer and local attorney, Tara, recalled the first few days after the storm were chaotic. South Kilbourne Elementary School, located a few blocks from Gills Creek towards downtown Columbia, was accepting donations and supplies for stranded and displaced residents. The South Kilbourne neighborhood of Columbia, where the school is located, experienced catastrophic flooding when the Gills Creek dam failed and inundated the surrounding

area. Tara brought wet-vacs, diapers, and non-perishables for families in need. During an interview with Tara in early 2022, she recalled a particularly striking encounter she had with a teacher at South Kilbourne Elementary [depicted in Figure 4.4] who managed the donations intake:

She [the teacher] told me thanks for bringing in what I could, but respectfully, this isn't just a wet vac situation. Some homes are still surrounded by water. This is days after the big flood, right. She told me to drive around and see what she meant. So, I drove down to Glenhaven and Whispering Pines [depicted in Figure 4.4]. I was expecting an emergency presence of some sort – the Red Cross or something. I didn't think I was in the right place. But, then, I came across an older car with its trunk open. There was a woman passing out peanut butter sandwiches. She was the emergency response. I couldn't believe it. The other side of Gills Creek, you know, Cross Hill Road – they seemed to be getting all the social media attention and community response. I hate to say it, but it was a more affluent neighborhood with mainly single-family homes. South Kilbourne was more of a mixed neighborhood – apartments, houses, renters, homeowners, young people, older people...

For folks willing and able to help their community, it was difficult to know what neighborhoods needed the most help. Tara explained national news coverage tended to focus on “feel good” and heartwarming stories of heroic efforts in Columbia – she recalled the viral news story of a Coast Guard helicopter rescuing a woman and her baby through a small hole in their roof during the floods (CBS, 2015; Holleman, 2016). Community efforts to recover seemingly were already underway for a more affluent neighborhood on the other side of Gills Creek, and local media followed national media trends, which, Tara thought, provided a sense of stabilization and hope for residents. Meanwhile, other communities did not receive this attention and residents were unaware of their needs.

Outside of her own social network, Tara was completely unaware of what occurred in the South Kilbourne neighborhood because she did not have many personal

ties to this community before the flood. She felt that she had to do more to help this community and identified a corner lot at Whispering Pines Circle and Glenhaven Drive near the center of the South Beltline neighborhood and asked the homeowner if she could set up a tent in their yard to pass out supplies with a few other volunteers. The homeowner agreed, and Tara started a Facebook group requesting donated items and goods for the neighborhood to stock the temporary location with necessary supplies for residents. The word spread very quickly across the social network, Tara recalled. The group collected donated food and clothing items, in addition to water and meals for anyone in need. For 55 days, Tara's group stood in the same spot. As the group grew and needed storage for donated items, they would relocate to a nearby warehouse and continue their distribution of aid.

Soon, the group of volunteers set up a 501(3)c non-profit organization so it could accept monetary donations and apply for grants. The process took under a month for Tara's group, as she was easily able to navigate the process given her own experience working with contracts and tax forms as a real estate attorney. These donations went towards more supplies for the community and small mitigation/restoration projects, like carpet and debris removal. Tara remarked there were hundreds of volunteers only two weeks into her group's operation to help with response efforts.

Once they [neighborhood residents] saw we were there, they bought into that we were going to help them. That's how we were able to reach out to people, we were there. We were the only boots on the ground community group. We had a 6x6 white board with addresses and who was dealing with what. We had a lot of homeowners and renters, but renters couldn't control who was dealing with their house. I was able, as a real estate attorney, to figure out who owned properties so I could contact them, and I was doing a lot of that. The people that lived there, some people wouldn't even come out of their house. We had a lot of renters. You can't have people knock on a door and go knock things down. It's not the renter's house. If you don't

coordinate, it can get crazy. There are also scammers and looters, and just bad people trying to get into people's houses. There were instances of some demolition projects that we didn't have permission to do.

Community organizers, with emergency supplies, found themselves coaxing individuals, notably elderly populations, out of their homes once the flooding subsided. One of the primary concerns with flood damaged housing was water damage and mold, which both create respiratory issues for residents and compromise the structural integrity of housing (Adcox, 2019). Even homes that experienced only minimal flooding were at risk for major mold infestations, which could lead to properties being condemned by the city if the homes were not quickly and properly gutted and cleaned out. It took weeks for city and county officials to survey the extent of the damage, which put residents who occupied flooded homes in precarious positions. Tara recalled the city's unofficial sticker system wherein homes that received a green sticker were safe to occupy, while homes with red stickers were condemned. By the time the city's sticker system was rolled out, however, some residents were already experiencing symptoms consistent with mold exposure, such as wheezing and coughing (Adcox, 2019). Tara recalled one such instance:

There was a cute family, the grandmother, a mom, and infant twins. Their carpet was mushy, still wet weeks after. We were trying to coordinate with the landlords to pull the carpet out. Basic mitigation, we don't want mold growing. Some of the government entities – in the apartment building this man owned, they put a green sticker on the door where you could still see the water line. They gave it a green sticker, probably because the owner was like, do me a solid and give me a sticker. That was huge challenge, renters being victimized or traumatized again by people just not doing the right thing.

Tara recalled some homes received a green sticker, even though the floods compromised the home's ductwork and was able to infiltrate, leaving an obvious

waterline on the walls. She implied the possibility of some collusion between this landlord and city officials because his wife was a powerful figure but did not feel comfortable saying anymore on the matter.

Interactions with landlords and property managers after disasters

As the activities of Tara and other community organizations in the South Kilbourne neighborhood indicate, renters and homeowners (either primary residence homeowners or landlords) experience the aftermath of disasters like the Columbia flood in distinct and unequal ways. Tenants rely largely on the property owners of their homes, who act as intermediaries standing between the tenant and their capacity to recover safe and secure housing after a disaster. Property owners can either be individual landlords or a massive property management conglomerate, each of which might have distinct ways of interacting with tenants and managing damaged housing. Regardless of the state of the properties an intermediary manages, they are not legally required to act with a particular haste to fix damaged housing for their tenants. Compared to homeowners who occupy their primary residences, landlords and property management companies might not be motivated immediately to begin the process of rehabilitating damaged properties, or even have access to the resources (i.e., cash) in the immediate aftermath of a disaster.

Tenants have little capacity to compel their landlords or property management companies to swiftly repair damaged housing, so they are often at the mercy of what those intermediaries decide to do (Hersher, 2020). One of the tenants interviewed for this project, Bryan, whose home became uninhabitable after the floods, had a positive experience with his landlord in the weeks after the storm. In an interview in early 2022, Bryan recalled he and his roommates just paid rent for October 2015 when the house

flooded on October 4th. When their landlord realized the extent of the damage a few days after the flood, he returned the security deposit and October rent Bryan and his roommates paid, effectively releasing them from the financial obligations of the lease which would not conclude until the following September. Although Bryan and his roommates had to find housing elsewhere, they were at least not financially liable to pay rent for the remainder of the lease while the home was uninhabitable. Because their landlord returned their deposit and rent, Bryan and his roommates were able to put those funds towards a new rental.

Adam Patterson, a litigation attorney for the South Carolina Appleseed Legal Justice Center, was interviewed in early 2022 to provide insight on landlord-tenant relations during a disaster as SC Appleseed offers low cost or free representation for South Carolina residents. Mr. Patterson explained to ensure a stream of income remains, however, some landlords attempt to hold their tenants to the terms of their leasing agreement, even if the living conditions are substandard and unsafe (Heiman, 2020; National Center for Environmental Health, 2011). He noted this to have occurred among some of his clients in the aftermath of Hurricane Joaquin in 2015 and Hurricane Matthew in 2016. Alternatively, property owners sometimes find other desperate tenants who are willing and able to abide by the terms of their leasing agreement, regardless of the condition of their properties (Brennan et.al, 2021). After a disaster, this leaves displaced low-income individuals at a disadvantage because they are forced to inhabit such properties as they are often more affordable. Tara reported encountering a landlord finding immaterial reasons to evict their tenants only for the landlord to raise the rent for displaced individuals desperate for housing. While this is the only time this allegation

surfaced in this research, Tara suggested this landlord threatened to or did file a Writ of Ejectment (eviction) against least two dozen tenants around his townhome properties on Tall Pines Circle (seen in Figure 4.8) near Gills Creek. Brennan et.al (2021) and Raymond et.al (2021) both affirm that this is to be a possible outcome for renters after disasters.

There are, however, legal actions a tenant can take to retaliate against landlords who attempt to evict and/or insist that tenants continue to be held to a lease when their rental properties become uninhabitable. SC Appleseed provided an extensive guide and interpretation of the South Carolina Residential Landlord-Tenant Act (SCRLTA) for tenants to learn how to legally protect themselves after a disaster (SC Appleseed, 2018). If a home becomes “substantially impaired,” the tenant can vacate the premises and notify the landlord of intent to terminate the lease. If a tenant chooses to continue to occupy a home, they should not stop paying rent without having legal representation, as it would be substantial cause for a landlord to file an eviction against the tenant (SC Appleseed, 2018). However, the SCRLTA does permit a tenant to bring an action of injunctive relief, which would require the landlord to perform repairs within the terms of the lease. Unless a government authority deems a property inhabitable or a tenant is evicted, they are not required to move out (SC Appleseed, 2018). Mr. Patterson explained that, without legal aid, the capacity of renters to challenge their landlords on legal grounds, however, is often a lengthy and costly expense for tenants.

Though some landlords chose to put their tenants in precarious living and financial circumstances after a disaster, not all will abandon their tenants. Communicating with tenants in the aftermath of a disaster, however, can sometimes be an

unexpected challenge for both landlords and tenants. In some instances, tenants rent from a landlord who only owns one single-family home or an apartment complex. In other instances, a landlord owns the property but hires a property manager to oversee the property. This distinction is important to note because it ultimately shortens or lengthens the line of communication for a tenant following a disaster. In general, it is easier to communicate with and to receive assistance from a landlord if they have fewer tenants with concerns to address (Shaw, 2015). Tara recalled tenants reaching out to her organization for help mitigating flood damage, but they were unable to do so without permission from the homeowner. If the property was managed by a company, the tenant often did not know who the property owner was. Tara helped tenants find this information through property tax records, but even then, some property owners choose to operate their rentals under the guise of an LLC meaning their name and contact information is not listed directly on tax records.

Property management companies often oversee dozens to hundreds of properties, more than likely within the same affected city. During a major disaster, a single property management company may have dozens of affected tenants. The tenant then depends on a property management company for communication and information about their housing situation. Similarly, apartment complexes are sometimes owned by larger corporations that manage dozens of apartment complexes across state lines (Joint Center for Housing Studies, 2022; Weeden, 2022). Lack of communication creates that much more uncertainty and stress for the tenant, on top of experiencing the trauma that is being displaced from one's home in the aftermath of disaster (McKim, 2016). This does not necessarily imply a tenant will have an easier recovery process if they rent from a

landlord who owns fewer properties. Rather, it reflects the fact that not all landlords are the same, which means there can be extensive differences in the capacities of tenants and landlords to communicate with each other during and after disasters

Through a text message, Bryan alerted his landlord when water started to overflow from the toilets and sinks in his house. It was less than hour later that the entire house was underwater. Bryan did not hear from his landlord until the next day, after he and his roommates narrowly escaped the home. Because his landlord lived out of state, he was not even aware there was bad weather or flooding in Columbia. Not until Bryan returned a few days later to take pictures did the landlord understand the gravity of the damage to his property. Bryan's landlord attempted to navigate recovery through FEMA, but quickly realized any payout would not cover the costs of rebuilding. They considered demolishing the home to sell the land but realized participating in Columbia's CDBG-DR program offered residents 75% of the property's pre-flood value. The next section of this chapter dives deeper into CDBG-DR programs.

