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Disparate Flood Outcomes and Social Vulnerability as a Fair Housing Issue in Norfolk, Virginia

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Professional Plan

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and
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MASTER OF URBAN & REGIONAL PLANNING PROGRAM
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Disparate Flood Outcomes and Social Vulnerability
as a Fair Housing Issue in Norfolk, Virginia

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About the Client

HOME (Housing Opportunities Made Equal) of Virginia

Housing Opportunities Made Equal of Virginia, Inc. (HOME) is a 501(c)3 non-profit corporation organized under the laws of the Commonwealth of Virginia and a HUD-approved housing counseling agency. HOME was born out of the necessity to enforce the Fair Housing Act. As long as discriminatory practices prevent access to housing, we will be here to protect the rights of all Virginians. We tackle systemically divisive housing practices through fair housing enforcement, research, advocacy, and statewide policy work. We also aid first-time homebuyers and those under the threat of foreclosure. When unequal access to housing and credit contributes most to our growing wealth gap, our multi-faceted approach is a powerful catalyst toward furthering fair housing (HOME of VA, 2022).

Introduction

Figure 1: Census tract 48 in Norfolk. Taken by Molly Frey, January 10, 2023.

       Norfolk is a city of approximately 238,000 people in the Hampton Roads region of Virginia. The town is increasingly at high risk for flooding and sea level rise due to a combination of factors. Climate change is causing more frequent and extreme tropical storms and an overall increase in rainfall results in severe flooding in Norfolk (Virginia Department of Conservation and Recreation & Office of Governor Ralph S. Northam, 2021). Norfolk's location puts it particularly at risk since it lies in a low elevation area of the Chesapeake Bay that contains 144 miles of shoreline between the Bay, various lakes, rivers, and the Atlantic Ocean (City of Norfolk, 2022a).

       Fair Housing laws and research are enacted for the purpose of eliminating discrimination in the housing market and bringing equality to housing situations. This can include improving safety, affordability, and access for folks of every background (HOME of VA, 2023). Flooding is a housing issue because the location of one's residence, and the structure that one lives in, expose a person to many different flood-related impacts. Governments and stakeholders use flood risk management (FRM) practices which incorporate various strategies, activities, and plans to mitigate and prepare for flooding events (Morrison et al., 2018). In places like Norfolk, FRM is

highly important in mitigating flood devastation. This can include anything from mitigating loss of human life to reducing flood damage to housing.

Proper flood mitigation must take into account that flooding does not affect everyone equally. The term social vulnerability describes how personal, social, and economic characteristics put certain groups at greater risk during flooding or other natural disasters, resulting in worse outcomes. Socially vulnerable groups are typically people of color and low-income persons. Therefore, social vulnerability is rooted in historic patterns of racism, exclusion, and displacement that result in disproportionate impacts on people of color (Stafford & Abramowitz, 2016). The inequality embedded in social vulnerability and the negative flooding and subsequent housing outcomes experienced by these disadvantaged populations poses a fair housing risk that is currently unrecognized in legislation.

Plan Purpose

The purpose of this plan is to explore how social vulnerability and the disparate impacts of floods can be viewed as a fair housing infringement. This plan includes examining the current and past conditions of how FRM, housing development, and the natural environment have been operating in favor of or against socially vulnerable populations in Norfolk. These topics have been explored through stakeholder interviews, geographic analysis, and descriptive analysis. A case study about two flood-prone, socially vulnerable census tracts in Norfolk, census tract 46 and 48, and two federally-funded, city managed redevelopment projects in those tracts will illustrate the key principles.

This project suggests an understanding of fair housing in which the equitable sharing of environmental risk and the benefits of its management, are integral to equal access in housing, inclusive neighborhoods, and full enjoyment of one's residence. In doing so, new understandings are created as to how environmental hazards, such as flooding, can negatively impact fair housing. By casting the disproportionate flooding burden faced by socially vulnerable groups as a fair housing violation, we can begin to recognize and make reparations for this inequality.