Having an out of state landlord, or a landlord who is not necessarily monitoring the environmental conditions of their properties daily, is not unusual. Lags in communication or action are rarely malicious on behalf of the property owner. The flooding that took place in Columbia during October 2015 abruptly occurred in the middle of the night and very few were prepared for the severe damage the floods ensued across the city (Shaw, 2015; Wilks, 2015a). During a disaster, lines of communications are unpredictable and unstable. Even if a property owner is being communicative, it could take several days to safely address the scope of the damage and create a path forward, as was the case with Bryan's landlord. Some of the damaged properties along

the Gills Creek Watershed near downtown Columbia were only accessible by boat in the days after the flood (Musser et.al, 2016). At the same time, any landlord still can be unresponsive and unnecessarily difficult, which leads some tenants to sometimes organize together to demand the response of a landlord or property management company (Bennett; 2018; Shaw, 2015). In Columbia, some tenants took their concerns to the media to bring attention to unresponsive apartment complex property managers – one such instance occurred at Mallard Pointe on Garners Ferry Road, where tenants received a notice from the landlord requesting that they vacate the apartments so repairs can take place but was not communicative about prorated rent (Shaw, 2015).

Building back: Navigating recovery aid

As previously highlighted, tenants and landlords are often navigating complicated environmental, financial, and interpersonal challenges in the immediate days and weeks after a disaster. In addition to turning to friends, mutual aid networks and, sometimes, concerned landlords, renters also turn to federal disaster aid and private insurance to help access the necessarily resources for short- and long-term recovery.

Before any federal assistance becomes available, the President of the United States must declare a major disaster (Wilks, 2015b). The flooding in Columbia received a federal disaster declaration on October 5, 2015, making impacted residents eligible for federal aid. The following sub-section outlines the different ways landlords and tenants navigated federal disaster relief assistance in addition to private insurance, in the weeks and months following the flood in Columbia.

Federal financial assistance for landlords

One of the primary ways landlords begin rehabilitating damaged rental properties is through applying for federal aid through FEMA or filing an insurance claim. Some rental properties qualify for the business physical disaster loans through the Small Business Administration (SBA), but these loans only cover outstanding damages not already covered by insurance. SBA is a separate independent agency under the federal government that provides support for small businesses and entrepreneurs through grant and loan programs. After disasters, SBA offers low-interest disaster loans to assist businesses and individuals with recovery. Homeowners can borrow up to \$200,000 to restore a primary residence, while both renters and homeowners can borrow up to \$40,000 to replace personal property (Emrich et.al, 2020). To be eligible for an SBA loan, applicants must be deemed creditworthy and to have been affected by a federally declared disaster. Across South Carolina, there were 47,882 SBA applicants (Emrich et.al, 2020; Richland County, 2016). Because one must be considered creditworthy and any loans received must be repaid, Emrich et.al (2020) suggests this program is not significantly utilized by low-income residents.

Immediately following a disaster, FEMA aid is distributed to those in the greatest need, which means it prioritizes primary residences. This project revealed a major obstacle when property owners tried applying for aid through FEMA for their rental properties, because these are categorized as secondary residences.⁹ Secondary residences,

⁹A single-family building, condominium unit, apartment unit, or unit within a cooperative building that will be lived in by the policyholder or the policyholder's spouse for more than 50% of the 365 calendar days following the current policy effective date or 50% or

such as rental properties or vacation homes, are not eligible for recovery funds through FEMA. When divvying recovery assistance, primary residences are understandably prioritized, but this creates an additional barrier for both the property owner and the tenant. Inadvertently, this FEMA eligibility requirement discourages landlords from restoring their properties, which puts current or future tenants at risk to substandard living conditions. Ultimately, landlords may decide to step away from the property – waiting for a government buyout or demolishing the property to sell the land. Bryan’s landlord opted for the former, participating in the City of Columbia’s Home Buyout program. Bryan’s rental home was finally demolished in October 2020, after standing abandoned and unoccupied for five years.

If a property owner obtains any amount of recovery funds, it still takes several months, and even years, for a property to become habitable following a disaster as significant as the floods in Columbia. FEMA determines payouts within 10 days following an inspection, and if there are no appeals or other issues with the application, the applicant can receive those funds within 24 hours. If the payout is not sufficient to cover the costs of total restoration, homeowners may try to navigate other avenues of disaster assistance or wait until they can afford to cover the cost themselves (Richland County, 2016). Throughout the initial application process, tenants are often left in limbo as they scramble to find temporary housing, or even permanent new housing.

In a report addressing unmet needs following the flood, Richland County (2016) estimated 1,269 rental homes received FEMA damage estimates. Rental properties were

less of the 365 calendar days (FEMA, 2018).

12.7% of the estimated 10,000 total homes. However, at the time, 41.6% of homes in Richland County were renter-occupied. This report suggests the number of renter-occupied units was greater than 1,269. Using this information, Richland County estimated there were 554 renters in the City of Columbia and 2,052 throughout the rest of the county with unmet needs based solely on those who received or anticipated receiving FEMA rental assistance. However, the total number of renters with unmet needs includes 5,121 renters who registered with FEMA and received no assistance.

Federal financial assistance for renters

In major disasters like Hurricane Joaquin, FEMA offers some forms of assistance for renters, which are largely geared towards funds for emergency housing and replacing material possessions. According to FEMA's *Citizen's Guide to Disaster Assistance* (2003), housing falls under FEMA Assistance for Individuals and Businesses, which "includes assistance available to individuals, families, and businesses [including] disaster housing, unemployment assistance, individual and family grant, legal services, crisis counseling, tax relief, and agricultural assistance" (2003, p.15).

Under FEMA's Individuals and Households Program, the federal government offers provisions to homeowners and renters. These provisions contribute towards rental assistance, repair, replace, and rebuild assistance. Both homeowners and renters must verify they occupied the home at the time of the disaster and that any damage is disaster related. Through Housing Assistance, tenants apply for up to 18 months or \$25,000 of rental assistance. Renters are expected to have meticulous documentation verifying their home as their legal residence, evidence of damage, several months' worth of rent payments and a lease agreement. Even when FEMA caseworkers and volunteers are

available to help with paperwork, the process is very daunting for applicants (Shaw, 2015; Eddy, 2016). This documentation is difficult to ascertain, particularly in the confusion and displacement that coincides with disaster. This creates a major barrier for tenants who pay their rent in cash (as their landlords may require) or have handshake/informal lease agreements. When participating in South Carolina Eviction consortium meetings, some of the members echoed the difficulty renters with informal leases have when applying for disaster aid. At the time (mid-2021), renters with informal leases were ineligible for funds through individual county's COVID-19 rental assistance programs. Even if tenants have a formal lease, it is difficult to keep track of this documentation in the post-disaster chaos that ensues.

There is significant variability in the amount of financial assistance tenants receive from FEMA, if any. It puzzles tenants trying to understand how FEMA determines payouts. This was felt firsthand by some of the victims of Hurricane Joaquin. For instance, Bryan lived in a house with three roommates. All four roommates filed claims with FEMA. All had belongings similar in quality and quantity. Two roommates received \$2000 each, one roommate received \$1000, and one roommate received nothing. They appealed this payout, but no changes were made. Bryan said this left them feeling very frustrated by the seeming unfairness of the process. But, surrounded by devastation, they still felt lucky to have support from friends, family, and their community. The roommates met as coworkers and were college students at the University of South Carolina and Midlands Technical Community College. When asked what the roommates used the FEMA money for, Bryan explained the roommates mostly used their money to replace electronics and school laptops. Though they lost close to all material possessions,

the group took advantage of the massive outpouring of food, clothes, and furniture donations from community groups like Tara's. It took a month after the storm for the roommates to find another home together, but only a week after the storm for it to be fully furnished. Other affected residents in the neighborhood shared experiences of an outpouring of neighborly generosity (Joseph, 2020).

If the payouts are that varied within the same household, it is difficult to conceptualize the variety of assistance provided across an entire state. Even if there is a federal disaster declaration, renters are still forced to pick up the pieces. Immediately after the disaster, the roommates were able to stay with their respective families while determining the next steps. In a happenstance, all the roommates' families lived locally in Irmo, which is around 30 minutes away from Columbia. Of the 101,621 Individual Assistance applicants across South Carolina, Emrich et.al (2020) found that Individual Assistance was allocated equitably across seven socially vulnerable populations, including renters. It stands that having a safety net, whether it consists of financial security or strong community ties, is crucial for anyone during disaster recovery, but especially for tenants.

Private insurance and outdated flood maps

Navigating private insurance is another obstacle that both landlords and renters face in the wake of a disaster. For landlords, home insurance covers most types of damages brought on by disaster, except for flood damage. If a home falls within a 100-year floodplain (also known as a Special Flood Hazard Area (SFHA), the owner of the property is required to cover the property through the NFIP (Carolinas Integrated Sciences & Assessments, 2016; Kinnard & Schafer, 2015). Without it, the homeowner

assumes all the risks and financial burdens of floods. In Columbia, which is surrounded by rivers and streams, this can prove to be a very expensive undertaking. Prior to the October 2015 flood, many of the FEMA flood inundated maps were outdated, which could explain why many homeowners were oblivious to their property's flood risk (Kinnard & Shafer, 2015; Mathis, 2022). There were instances of homes that had been in families for decades and had never previously flooded along Gills Creek Watershed (Wilks, 2015b). Additionally, FEMA is only required to update flood maps every five years. Prior to 2017, Columbia's flood map was last revised in 2010 (Figure 4.7). Besides their home's proximity to Gills Creek and the history of the dams along it, there was little indication of flood risk (Carolina Integrated Services & Assessments, 2016). Without flood insurance, homeowners must rely heavily on FEMA's Individual Assistance or the SBA loan program to assist with recovery.

FEMA offers several guides on its National Flood Insurance Program (NFIP), which is separate from home insurance (FEMA, 2018). Through the NFIP, businesses, homeowners, and renters can purchase flood insurance through up to 29 insurance companies in South Carolina in participating communities. To participate in the NFIP, a community must apply, adopt a resolution to cooperate with FEMA, and adopt a floodplain management ordinance that meets the NFIP's criteria. Insurance premiums and costs are determined by the insured property's flood risk, which is determined through its flood zone.

FEMA flood maps ultimately determine a community's flood zone to be low, moderate, or high risk. While these distinctions can be helpful for residents, there are over 23,000 communities participating communities in the NFIP nationwide (FEMA,

2018). Because there are so many communities with landforms actively undergoing physical changes in real time, the flood maps become outdated quickly making it difficult to know the current flood risk of a home. A 2017 investigation by the Department of Homeland Security revealed 58% of FEMA's flood maps were outdated (DHS, 2017). FEMA's flood map for the City of Columbia was last updated in 2017, which now reflects the flood risk revealed by the October 2015 flood (Figure 4.8).

At the time of the October 2015 flood in Columbia, there were an estimated 200,000 NFIP policies in effect in South Carolina out of two million households (Casazza, 2017; Johnson, 2021). Most of the NFIP claims filed after the flood (around 5,200 total) were concentrated along South Carolina's coast (Emrich et.al, 2020). Naturally, people who live near the coast may be more cognizant of flood risk. However, further inland towards Columbia, there were significantly fewer claims filed. Of the total households in Richland County in 2014, an estimated 1.34% had flood insurance in 2015 compared to Charleston County's 36.8% (Casazza, 2017; McShane & Yusuf, 2019).

The outdated maps were one reason Columbia residents did not know about their flood risk and did not realize they needed flood insurance. But, even if residents were aware, flood insurance is still an added cost NFIP policyholders must absorb. Depending on the flood risk, the average cost of flood insurance is around \$1,200 for homeowners per year in South Carolina (Johnson, 2021). This is substantial in addition to the other expenses property owners have. For many victims of the flooding in Columbia who lost everything, it is now an obvious decision to take out an NFIP policy. Homeowners use the NFIP to restore their properties or replace material possessions. Because FEMA

assistance is unpredictable and unreliable, flood insurance is crucial for a smooth recovery process after a major flooding disaster.

Renters' insurance can help to replace material possessions damaged or lost in disaster. However, like homeowner's insurance, renters' insurance typically will not cover damages due to flooding. In a press release issued in 2018, FEMA detailed that the NFIP offers policies for renters and will cover up to \$100,000 in damages for material possessions (FEMA, 2018). Because the NFIP only covers material possessions for renters, the policy rates are much lower – around an average of \$150 per year, which is close to the cost of renters' insurance. An estimated 2% of all NFIP policies nationwide insure rental properties (Cassaza, 2017). The added cost of flood insurance, though a fraction of the cost of homeowner's flood insurance, can still be burdensome for the average renter in South Carolina, who likely spends more than 40% of their income on rent alone according to the 2021 SC Housing Authority's Housing Needs Assessment (SC Housing, 2022).

Some leasing agreements require the tenant to purchase a renters' insurance policy, but that is at the discretion of the lessor. Landlords cannot legally require their tenants to purchase flood insurance (FEMA, 2022). Neither Bryan nor his three roommates had renters' or flood insurance. In fact, only two of the roommates even signed a formal lease with the landlord. In Columbia, only three non-related tenants are legally allowed to reside within the same household, although there were four tenants in Bryan's home. To obtain either type of insurance, the renter must have a lease. As Mr. Patterson explained, informal lease agreements are not uncommon because they can make affordable housing more accessible through reducing financial barriers.

In Bryan's case, the landlord did not run a credit or rental background check before allowing them to occupy the home. Instead, the landlord entrusted the original lessee to find financially stable and responsible roommates despite the risk. While informal leases reduce barriers of accessing affordable housing, they complicate the disaster recovery process and, in turn, ultimately add more financial stress to the tenant in the long-term because tenants lack the proper documentation to apply for assistance. If tenants willingly moved into a home that was in a known high risk flood zone, they logically would purchase an insurance policy or avoid the property altogether if financially able to do so.

Disclosing flood risk

Not all tenants have the proper foresight to purchase a flood insurance policy. Only in seven states are property owners legally required to disclose a property's flooding history and risks (Heiman, 2020; Mathis, 2022). South Carolina is not one of them, despite its recent history with severe flooding (Hinks & Reynolds, 2022; Hughes, 2022; Laird, 2022a). Tenants can research a rental property's flood risk before signing a lease agreement, but it is likely the flood map for their community is outdated and displays an inaccurate flood risk (Mathis, 2022). Tenants deserve the right to know the flood risk of their homes. In addition to seven states, some cities and counties with significant renter populations, like Boone, North Carolina, moved to require landlords to disclose flood risk for all renters (Katz, 2021; Mathis, 2022). The concern behind more awareness around flood risk is that it causes land and property values to depreciate. In turn, it may become cheaper to rent homes and more expensive to insure homes with a greater flood risk. This concern places lower-income renters at a disadvantage, but a report by the National

Bureau of Economic Research found these concerns unsubstantiated by research on climate risk's impact on rental property values (Hino & Burke, 2020; Keenan, 2018).

South Carolina renters deserve legal protections like required flood risk disclosure. Texas is one of the states that requires disclosure to tenants, a statute that only came into effect in 2021 after the devastation Hurricane Harvey wrought on the state in 2017 (Cassaza, 2017; Mathis, 2022). While a handful of states, cities, and counties require these disclosures, there is no consistency as to how these statutes are designed. However, there are already valuable lessons South Carolina and its communities can learn depicting how such statutes are most effectively designed. Texas requires SFHAs and high-moderate flood risks be disclosed to renters. Additionally, Texas and Oklahoma require any instances of flooding within the past five years to be disclosed (Mathis, 2022). Other entities have less stringent flood history requirements – for instance, Georgia requires there must be three separate floods on a property before a landlord is required to disclose it. There is also some precedent in the Residential Lead-Based Paint Hazard Reduction Act of 1992, which is a federal statute that requires property owners/landlords to disclose of any known information regarding lead-based paint on rental properties built before 1978 (SC Appleseed, 2012).

Notably, it is crucial that the renter is made aware of a home's flood risk before occupation begins. Disclosures of flood history and risk should be delivered before a lease agreement is signed in writing and in the preferred language of the potential renter. Further, both the property's flood history and current flood risk should be disclosed to the potential renter. Ultimately, there is never a zero percent chance a property experiences flooding. Utilizing these basic requirements alone, renters become more informed about

their legal protections during a flood, have the proper knowledge about their home's flood risk, and have the context to decide if flood insurance is a worthy investment for them. In turn, they navigate the recovery process with more ease following a disaster as Columbia experienced in 2015.

Mitigating flood risk in Columbia

Despite its unfounded claim that renters are better equipped to navigate the aftermath of a disaster, the City of Columbia expressed great concern in the depletion of the affordable housing stock following the October 2015 flood (City of Columbia, 2016). Determinations made by FEMA's IA and the city's own inspections revealed a strong need for redevelopment and rehabilitation of existing affordable housing. The following section takes a closer look at Columbia's CDBG-DR buyout program, as it is compared to Richland County's. Additionally, the section examines how the program affected both homeowners and renters in Columbia.

Buyout programs in Columbia

Floods cause the most damage out of any other disaster in the country. In Columbia, entire communities were devastated by flooding. Homes that never flooded were now located in floodplains. Some homes withstood so much damage they immediately became uninhabitable, while others eventually became uninhabitable after sitting so long without the proper repairs, primarily from not addressing water damage (Ringwalt, 2018). Rather than pumping funds into infrastructure projects that could make these homes safe again, both Richland County and the City of Columbia began to acquire properties that experienced the worst of the damage and would likely flood in the future (Ellis, 2016b; Wilks, 2015b). Both municipalities recognized, while reducing the risk of

an individual at-risk home flooding to zero, buyout programs dig into the affordable housing stock (Richland County, 2016; Wilks, 2015b). Especially when considering both buyout programs were targeted towards low-income households, there was no immediate effort to replenish the number of affordable homes in less flood-prone areas of the city and the county (Ringwalt, 2018). While buyout programs are designed for homeowners, some homes acquired were rental properties. Bryan's landlord participated in the city's buyout program following the disaster after realizing the cost to repair the home. This property housed four renters, and without it, four renters shuffled to find alternative housing along with others displaced. Even if owner-occupied at the time, the option to rent the property ceases to exist upon being acquired.

Both buyout programs received funding through the Department of Housing and Urban Development (HUD)'s Community Development Block Grant Disaster Recovery (CDBG-DR) grant program. Grant recipients use funding to purchase both residential and commercial properties to demolish structures in communities that have endured multiple disasters or sustained one disaster, but there is a risk of future disasters, like in a 100-year floodplain (City of Columbia, 2020; Wilks, 2015b). After demolishing these homes, the goal is to eventually develop open space, park amenities, or flood overflow areas in their place. According to HUD, buyout programs reduce the potential impact of future disaster events (City of Columbia, 2020).

In early 2016, more than 70 property owners began advocating for a buyout program (Liebson, 2022a). Before the CDBG-DR grants, there was already funding available to buy out properties through flood recovery aid from FEMA and HUD. Both the city and county began identifying the eligible properties and contacting the owners.

The city contacted 200 property owners in early 2016 to ask if they would be interested in the program (Ellis, 2016a). Once receiving a list of interested residents, local officials ranked eligible properties to include in applications for CDBG-DR grants. Primarily interested were those unable to afford repairs. If bought out, the county paid property owners up to 75% of the pre-flood value (Marchant, 2020; Ringwalt, 2018). Richland County concluded its buyout efforts in early 2021 with a total of 57 properties out of an estimated 63 eligible properties, the majority of which were along Gills Creek. In addition to buyouts, Richland County utilized funds to repair 375 homes through CDBG-DR funds and volunteer labor through a cluster of volunteer organizations (Richland County, 2021a). Comparing Richland County to the City of Columbia is not exactly fair considering how many more eligible applicants Columbia had; it still took four years for the county to complete its buyout program (City of Columbia, 2020).

Once the grant funding was secured, 454 Columbia homeowners applied for help. As of early 2022, 49 applicants had projects completed. 207 applicants were denied for various reasons, from failing to provide proper documentation, failing to meet income requirements, or selling their properties to other buyers. The remaining 198 were unsure of where their applications stood (Liebson, 2022a; Liebson, 2022b). This was alarming to the homeowners, because the city must spend those funds before the end of 2022. While homeowners were initially relieved to have a buyout program, they were unaware of the nearly five-year wait time just to be eventually denied. Bryan's landlord completed his buyout in 2020, though the home stood until late 2021. Some homes were sealed after the flood to never again be occupied (Liebson, 2022a). In the meantime, some homeowners still paid for a mortgage, insurance, and rent or a second mortgage elsewhere. Without

the financial means and under the impression relief would come sooner than later, others returned to their damaged homes despite the risks.

Utilizing CDBG-DR funds for affordable housing

In its CDBG-DR Action Plan, the city committed to allocating 31.3% of CDBG-DR funding towards rehabilitating affordable rental properties outside of floodplain areas. In its CDBG-DR April-June of 2022 quarterly report (2022), the city reported to have received only a few buyout applications on behalf of rental property owners perhaps because property owners made necessary repairs through insurance or some form of FEMA assistance. Through the Small Rental Repair Program (SRRP), buyouts were only available to rental property owners upon a grant agreement that rehabilitated and reconstructed units remain affordable for two years, must rent to LMI individuals, and must give priority to LMI rental applications. To further its reach, the city sent over 1,800 letters to rental property owners and now has 36 eligible applications.

In addition to the SRRP, Columbia also developed the Multifamily Affordable Housing Fund, which allows the city to use grants and loans to ultimately finance the acquisition and new construction of rental housing or to reconstruct damaged rental units. To be eligible, a project must meet a long list of criteria entailing the property having experienced damage by the October 2015 flood, a maximum number of LMI beneficiaries, and being located within a City of Columbia Neighborhood Revitalization area. As of March 2022, two projects were completed, resulting in new 145 multifamily housing units, also according to the April-June of 2022 CDBG-DR quarterly report.

Capital Improvement Projects

In addition to the destruction caused to dams and the Columbia Canal, other infrastructure issues popped up after the storm. According to Richland County, floods damaged 270 roads across the Midlands, which created yet another immediate need for local officials to assess (Richland County, 2016). As residents tried returning to their homes, it was dangerous and even impossible to do so until roads were cleared of debris and were smoothed over again. Most of this destruction was caused by the soil beneath the roads becoming overly saturated and eroded. Richland County and the City of Columbia were tasked with taking on most of the immediate infrastructure needs to help the city gain a sense of normalcy following the storm. The South Carolina Army National Guard repaired 15 major roadways, and Richland County Public works coordinated repairs for the others (Richland County, 2016).

Both Richland County and the City of Columbia maintain Capital Improvement Programs, which facilitate the creation and implementation of watershed improvements. A major goal of these projects is to improve and preserve water quality by identifying pollutants and action plans to address them. Prior to the 2015 flood, Richland County completed a project to develop a watershed management plan for Gills Creek Watershed, but this plan primarily identified pollutant sources that impaired the creek and established means to reduce pollutant loads into the watershed.

Efforts to implement watershed management plans for Gills Creek are underway (City of Columbia, 2020; Richland County, 2021a). Richland County's Stormwater Management Division reports having two primary drainage improvements projects underway (Richland County, 2021b). The first includes pond improvements, pipe replacements, pipe rehabilitation, and channel rehabilitation near Danbury Drive drainage

basin located northeast of downtown Columbia. The second addresses flooding along a drainage channel between Knollwood and Planters Drive, located on the eastern side of where Gills Creek experienced major flooding in downtown Columbia. Following 2015, Richland County's Stormwater Management Division conducted a study to identify what caused the homes along these two streets to flood. Ultimately, the study recommended the county acquire these properties and remove them from the floodplain. Nine homes were demolished along the drainage channel. Though these no homes no longer exist to flood, Richland County continues efforts in restoration projects to mitigate future downstream flooding.

Both major projects in Richland County are relatively close to downtown Columbia. However, Richland County has a total land area of 748 square miles. The county identifies several other flood hazards in in the rest of the county where floodplain management is needed, notably in the northeast and southeast parts of the county (Richland County, 2018b). Richland County recognizes dams along Gills Creek, if subjected to another deep flooding event with high water velocities, would likely fail again and cause significant damage. The county also notes other dams in heavily developed areas experience a similar level of risk. This suggests the dams are still recreational in nature, though having been repaired since 2015, they are unable to withstand major flood events despite mitigation efforts (Hincks and Reynolds, 2022; Hughes, 2022).