The findings illustrate some of these existing obstacles that prohibit housing equality from being achieved. This is further explained and mitigated by the recommendations, which are intended for this capstone's client, HOME of VA, and rooted in program and policy implementations. The most notable being the proposal of a new rule to HUD's Affirmatively Furthering Fair Housing (AFFH) that would present the disparate impacts of natural disasters that socially vulnerable populations face as an impediment to fair housing. While this project is specific to Norfolk and flooding, it lays the groundwork for this type of research to be applied elsewhere for socially vulnerable populations and whatever natural disaster is pertinent to that location and population.

Figure 2: Hampton Roads, circled on a map of Virginia (ESRI, 2022).

Figure 3: Norfolk, highlighted in blue. Shown as a part of Hampton Roads (ESRI, 2022).

Literature Review

Flood Risk Management

Flood risk management looks different for every government or agency that employs it, particularly because different places have different situations and needs. Morrison et al. (2018) describe that flood risk management tends to favor "resistance-based strategies", which can be productive in lessening flood damage but overall are ill-equipped for uncertainty (Morrison et al., 2018, p. 291). An example of a resistance-based approach are levees, which provide a level of physical protection to a community, but levees can only handle so much water until they fail and let water pass through. This occurred during Hurricane Katrina in New Orleans. The city's floodwalls were not deep enough or tall enough to withstand the unforeseen storm surge that the hurricane brought, and devastation ensued (Laska & Morrow, 2006). Cities that focus too heavily on FRM strategies involving physical resilience as opposed social resilience may be susceptible to worse flooding outcomes, and those outcomes are likely to be felt most strongly by the most disadvantaged populations (Morrison et al., 2018)**.** Morrison et al. call for adaptive efforts that acknowledge the human influence of social factors on the environment as well as uncertainty, in order to "accommodate rather than control systems" (Morrison et al., 2018, p. 291).

Social Vulnerability

Proper flood risk management must acknowledge the most disadvantaged populations in flooding events in order to properly prepare for floods and their inequitable effects. Social vulnerability is a method of analysis used to identify these disadvantaged groups. In academic literature, social vulnerability measurements assess the various social and economic factors that contribute to specific groups and individuals having worse outcomes in an event of a natural hazard (Stafford & Abramowitz, 2016).

Social vulnerability assessments can be conducted and measured in many different ways. Stafford and Abramowitz (2016) write about one of the most common versions, the Social Vulnerability Index, or SoVI. This index is commonly used for "quantitatively identifying social vulnerability to environmental hazards, particularly for studies that focus on natural hazards associated with climate change such as hurricanes, storm surge, flooding, and coastal erosion" (Stafford & Abramowitz, 2016, p. 1092). Their study created an index of various social vulnerability variables in order to address who was most disadvantaged. Deciding which social factors to include and the weighing of variables ultimately determines who is considered vulnerable. Certain indicators interact and combine to create higher levels of social vulnerability. Stafford and Abramowitz assigned an area as highly vulnerable if they had a lack of resources (coupling low-income and high unemployment or low female labor force participation), lack of representation (coupling low-income, high percentage of no high school degree, and high percentage of Black residents), and high-need (elderly, low-income, high percentages of social security assistance) (Stafford & Abramowitz, 2016, p. 1109).

Measuring social vulnerability is a highly important and useful tool in understanding inequality. Rufat et al. (2015) writes the use of quantifying social vulnerability can aid in policy implementation and prioritization of resources and projects. However, the authors address that focusing only social vulnerability measurements instead of acknowledging community concerns and participation may lead to further inequities (Rufat et al., 2015). Haverkamp addresses this directly in Hampton Roads, as the author conducted interviews and attended regional Sea-Level Rise and Adaptation Forums as an observer. Haverkamp finds that Hampton Roads is using a technocratic, pragmatic approach to social vulnerability and hazard assessment, and calls for a more participatory approach that is critically reflexive in order to make more just and equitable assessments. Haverkamp writes regarding adaptation, "when root causes of vulnerability are misguided and not holistically nor deliberately derived, adaptation actions may in effect reduce the vulnerability of only those best positioned to take advantage of governance institutions, rather than reduce the vulnerability of marginalized or undervalued parts of the system" (Haverkamp, 2017, p. 2676).