The City of Columbia has its own Capital Improvements Project program, through which it has managed sixteen various major stormwater projects over the past five years (Figure 4.10). As of early 2022, three construction projects were completed,

including an off-stream stormwater detention facility to reduce downstream flooding of Rocky Branch, which flows through the University of South Carolina's campus (City of Columbia, 2020). The other two completed projects entailed vegetation and unnatural debris removal blocking channel flow of Gills Creek and Devils Ditch. The remaining capital improvement projects are either in the construction, design, or moving towards design phase and cover a wide variety of flood mitigation measures. According to a report by Columbia's Capital Improvements Project program, most of these include improvements to ageing drainage infrastructure, like replacing storm drainpipes, bioretention water quality projects, slope stabilization along streams. The completed projects cost a total of \$9 million, with the remaining costing an estimated \$60 million (City of Columbia, 2020).

Half of the remaining estimated costs are allotted to the Shandon watershed, which is a more affluent area close to downtown (depicted in Figure 4.10). While there are clearly many efforts underway to mitigate flooding in Columbia, it is unclear when the projects will complete and if they will have any positive effects on flooding (Hughes, 2022; Joseph, 2022). While projects exist in each City Council area and indicate they are equally distributed to positively affect the entirety of Columbia's population, the more extensive projects appear to take place in more affluent areas of Columbia (Figure 4.11 and 4.12).

The debris removal and stream restoration projects are generally less costly than projects that require construction and infrastructure replacement (City of Columbia, 2020). The question stands as to what areas of Columbia still need serious and expensive infrastructure overhaul that must settle for temporary fixes, like debris removal.

Columbia is better off for any flood mitigation to occur (Joseph, 2022; Petty, 2022).

Unfortunately, it is unclear how long some of these projects remain in the design or progressing towards design phases. Further, it is unclear if the residents forced to wait for projects have the means to handle any flooding damages to their properties in the meantime.

Green spaces

With at least one hundred homes demolished in Columbia and Richland County, officials plan the future of the properties. Immediately after concluding its buyout program, Richland County began a major flood redevelopment project focusing on a strip of 20 now-demolished homes along Timberlane Drive, which falls alongside Gills Creek (Holdman, 2021). In early 2018, the county mailed surveys to ask residents how they would like to see the property redeveloped. The majority of those surveyed asked for the property to return to its natural state (Leblanc, 2017; Richland County, 2021). Because the buyout process lasted longer than anticipated, another survey was sent in 2021. The majority still felt the properties should be returned to green spaces. Some advocated to add a trail on the property if it were re-naturalized (Holdman, 2021).

The properties make up about eight acres of land, though the properties bought out do not fall in a straight line to warrant a significant trail (Holdman, 2022). Ultimately, the city and county must collaborate to develop anything beyond green spaces as homes that could fall contiguously are zoned to either the city or the county. In the event of future flooding, green space provides more area for water to absorb than to flow downstream. Since the homes have been demolished, there has been an uptick in illegal dumping along Timberlane Drive (Holdman, 2022). Some officials explain that some re-

naturalizing development is necessary to ward off such behavior and to prevent more pollution in Gills Creek. The county and city plan to collaborate with the Gills Creek Watershed Association, a local non-profit working to restore Gills Creek, to carry out their efforts in a way that best serves the community.

This chapter walked through some of the unique challenges renters experienced after the flooding in 2015. Development in Columbia was never designed to withstand an event like the 2015 floods. Both the City of Columbia and Richland County stepped towards mitigating what placed residents at such a high risk of their homes flooding. With some mitigation efforts completed, residents hold their breath awaiting long-term results (Liebson, 2022a). Officials claim any storm of this nature would cause such catastrophic amounts of damage. But that discounts the fact that Columbia relied on recreational dams to prevent flooding along Gills Creek Watershed when they were never designed to do so (Jacobs, 2017). It was an unprecedented event, but dams within the watershed experienced major flooding and subsequent damages in the past. The most recent estimate by the City of Columbia indicates there are \$210,388,416 in unmet recovery needs from the October 2015 floods (City of Columbia, 2022). Though the bulk of these unmet needs are allocated towards Columbia Canal repairs, the city considers housing the largest unmet need due to many residents affected by the floods and the limited number of affordable LMI housing options. Rather than wait for infrastructural improvements to complete, there exists a series of necessary policy solutions that can protect renters in general and renters during major flooding events. These solutions can occur at the federal, state, and/or local levels. Even implementing one of them could

ensure renters are better protected and are better equipped to endure the next major flood, which is always right around the corner.

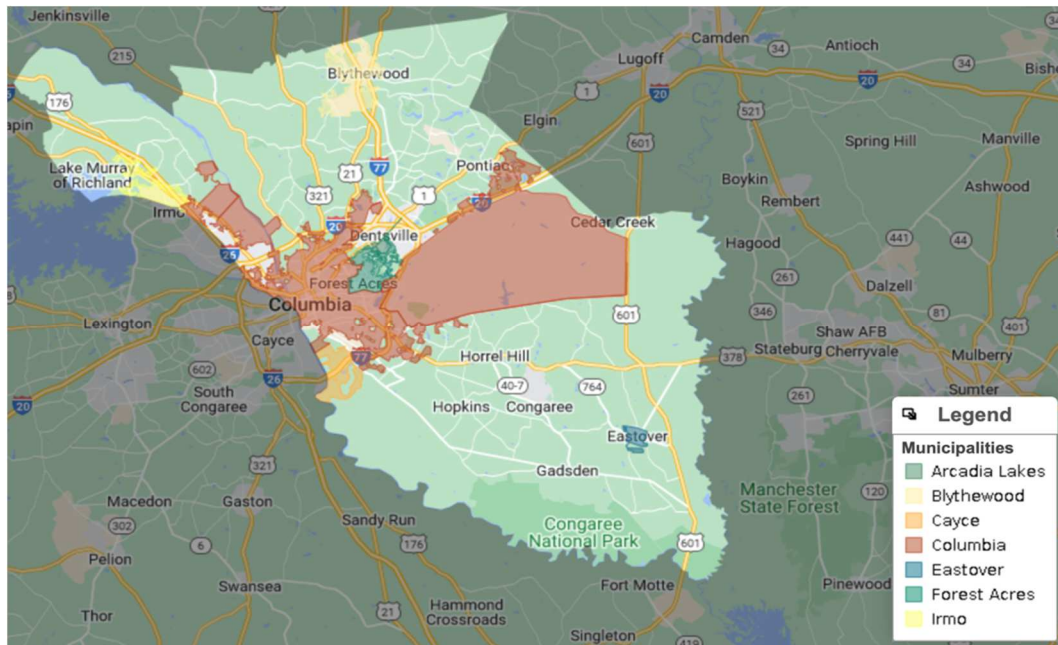


Figure 4.1 Map depicting the seven municipalities incorporated within Richland County, including Columbia (Richland County, 2018b).

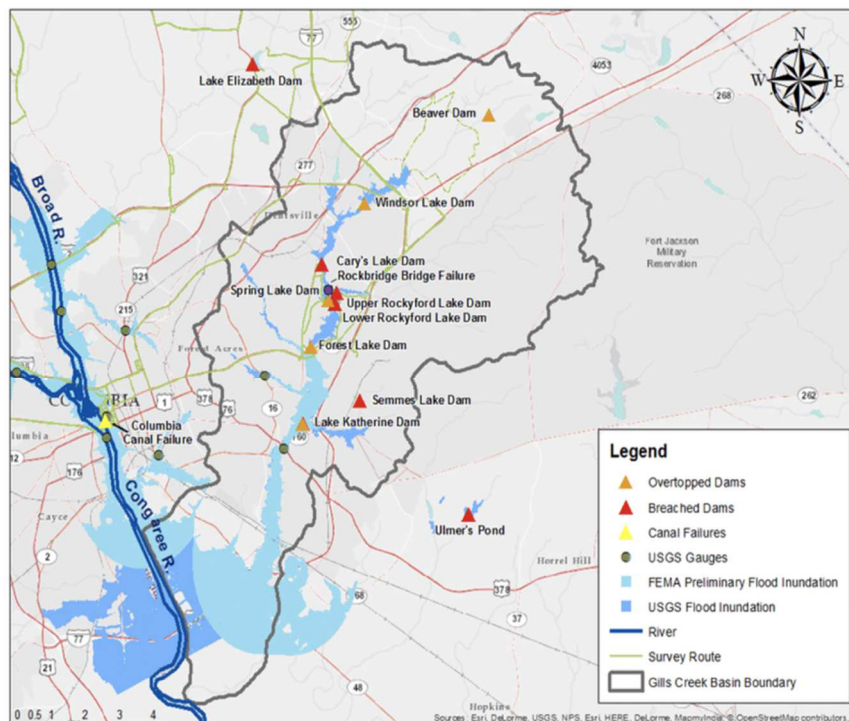


Figure 4.2 This map depicts dam failures in the Upper Gills Creek and the subsequent flooding of the Gills Creek Watershed (Musters et.al, 2016).



Figure 4.3 This map depicts failed and compromised dams along the Gills Creek Watershed (Jacobs, 2017).

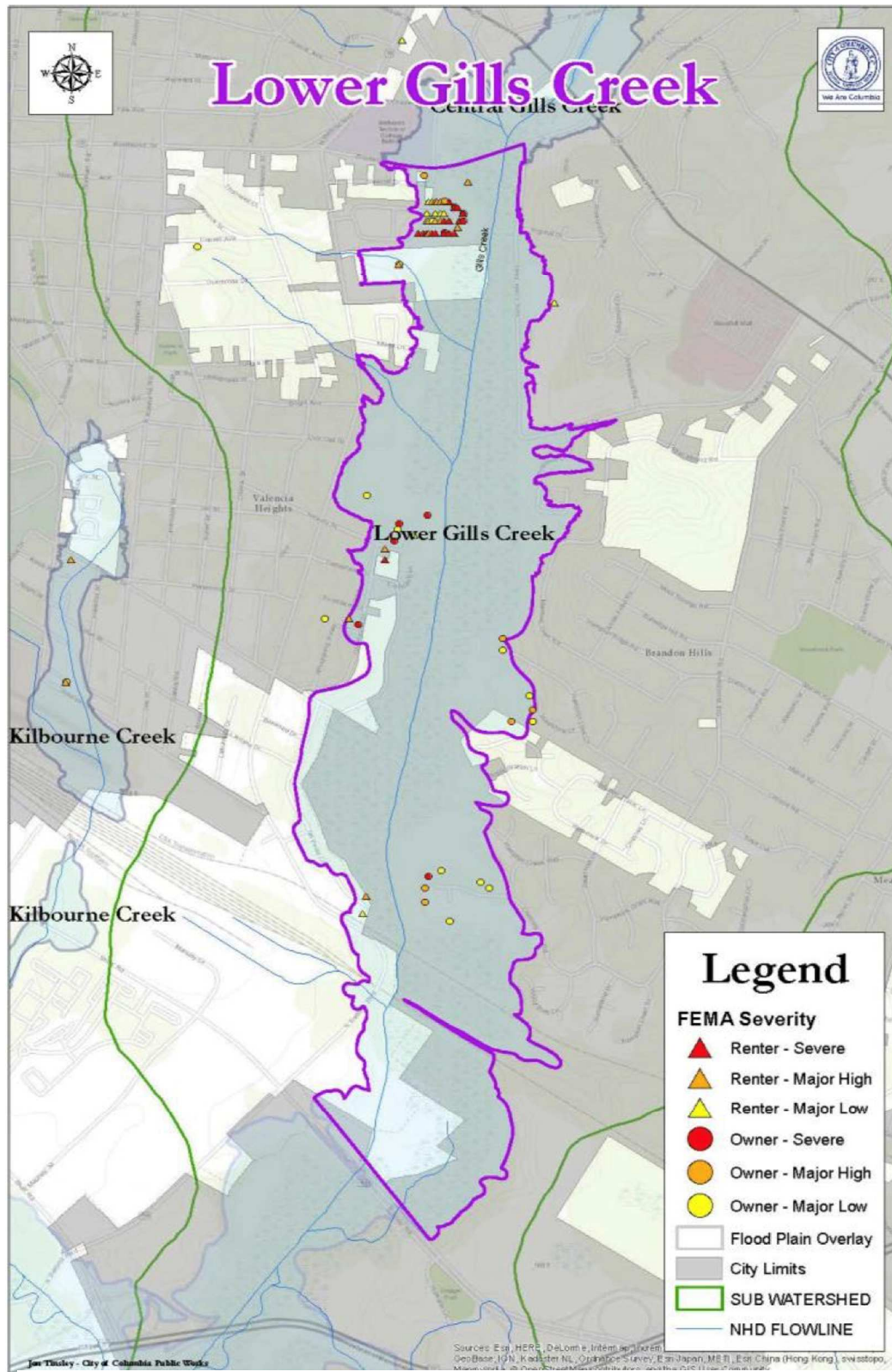


Figure 4.4 This map depicts both renter and owner-occupied most affected homes along Lower Gills Creek (City of Columbia, 2016).

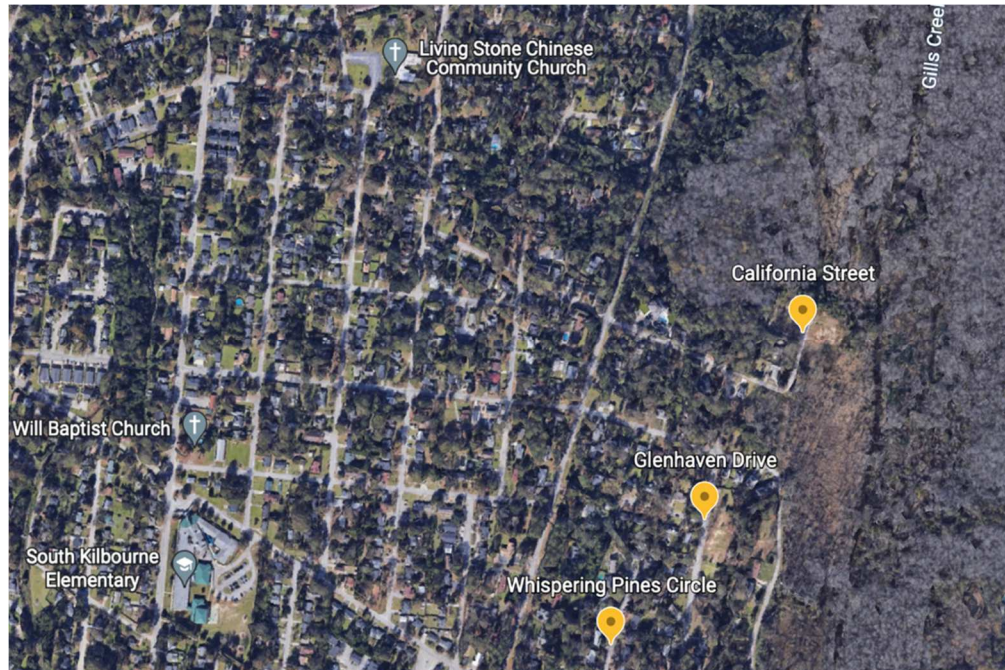


Figure 4.5 This map depicts where some of the heavy flooding occurred in the South Beltline neighborhood, notably the since cleared land bordering Gills Creek (Google Earth, 2022).

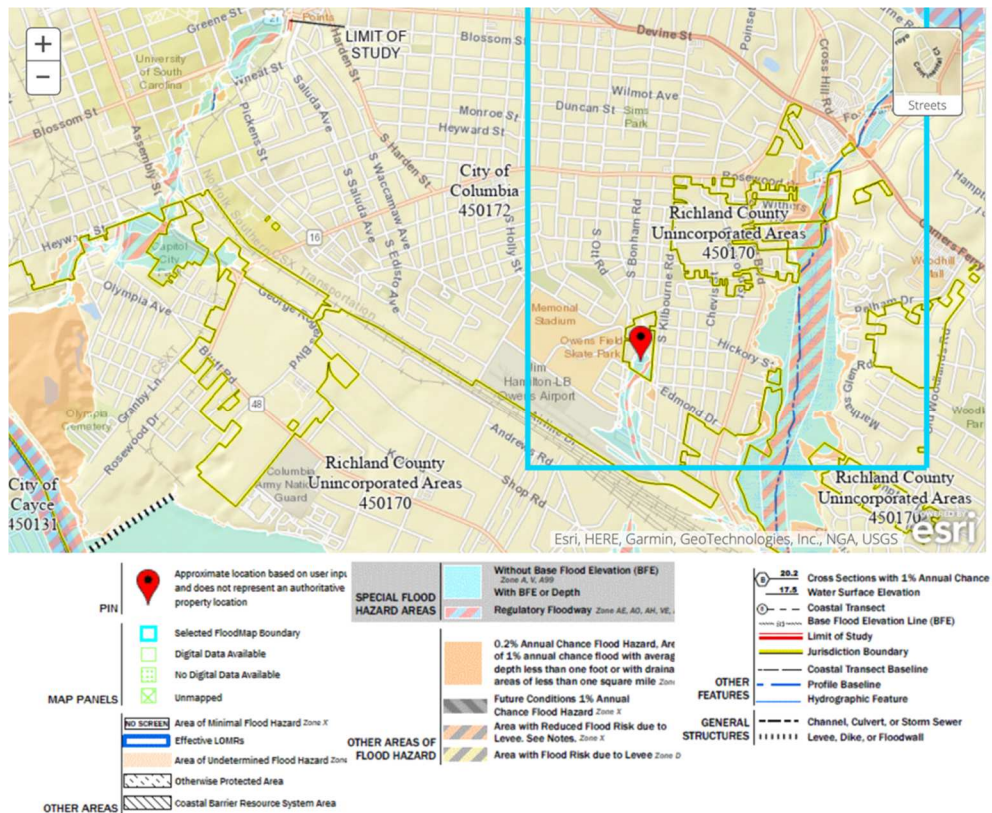


Figure 4.6 FEMA flood map from 2017 depicting flood zones around the Gills Creek Watershed (FEMA Flood Map Service Center, 2018).

Figure 4.7 This map reflects the 2010 revised Flood Insurance Rate Map (FIRM) for the South Kilbourne neighborhood. Areas considered Zone AE reflect Special Hazard Flood Areas (FIRM/FEMA City of Columbia, South Carolina, Panel 376, Map Number 45079c0376k, September 29, 2010).

Figure 4.8 This map reflects the 2017 revised Flood Insurance Rate Map (FIRM) for the South Kilbourne neighborhood. Areas considered Zone AE reflect Special Hazard Flood Areas. Note the streets below Timberlane Drive were not depicted before 2017. (FIRM/FEMA, City of Columbia, South Carolina, Panel 376, Map Number 45079c03761, December 21, 2017).

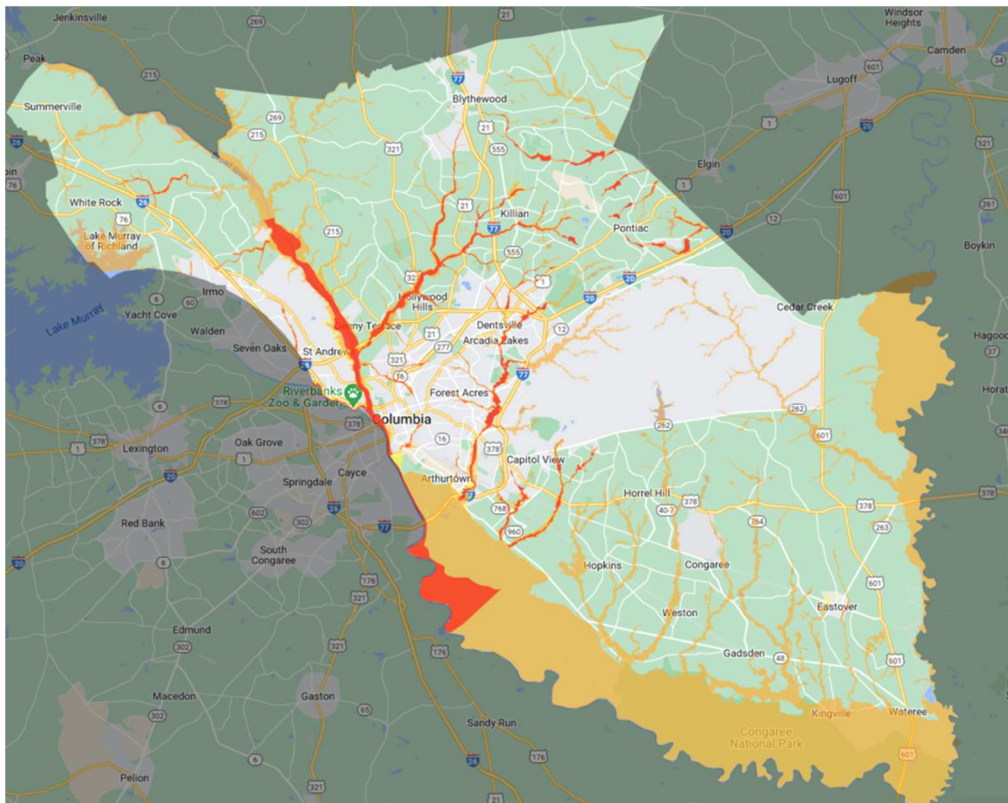


Figure 4.9 This map depicts high risk flood zones throughout Richland County in red (Richland County, 2018b).

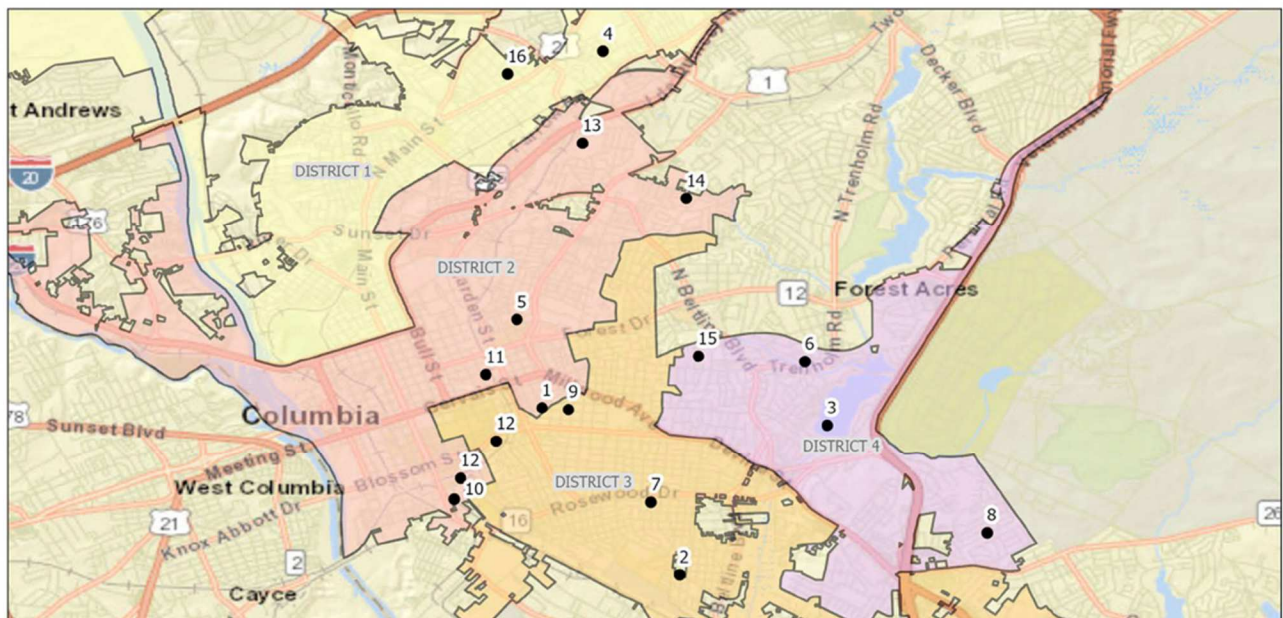


Figure 4.10 This map depicts all sixteen of the City of Columbia's completed and ongoing flood mitigation projects (City of Columbia, 2020).