Fair Housing

The United States Department of Housing and Urban Development (HUD) is responsible for enforcing the Fair Housing Act (FHA) of 1968 as well as allocating important federal funds to states and jurisdictions for a variety of housing and economic related projects. The FHA has required HUD and those receiving funds to "affirmatively further fair housing" (AFFH) by taking "meaningful actions, in addition to combating discrimination, that overcome patterns of segregation and foster inclusive communities free from barriers that restrict access to opportunity based on protected characteristics" (HUD, 2023). Over time, HUD has published new interpretations of AFFH, requiring new plans and documentation in order for jurisdictions to fulfill AFFH. In 1996, HUD published the Fair Housing Planning Guide, which included a new interpretation known as the Analysis of Impediments to Fair Housing (AI). The AI is a pivotal piece of fair housing legislation because it requires states and jurisdictions to document and describe any fair housing infringements in their area (Dillman, 2020). Without an AI, states and localities cannot receive funding from HUD. The AI takes the FHA a step further from simply protecting those experiencing housing discrimination in a court of law, to requiring governments to conduct research and analysis to uncover patterns of discrimination and issues in fair housing specific to that location (Virginia HUD, 2018).

The FHA already contains language for protecting disabled folks that could easily apply to socially vulnerable folks as well. The law states those with disabilities are entitled to reasonable accommodations and modifications to their housing in order to ensure "full enjoyment" of their housing (Virginia Real Estate Board, 2021). This "full enjoyment" ensures safe housing for disabled persons and could be extended to also include safety from environmental hazards. In this view, if all persons are entitled to full enjoyment of their homes, but then environmental risks are not shared equitably, socially vulnerable residents lose their

ability to do so. This argument could help support a new AFFH rule to protect socially vulnerable populations.

The "Discriminatory Effects" Rule was also an additional rule HUD has reincorporated in 2023. HUD declares that "the discriminatory effects doctrine (which includes disparate impact and perpetuation of segregation) is a tool for addressing policies that unnecessarily cause systemic inequality in housing, regardless of whether they were adopted with discriminatory intent" (HUD, 2023). The Discriminatory Effects Rule is highly meaningful because it validates the core assumption of this capstone; the disparate impacts socially vulnerable populations face from flooding is a form of fair housing infringement.

Housing related factors are influential in a person's ability to prepare, react, and recover in the event of a flood. One example is housing tenure, an important factor given renters are a more disadvantaged group compared to homeowners. Lee and Zandt (2019) write, "many characteristics of renters correlate with aspects of social and physical vulnerability, including being low-income and/or minority, living in low-quality housing, and lacking or having only limited control of resources (Lee & Van Zandt, 2019, p. 156). Because of these vulnerabilities, renters have worse outcomes in the event of a natural disaster. Lee and Zandt explain that there are differences in both social resources and physical resources for renters compared to homeowners. Homeowners are likely to have more knowledge of the local area while renters are subject to mobility and may lack knowledge about neighborhood hazards. Renters cannot make infrastructure investments and improvements in their home like homeowners can (Lee & Van Zandt, 2019).