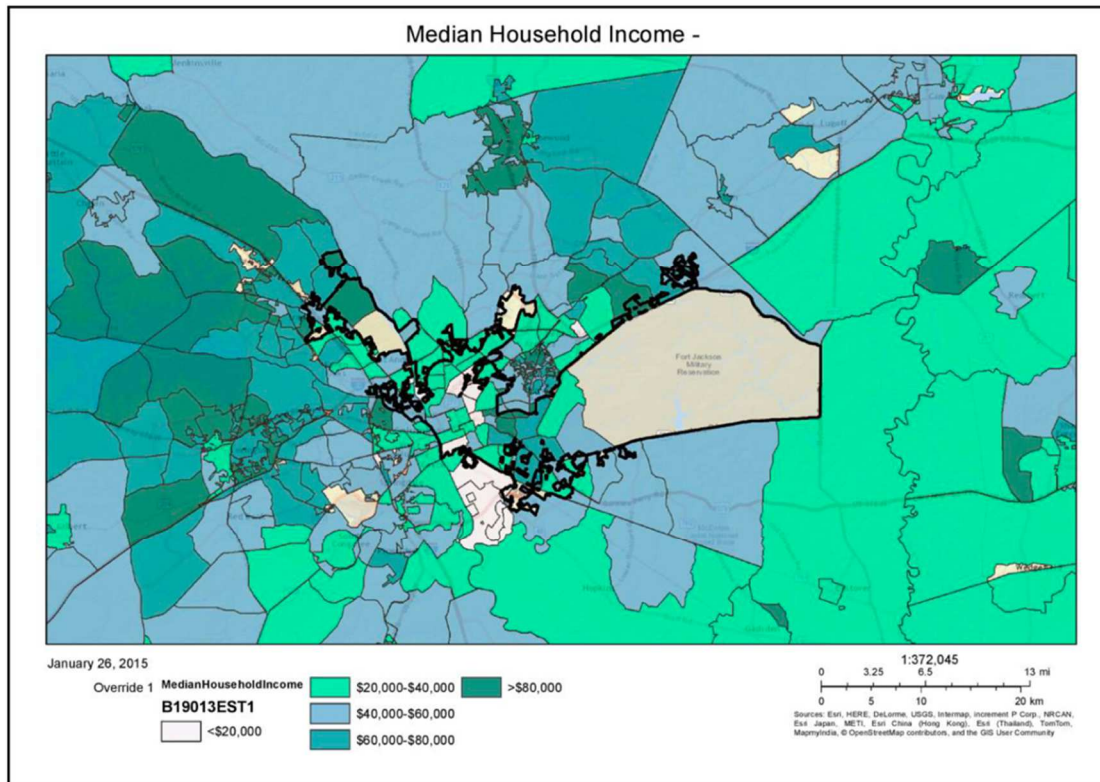


Figure 4.11 This map depicts median household income across the City of Columbia in 2015 (City of Columbia, 2015).

CHAPTER 5

POLICY RECOMMENDATIONS AND CONCLUSION

In a Richland County press release commemorating five years since the flood, Ken Aucoin, chief meteorologist for Richland County said, “Such rainfall amounts in such a short amount of time were historic. Few communities, if any, could withstand such a rain event.” Such catastrophic events open policy windows for municipalities. When opened, policy windows effect significant and lasting change. This final chapter summarizes the findings of each research question and evaluates different policy solutions Columbia can take to better support renters needs during environmental disasters.

How do the rights of tenants compare to those of landlords in South Carolina after disaster?

Renters lack legal standing, access, and ability to make repairs to their homes after a disaster, even if the repairs improve their own living conditions. It is important for both renters and landlords to know what legal obligations they must fulfill following a disaster. Most importantly, if a home becomes substantially impaired, the tenant must first notify the landlord of needed repairs. The landlord is obligated to ensure their property follows all building codes; has running hot and cold water; has central heat and air; has operational electrical, plumbing, sanitation, ventilation; and has working appliances. If the repairs are not made within 14 days, the tenant can terminate their lease

in writing, but they can no longer occupy the home. In our interviews, Mr. Patterson stressed the importance for the tenant to document any damages for their own legal protection; this documentation may also help when applying for aid or filing an insurance claim. If a tenant chooses to stay in the home, regardless of its condition, they must continue paying rent unless they have legal representation instructing them to do otherwise. Non-payment is cause for the landlord to file a Writ of Ejectment against the tenant, otherwise known as an eviction. The landlord cannot ask the tenant to vacate following a disaster, even temporarily, without the tenant agreeing to vacate in writing. In my interview with Bryan, he explained that he had a smoother transition once he and his roommates were displaced by the 2015 flood and attributed this transition to his landlord, who immediately released he and his roommates from their lease and refunded their security deposit and last month's rent. This is a best-case scenario for tenants in Bryan's position, as both Mr. Patterson and Tara shared accounts of tenants having negative experiences with their landlords following a disaster. Mr. Patterson noted that the most substantial disparity between the rights of tenants and landlords in South Carolina lies within the eviction process, which again, are the one of the strongest remedies the legal system offers a party. The discussion of the last research question dives deeper into the process of eviction.

In what ways does urban flooding increase housing stress, specifically to tenants?

Unless homes damaged by urban flooding are repaired or restored, the housing stock only further depletes. Immediately following the October 2015 flood, tenants experienced more of a prolonged waiting period to restabilize their housing compared to homeowners. If a tenant's home becomes immediately unlivable, ultimately the landlord

decides the fate of the property and whether to release the tenant from their lease agreement. If a tenant's home suffers significant damage but is still occupiable, ultimately the landlord decides what repairs are done and when. Homeowners do not have to rely on an intermediary to embark on immediate disaster recovery. Tenants have a variety of living situations, all of which predetermine the ease at which they can recover. Tenants' homes may be owned by private landlords, property management companies, apartment complexes, or family members – because tenants rely so heavily on their landlord following a disaster, these relationships, or lack of, are crucial to navigating disaster recovery as a tenant. Given this variety, it also complicates disaster assistance, as community organizers may not always know the best way to help each individual tenant. In my interview with Tara, she provided several anecdotes about the unique obstacles renters had to face following the flood. Notably, Tara recollected that communication can be precarious for everyone when disaster strikes; but the tenant relies on their landlord to know the fate of their housing.

While tenants experience this waiting period immediately following a disaster when communication is spotty at best, other displaced renters and homeowners are already scrambling to find available rental housing. Even when Tara's organization was ready and willing to do basic flood mitigation for rental homes, they could not get in touch with the property owner to get necessary approval for these projects, which further endangers the health and safety of tenants. By the time the tenant arrives at the conclusion they need to find alternative housing, the available rental housing stock is already watered down. This is one of the reasons why it was so important that Bryan's landlord immediately released him from his lease and refunded his deposit and rent, so

that he and his roommates could immediately fund alternative housing. Without this extra financial cushion, tenants may have no choice but to wait on disaster relief from FEMA or other relief organizations to afford the costs of moving, but even when they receive this aid, it is likely to be a fraction of the funding they need. Private landlords can request higher security deposits and charge higher rent because there is more of a demand for housing than a supply. Given a bigger pool of applicants, it is in the landlord's best financial interest to select the most creditworthy and highest paid renters, which leaves LMI renters at a disadvantage. This sense of competitiveness surfaced several times when reviewing news articles about housing following the flood, within which residents recounted a lack of housing options.

If a rental home floods and is not properly mitigated, this poses an imminent health threat to the tenant. Exposure to damp conditions, mold, and water damage results in a variety of adverse health conditions – ranging from respiratory infections to depression and anxiety. Exposure to flood damage affects all renters, but especially children, the elderly, and anyone with preexisting health conditions. In addition to the financial stress from flood recovery, health problems also pose a significant financial burden for those least likely to be able to afford it. Having established how affected tenants experienced immediate housing stress following the 2015 flood, the section further explores the short and long-term impact on tenants after the flood.

What have been the impacts to tenants short and long term, displaced by the 2015 floods in Columbia, South Carolina?

While a combination of community support, disaster relief, and insurance helped some absorb this sudden expense, the financial burden of a disaster is the most significant

impact in both the short and long-term for renters after the 2015 floods. In 2022, the Federal Reserve System issued a report indicating 22% of Americans 1 in 9 Americans indicated they cannot afford a \$400 emergency expense whatsoever – yet, after the 2015 flood in South Carolina, the average renter accrued over \$2000 in personal property damage. The same report by the Federal Reserve System (2022) also revealed half of renters with income between \$25,000 and \$49,999 have rental payment that exceed 30% of their income. Already experiencing a cost burden from housing alone, the average renter struggles to afford just their rent, even more so other monthly expenses, and the additional costs from disaster recovery. Out of 502 renters with moderate to severe levels of damage from the 2015 floods in Columbia, 451 identified as LMI. This suggests most of the renters with moderate to severe damage from the floods were already cost-burdened by their housing before the flood and did not have a safety net to afford a sudden displacement and relocation. Unless renters can secure more affordable housing, they will not be able to accumulate a wider safety net to financially survive the next disaster.

When Bryan and his roommates received varying amounts of FEMA aid despite experiencing the same amount of damage, they felt confused and mostly frustrated by the process. This was just one example of the variability renters experience when applying for aid, which speaks to the necessity of having a personal financial net. To Bryan and his roommates' benefit, they all had family who lived locally with whom they sheltered in the first days after the flood. This undoubtedly saved them both money and stress in the initial recovery period. They also received a massive influx of community donations, which helped refurnish their new home, replace personal possessions, and financially

restabilize themselves after having missed several days of work. Bryan acknowledged how difficult it would have been to bounce back without the generosity of his community, especially considering he received no FEMA aid while his roommates did. Bryan represents just one tenant voice of the several hundred affected by the 2015 flood – there are many other individual and family financial situations that complicate and alter one’s disaster recovery experience.

How can hazard mitigation and policy solutions alleviate housing stress during urban flooding events in South Carolina and beyond?

By bringing the intersections of urban flooding and affordable housing into focus, I examined both societal issues separately and identified overlapping aspects. There are not numerous, nor concise policy solutions designed specifically to address this intersection; for example, the clearest solution is the need for more affordable, flood resilient housing designated for LMI renters, but this effort relies entirely on funding sources and can take years to result in more affordable housing units. Columbia accomplished this using CDBG-DR funds; however, it was more of a last-ditch effort when the city was unable to initially accrue interest from rental properties in the buyout and Small Rental Repairs Program despite having originally committed to spend over 30% of the funding towards restabilizing the rental housing stock. Rather than waiting for the next disaster, municipalities must be proactive in their housing first approach to hazard mitigation. Rather than identifying solutions specific to this intersection, we can examine both a variety disaster policy solutions and housing policy solutions that, together, can immediately alleviate housing stress for tenants if enacted. The following

section dives deeper into disaster policy solutions, like flood disclosures and better marketing of the NFIP.

Disaster policy solutions

Flood disclosures are more of a preventative approach when considering the challenges renters face during disaster. If renters willingly sign a lease for a home with significant flood risk, they may be more inclined to elect to purchase renters' flood insurance (Casazza, 2017). Findings from this project revealed an under-marketing of the NFIP for renters. Further exploration is needed to understand why such a small percentage of renters nationwide have flood insurance. The most obvious reasons are the added expense, unawareness, and general apathy towards floods. Because renters usually only receive a portion of the disaster assistance they request from FEMA, flood insurance helps meet the difference and provides renters with more of a safety net. The cost is only a fraction of flood insurance for homeowners, but the average renter's monthly income is already accounted for – mostly by housing costs (McShane and Yusuf, 2019). The NFIP program already has an array of complex and procedural problems. Primarily, the amount NFIP pays out every year is more than it receives from policyholders' premiums (Johnson, 2021). However, to ensure it alleviates cost burden for all Americans after a flood, it must exert a maximal effort into recruiting more renters. To best accomplish this, renters first must learn of their flood risk and of the challenges they will ultimately face during a flood. It is an investment that hopefully never pays off, but if it does, it is life changing.

In a more retroactive approach to speed up the recovery process, Chapter 4 further explored FEMA's primary residence requirement for disaster housing assistance and the

ways it can impact both homeowners and renters. Understandably, FEMA wants to prioritize housing assistance towards people whose primary residences were affected. Vacation homes are considered secondary residences, but so are rental properties. Because FEMA does not allow rental property owners to apply for any relief, they must rely on insurance, SBA loans, or pay out of pocket for repairs. Especially when rental property owners rely on rental payments as a stream of income, they may not be able to make the necessary repairs on a property, and instead, choose to participate in a buyout program or sell the property all-together. Meanwhile, tenants of the property have no choice but to live in a home while awaiting repairs that may never happen. If the rental property owner chooses to sell, the stock of rental housing takes a hit in addition to any rental homes considered total losses by storm damages. FEMA must consider tweaking this requirement to make an exception for rental properties as secondary residences. Though aid received may not cover the full cost of repairs, it will at least provide property owners enough funding to create safe and livable conditions for their tenants. In turn, fewer tenants scramble to find alternative housing after a disaster and avoid the cost of relocating in addition to any property damage they experienced.

Housing policy solutions

A major motivation to pursue this project in South Carolina is the state's housing crisis. To an extent, landlord-tenant policy improvements are designed to alleviate stress for tenants in general. But, because disasters create so much financial uncertainty for renters, additional legal protections to create more stability and to prevent displacement are desperately needed in South Carolina. After conducting participants observations at South Carolina Eviction Consortium meetings and an interview with a legal aid attorney

specializing in landlord-tenant relations, some policy improvements were noted to have extraordinary potential to help renters in South Carolina. Chapter 4 provided some detail around legal problems that arise for renters during a disaster; notably, when landlords do not make repairs fast enough and subject renters to substandard living conditions; or if a renter is unable to make rental payments because of disaster-provoked financial hardship. Because research has shown that eviction filings increase after a disaster, it is important to explore what can be done to prevent that in South Carolina. Raymond et.al (2021) found that eviction rates in disaster-affected areas rose by 16% in South Carolina following Hurricane Joaquin. The goal of most of the following policy improvements is to prevent renters from ultimately experiencing displacement twice – once during the disaster and once again through the eviction process.

Filing fees

Mr. Patterson explained that time is of the essence for renters in South Carolina in our interview. While the problem is not so much that the SCRLTA is better or worse than any other state's equivalent of landlord-tenant law, Mr. Patterson expressed South Carolina is unique in how fast a landlord can evict a tenant. There are few places in the legal system where a party is given such an extreme of a remedy as evictions give landlords. In just two weeks in South Carolina, a landlord can file an eviction against a tenant for only \$40. Eviction filings usually cite non-payment as the cause, as opposed to a tenant breaking other terms of a lease such as damaging the property. Because of how fast and cheap the process is for landlords, Mr. Patterson was of the opinion that South Carolina landlords can effectively use evictions as debt collection tools. We can look towards a fellow southern state, Alabama, where eviction filing fees are set by county and

range between \$240-300 (Princeton Eviction Lab, 2018). While there are other influencers in the eviction rate, it is thought that the higher filing fee helps Alabama to have an eviction rate of only 1.82% (Princeton Eviction Lab, 2018). Participant observations with the South Carolina Eviction Consortium echo the positive effects when a state has a higher eviction filing fee. Because research shows states with higher filing fees have fewer eviction filings, this suggests landlords may be more willing to work with and offer more leniency for tenants before filing an eviction (Greenberg, et.al, 2016). Statewide legislation is needed to then allow municipalities to lower the filing fee, but there are other legal approaches local governments may take to slow down the eviction process.

Mediation

One such tactic to slow down the eviction process is mandatory mediation, which would require an intermediary party meet with both the landlord and the tenant before an eviction case be heard before the court (Bieretz et.al, 2020). Mediation empowers both parties rather than allowing a judge or the court to determine the outcome and provides a space for both parties to voice their versions of the disputes. Disasters create temporary housing instabilities, and mediation helps buy time for the tenant to get back on their feet (Greenberg et.al, 2016; Hatch, 2021). At the very least, mediation helps soften the exit if the best course of action is for the tenant to find alternative housing and to create a move-out plan with their landlord. A relocation can still burden the tenant, but an eviction will follow them to their next home and the homes after that. Most importantly, mediation absolves the landlord-tenant relationship of a power imbalance by placing the power into the hands of the neutral intermediary. Mediation programs have been implemented on

county and city levels throughout the U.S., and usually involve funding and assigning mediators to eviction cases almost immediately after the evictions are filed. The funding is a considerable setback, and the programs usually involve extra paperwork for both the tenant and the landlord. For the tenant, this can make an overwhelming process even more so (Hatch, 2021).

Housing courts and right-to-counsel

There is also potential for change within the court system. Eviction cases in South Carolina are heard before magistrate courts which operate within county bounds. Magistrate courts are essentially small claims courts that cover evictions, traffic violations, and other civil cases. In 2019, Charleston County became the home of South Carolina's first housing court (South Carolina Legal Services, 2019). This pilot project was created by a South Carolina Supreme Court order after Eviction Lab data published 2016 found that North Charleston had the highest eviction rate in the country of 16.01, when the national average was 6.53 (South Carolina Legal Services, 2019). The goal of a housing court is to provide more specialized support and judgments for renters, rather than grouping evictions with a wide variety of other types of cases. The program completely depends on volunteer attorneys, which is crucial in South Carolina as the state does not guarantee counsel to tenants facing evictions (Roberts, 2017). Sometimes the cases escalate to trial, but first, attorneys act as mediators themselves to settle any disputes between the landlord and the tenant to prevent the case from escalating to an eviction.

Housing courts, like the one in Charleston, help solve the problem of legal representation, especially when South Carolina Legal Services estimate that 70% of

tenants facing eviction have no access to legal representation or knowledge. In the first year of the program, an estimated 61% of cases handled were able to avoid an eviction (Roberts, 2017; South Carolina Legal Services, 2019). Another accolade of the housing court is that tenants are more likely to request a court hearing once they have been served an eviction filing. Before the housing court, fewer than 10% would request a hearing. In just one year after the pilot program began, around 25% of tenants request a hearing. While this guarantees the tenant a second chance in court, it does not mean they will also avoid eviction (Moore, 2020).

Eviction moratoriums during disaster

COVID-19 placed immense financial pressure on millions of Americans and gave way to progressive housing policy, such as eviction moratoriums. Going on three years into the pandemic, most Americans are now familiar with eviction moratoriums. The federal government issued a nationwide eviction moratorium between September 2020 until July 2021, which effectively banned evictions. Additionally, many states and cities issued their own eviction moratoriums to protect tenants who may have fallen on economic hardships due to the pandemic, which was classified as a national emergency (NLIHC, 2021). Prior to COVID, the state of Florida attempted state legislation to ban evictions during emergencies in 2019 after Hurricane Dorian, which spurred a series of evictions in Miami-Dade County. Citing that county police would no longer assist with evictions from public housing during disasters, Miami-Dade issued a version of an eviction ban (Nelson, 2019; Merritt et.al, 2021). The eviction ban inspired a state bill that would effectively ban any evictions, private or public, from occurring during states of

emergency. The bill eventually lost momentum and was indefinitely postponed (Miller, 2021; Nelson, 2019).

Eviction bans during disasters and states of emergency would allow for folks to focus on their physical health and safety. While disasters cause temporary displacement for some, they are not preventable in the same way evictions could be. Eviction bans give tenants the time to find alternative housing before being evicted, but they are as temporary as the duration of the disaster (Miller, 2021). Once the federal eviction moratorium expired, tenants had to rely on state and local moratoriums in addition to rental assistance. The remaining assortment of dissimilar programs and assistance across states and localities made it difficult for renters to keep track of eligibility requirements and deadlines, proving to be overall ineffective. Such moratoriums also faced harsh criticism from landlords due to lost profit. Without rent payments, landlords can struggle to afford the mortgage and taxes on the property (Davis and King-Viehland, 2021; Miller, 2021). Additionally, without rental payments, landlords may be less likely to make necessary repairs and updates on the property to keep the home safe. Rather, the cost of housing insecurity to society at large should be considered, especially in states that take a pro-business approach to housing and landlord-tenant policies. The amount of legal and social resources alone that are poured into dealing with housing insecurity is not sustainable, especially as more become cost-burdened by housing.

Community organizing

In the interview with Tara, the power of community organizing after a disaster became clear. Perhaps the solution exists partially in policy, but also, even fully, in community organization. The eviction bans in Miami-Dade County, though limited in

scope, took years of community advocacy and organizing to reach (Nelson, 2019). A taste of progressive housing policy brought on by COVID-19 created a hunger for more, but it also highlighted how severe the housing crisis is in the U.S. Particularly earlier in the pandemic in March and April of 2020, tenant unions across the country hosted rent strikes (Black, 2020; Parker, 2022). As tenants' personal resources began to run dry leading into the summer of 2020, some estimates found that nationwide rental non-payments rose to 36%. While eviction moratoriums helped some from becoming houseless during a pandemic, some housing justice organizers saw the bans as a distraction to tenants, ultimately making tenants less willing to act through striking rent all-together (Black, 2020; Crown Heights Tenant Union, 2020). Tenant movements and unions are a practice in solidarity, like how the South Kilbourne community banded together in Columbia after the October 2015 floods. As the housing crisis only continues to implode without a clear future, the fate of tenants decidedly rests in their ability to collectively organize. The starting point for such an organization lies in the tenant's attachment to place and to their neighborhood, even if tenants are generally a more transient population compared to homeowners (Gowing, 2022; Parker, 2022).

Tenant associations and unions help shift the commandeering power dynamic between the landlord and tenant. Instead of landlord vs. tenant, it becomes landlord vs. tenant(s). With this shift comes a general education and mutual aid, not just among tenants, but possibly between tenants and landlords (Black, 2020; Crown Heights Tenant Union, 2020). Though uncomfortable and ungrounded, the early calls for rent reductions, repairs, control, and even cancellation were made from desperation, yet demonstrated a courage and energy among tenants to want more. The movement gained momentum

through a collective emergency, not necessarily through experienced organizers (Gowing, 2022). While a disaster may not catalyze such a widespread, nationwide movement, another movement for tenants may emerge from the next disaster. As of now, there are no formal tenants' rights organizations in South Carolina. Much of the legal aid for tenants is provided through organizations like SC Appleseed and the SC Legal Justice Center. Given the spirit of the community after the October 2015 floods, there is great potential when South Carolinians band together to help their neighbors.

Research Limitations

The data accrued through the interviews from this project resulted in extremely valuable data – conducting more interviews would only further enrich the findings in this project. Choosing the October 2015 floods in Columbia as the case study both helped and limited the scope of this study. Having firsthand experience of the flood and residing in Columbia since then, I found it easier to connect with the residents because they are my neighbors, too. If another place and time was selected, it would have been more difficult to gain spatial knowledge of the neighborhoods and develop these connections. Additionally, I worked for Richland County at the beginning of this project and have worked with some of the stakeholder organizations in the flood recovery process. I used my professional network to my advantage when possible, furthering the establishment of my own credibility when seeking interview participants. However, choosing an event that happened several years ago, it was more difficult to find renters willing to participate in interviews. If I was on the front lines of disaster recovery, I surely would have been able to establish relationships with more tenants to document their experiences with disaster recovery. The participants I interviewed were able to recount a significant amount of

detail for the event having occurred seven years ago, but it is worth acknowledging some details may not have been as accurate had the interviews taken place immediately after the disaster.

Conclusion

In Chapter 2, this project distinguished between different types of floods – pluvial, fluvial, and coastal. As a coastal state, South Carolina is no stranger to flooding, especially in major cities like Charleston and Myrtle Beach where the number of sunny day or nuisance floods is higher than ever due to rising sea levels (Hersher, 2022). As Hurricane Joaquin approached the coast, many South Carolina residents felt that, because they lived further inland, they were not at immediate risk as Hurricane Joaquin approached the coast. The previous chapter further explored this disparity around the concern of flood risk by comparing the number of NFIP policies along South Carolina’s coast compared to further inland. Though a home’s flood risk is never zero, it is understandable if a home did not have a history of flooding and was not located in a high-risk flood zone, flood insurance may not seem like a worthy investment. Certainly, no one anticipated two feet of rainfall the storm enticed. This misconception of flood risk, by both citizens and government officials, existed largely due to a lack of public education and outreach on flood risk; further, it is to blame for most of the unreadiness that caused a considerable loss of life and property in central South Carolina.

A dangerous underestimation, inland flooding causes more than 50% of hurricane related deaths each year. Though moving over land weakens a tropical storm’s windspeed, the storm is not able to blow through an area as quickly. In severe cases, a storm hovers over an area for an extended period, dumping massive amounts of rainfall

in a relatively small area. As the storm approaches, weather forecasters predict total rainfall for an area, but the difficulty lies in determining where the heaviest rainfall will occur and that area's capacity for it. Unfamiliarity with flood conditions and shortened response times pose the biggest threats to public safety. In Richland County, five people perished after the floodwaters trapped them inside of their vehicles. Four other lives were lost in flood-related traffic accidents. Because the flood onset in the early hours of the morning, it was still dark outside when the worst of the rainfall began. The roads were impossible to navigate safely, yet this message failed to reach some individuals in the area, which ultimately produced fatal results (Hersher, 2022; Liu, 2020).

The National Weather Service's Columbia office issued a flash flood warning for all of Columbia at 1am on October 4, 2015, but this information was clearly not received or taken into consideration by all. One resident reported: "I lost count of how many times the National Weather Service flash flood alert on my iPhone went off that night. I do know that each time I was awakened it seemed to be raining even harder, but I wasn't overly concerned" (Jöbsis, 2015). The rainfall was anticipated – on the morning of October 3, 2015, the South Carolina Emergency Management Division forecasted 10-15 inches of rain to fall across South Carolina's Midlands in the next day. The number of dam failures along Gills Creek, which caused most of the significant flooding and property damage, was not anticipated. The question stands if local officials adequately warned residents about flood risk and Columbia's flood risk.

This goal of this project was to highlight some of the challenges renters experience following a major urban flooding event, while arguing municipal response to urban flooding ought to take a "housing first" approach. Renters are considered a

particularly vulnerable population during disasters, and this project outlined how renters fared following the October 2015 floods in Columbia, South Carolina, which already has a significant affordable housing shortage.

Renters face different challenges than homeowners do when recovering from disaster. Generally, renters have a smaller or no financial safety net to lean on during a disaster. It is simultaneously difficult for landlords and emergency responders to address the needs of renters as it is difficult for renters to know how to help themselves. Because there is so much variety in how a tenant rents their property, it is challenging to create a concise disaster response plan especially in the chaotic aftermath directly after a storm. Both renters and homeowners lose a sense of housing stability during disaster, but renters rely on their landlords for resolution whereas homeowners are not relying on an intermediary to proceed with recovery. This key difference creates too much variation for renters to know the fate of their housing, which only adds to the stress and trauma generated by experiencing a life-threatening disaster.

This project chronicled the experiences of tenants displaced by the October 2015 floods. Those displaced faced significant challenges when finding alternative housing, primarily because of the sudden depletion of Columbia's rental housing stock. With more housing developments clustered together, flooding in urban areas propose a more significant threat to the housing stock. This flooding is primarily caused by weakened and outdated infrastructure, in addition to unprecedentedly extreme weather events, such as the October 2015 flood. Without having financial means and community support to survive unexpected displacement, the path towards recovery becomes a slippery slope

into possibly experiencing homelessness, which was the reality for a few renters after the flood.

Further down the road to recovery, Columbia's housing stock never fully rebounded from the flood. Homes that experienced the worst of the damage were demolished – only a select few were rebuilt and reestablished into rental property. If damaged homes withstood physical damage, some renters then had to combat damp and mold-infested conditions, which caused an array of health problems. Areas of Columbia continue to experience significant flooding during extreme rainfall, despite the city's efforts, both ongoing and completed, to overhaul its damaged infrastructure. Housing is more likely to be affordable in flood-prone areas, which attracts lower-income renters. This increases the likelihood of their homes flooding without the proper resources to adjust.

While some renters have no choice but to accept flood-prone housing, landlords in South Carolina are not legally required to disclose their rental property's flood risk following a disaster. Only seven states have this requirement, which deters already vulnerable renters from experiencing a flood or encourages them to purchase renters' flood insurance. As more states and municipalities require flood disclosures, there exists great potential for the NFIP to market itself better to renters. Because FEMA recovery funds are not available for renters unless there is a federal major disaster declaration, flood insurance is crucial for renters living in areas with frequent flood disasters. Even if there is a major disaster declaration, FEMA funds are not always easily accessible, as the application process requires extensive documentation renters may not always have in the chaotic aftermath of a disaster. Additionally, when funds are allocated, renters rarely

receive the full amount requested, which forces them to rely on community support and their own financial means to recover. FEMA can help preserve the rental housing stock by allowing rental property owners to access disaster relief for their secondary residences. Without this aid, repairs are often delayed as landlords try to make insurance claims or pay for the repairs out of pocket. The longer the process goes on, renters may be living in substandard and even dangerous conditions. Landlords also may elect to sell or demolish their property, which displaces renters again and places even more pressure on the local housing stock. At the very least, FEMA providing aid to rental properties would restore safe living conditions, primarily benefitting renters.

If renters are not displaced by the disaster itself, evictions also cause displacement and an array of other financial and economic barriers for low-income renters. Before housing instability escalates to eviction, there are other solutions that can empower renters to advocate for themselves in the landlord-tenant power dynamic. Mediation programs and filing fee increases are known to slow down the eviction process and encourage conversations between the tenant and the landlord. Charleston's housing court has seen tremendous success, representing a beacon for other municipalities in the state for how to humanely treat eviction cases. Though there is power in community, South Carolina does not have a tenant rights association. Like legal aid organizations, tenant rights associations provide free education and, sometimes, legal representation specifically for tenants being taken advantage of by landlords. This is crucial for tenants living in substandard conditions following a flood. These associations provide a sense of community for tenants who feel powerless to overcome their housing instability.

There are policy improvements that, if written into laws and statutes, can immediately start protecting renters in South Carolina. Moving forward, it is crucial that housing be a priority, not if, but when the next flooding disaster strikes South Carolina. Without these assurances, the renter population in South Carolina stands to become that much more vulnerable to housing instability and displacement when the next flood occurs.

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APPENDIX A: INTERVIEW PROTOCOL

Interview Protocols for Tenants/Landlords

Introduce project, introduce Principal Investigator, and read through the interview invitation. It should be clear to the subject that participation is voluntary, and the interview can stop at any time. The participant may also skip questions. The participant will be made aware before the interview that it will be voice recorded. The participant has the choice to remain anonymous. The interview will begin with questions regarding personal history with Columbia to understand the participant's relationship to the area. Then it will ask the participant about their personal perception and experience of the October 2015 flood, followed by questions about their personal experience of recovering from the flood. The interviews are semi-structured, and these questions will guide the conversation:

Personal History

1. What area did you live in during the October 2015 flood and how did you come to live there?
 - a. Do you still live there? If not, what area do you live in now and how did you come to live there?
2. How was it to live in that area before and after the storm?

The Flood

1. Do you remember first becoming aware of Hurricane Joaquin? What do you remember about the storm before it hit?
2. How did you prepare for the storm? Is that how you typically prepared for storms?
3. Did your home or personal property experience any damages from the storm? Would you provide details about the damage? Did your home become temporarily or permanently uninhabitable? If so, where did you go to stay instead? How did you come to go there?
 - a. Tenant -- If so, where did you go to stay instead? How did you come to go there?
 - b. Landlord -- If so, where did your tenants go to stay instead?
4. In what other ways did your daily life change after the storm? How else did the storm affect you?

Recovery

1. Prior to the storm, did you have flood and/or wind insurance? Why or why not?
 - a. If so, what was the claim process like?
2. When did you first investigate applying for disaster recovery assistance from FEMA? How did you come to learn what type of assistance for which you were qualified?
3. How was the process of applying for assistance? Did anyone help you apply for assistance? Who?
4. From researching and applying for assistance to receiving any assistance, approximately how long did the process take?

5. What was the approximate value of assistance for which you applied? What amount did you end up receiving?
6. Can you say more about the restoration process itself? What was that like? How long did it take?
7. Were you (or were tenants) able to occupy the home again?

Final Question

1. Is there anything I did not ask that you would like to add?

Interview Protocols for Housing/Legal Professionals

Introduce project, introduce Principal Investigator, and read through the interview invitation. It should be clear to the subject that participation is voluntary, and the interview can stop at any time. The participant may also skip questions. The participant will be made aware before the interview that it will be voice recorded. The participant has the choice to remain anonymous. The interview will begin with questions regarding personal work history as it pertains to housing in South Carolina, followed by a series of questions designed to measure the extent of housing insecurity in South Carolina and possible solutions.

Personal/work history

1. Where are you currently located and how did you come to live there?
2. Where did you receive your legal training? Can you walk us through your work experience since then?
3. If you have a specialty within your legal profession, how did that develop?

Housing

1. How do you define housing insecurity? Because this is an area of focus in your work, I know it matters to you. But why should housing insecurity matter to the average South Carolinian?
2. What do you perceive to be major drivers of housing insecurity in South Carolina? Do you perceive these challenges to be unique compared to other states?
3. Within your work, have you observed any relationship between disasters and housing insecurity? That is, for example, disasters exacerbating housing insecurity or vice versa? If so, can you say more about that or any experience you have around the relationship?
4. Can you describe the major challenges around alleviating housing insecurity in South Carolina? Do you perceive these challenges to be unique compared to other states?
5. Can you describe any solutions to those major challenges? Are these solutions more achievable locally, statewide, or nationwide?

Final Question

1. Is there anything I did not ask that you would like to include?

Interview Protocols for Emergency Management Professionals/Community Organizers

Introduce project, introduce Principal Investigator, and read through the interview invitation. It should be clear to the subject that participation is voluntary, and the interview can stop at any time. The participant may also skip questions. The participant will be made aware before the interview that it will be voice recorded. The participant has the choice to remain anonymous. The interview will begin with questions regarding personal work history leading up to and after the October 2015

flood. Then it will ask the participant about their personal perception and workplace experience of the October 2015 flood, followed by questions regarding a general overview of disaster response and recovery efforts. The interviews are semi-structured, and these questions will guide the conversation:

Life/Work History

1. Where were you employed during late September to late October of 2015? How long had you worked there at the time?
2. What is the mission of this place of employment? Can you provide an overview of their programs and services?
3. What was your role there and what were your main responsibilities? How was it working there at the time?
4. If you work somewhere else, where? What is your new role and current responsibilities?

The Flood

1. Do you remember first becoming aware of Hurricane Joaquin? What do you remember about the storm before it hit? Was there anything unique or remarkable about the storm?
2. How did you personally prepare for the storm? Is that how you typically prepared for storms?
3. With what phase(s) of the emergency management process was your workplace involved?
4. How did your workplace prepare for the storm? Can you say more about your workplace's emergency operations?

Disaster Response and Recovery

1. What challenges were there when responding to this storm? Were these challenges unique?
2. Can you provide an overview of what types of public services your workplace offered to the public during this storm?
3. What kind of challenges did your workplace experience in carrying out these public services? Of those challenges, which have been resolved and which are ongoing?
4. In your opinion, how successful were the overall response and recovery efforts in response to this storm?

Final Question

1. Is there anything I did not ask that you would like to include?