Race is a highly influential factor in the housing market. As a result of decades of racial discrimination in the housing market and a growing racial wealth gap, African Americans have lower homeownership and lower levels of wealth. In 2016, African Americans had a homeownership rate of only 41.7%, while white homeownership was 71.5% (Lee & Van Zandt, 2019). A study on flooding and race by the NAACP (2021) explains that Black communities are more likely to be located in areas with higher flood risk. Hundreds of years of institutionalized racism coupled with malpractice of the federal government have pushed Black Americans into vulnerable positions with worse outcomes in the event of a flood. The NAACP cites several examples of this such as New Orleans, Louisiana, where Hurricane Katrina had severe disparate impacts for Black residents. "Black households were 50% more likely to experience flooding, and by extension, more likely to be displaced" (NAACP, 2021, p. 27). They write that these disparate impacts can be traced back to early colonization of the region. Wealthy white settlers possessed maps that allowed them to settle in areas above sea level, pushing freed people of color and impoverished settlers into the low-lying flood-prone areas. The NAACP writes:

> A history of racially discriminatory policies on the federal, state, and local level, including redlining, gentrification, and discriminatory zoning, have lowered property values and created deep racial and economic inequities that perpetuated the disenfranchisement of Black communities. (NAACP, 2021, p. 21)

These historical racist housing policies are not unique to New Orleans. Redlining maps were a creation of the Home Owners Loan Coalition (HOLC) in the 1930s. The HOLC was created in order to protect mortgage lenders from risk of default, however it did so with the intent of specifically helping white lenders while harming people of color. Redlining maps proposed which residential areas would be safe for investment and which would be risky but were predominantly based on racial bias (Rothstein, 2017). White neighborhood would be rated as worthy of investment and given ratings of "A" (green) or "B" (blue). Neighborhoods with minority residents would receive grades of "C" (yellow) representing a declining "transition zone" or "D" (red) which was considered a fully declining "hazardous" area unsuitable for investment (Finn, 2018). Redlining maps were created for Norfolk, a topic of discussion in the "Existing Conditions" section.

Theoretical Framing

This research utilizes rethinking several frameworks within the realm of flood risk management and housing. The first utilized framework is the "Just City", which focuses on remedying injustices and acknowledging uneven power dynamics. It supports the notion that public policy should be rooted in "mitigating disadvantage" (Fainstein, 2015, p. 262). As Susan Fainstein (2015) writes in *Spatial Justice and Planning*, this planning framework re-adjusts focus to planning for "poorly represented groups, especially low-income minorities" (Fainstein, 2015, p. 261). Just City recognizes that a perfectly even allocation of resources and wealth is not possible in our society, so rather than fully trying to eliminate inequalities, we must try our best to relieve them as much as possible by trying to benefit groups that are most deprived.

The Just City framework can be appropriately applied to this capstone since this research recognizes it cannot solve the issue of flooding and ensure everyone has equal effects. Rather, this capstone acknowledges disparate flooding outcomes across the population and, similar to the Just City framework, encourages planning to improve the outcomes for those most negatively affected by floods. Fainstein's theory acknowledges that material equity, diversity, and democracy are constantly at odds with one another. In the case of Norfolk, material equity is achieved through proper mitigation techniques that acknowledge the diversity of Norfolk's residents. Deliberative democracy is demonstrated through this capstone's site selection choices, a process outlined in the "Methods" section.

While the Just City framework can help identify the need for justice and its ongoing tensions, the framework of sustainability is useful in defining and achieving justice. Sustainability in its essence describes planning practices and procedures that mitigate environmental damage in order to ensure future generations are not negatively impacted. However, sustainability has a malleable definition that can allow planners, policy makers, and any other relevant parties in FRM to create their own definitions appropriate for their own contexts. Sanyal et. al explains this flexibility and blending of positionalities allows planners to

"develop a practical future vision (different from the status quo) that creatively combines vibrant, livable communities with a lighter footprint on the planet and a deeper connection to place and people" (Sanyal et al., 2012, p. 121). For Norfolk, this could mean creating a definition of sustainability that highlights inequalities and plans to relieve those inequalities for current and future generations. Together, the Just City helps address the needs and conflicts related to creating more egalitarian outcomes while sustainability helps outline the actual process required in order to achieve equitable outcomes.

Methodology

This research and its two proposed research questions are based on the premise that the disparate impacts of hazards, such as flooding, represent a risk to vulnerable populations that goes against the intentions of fair housing. The first research question asks, how can this new definition of the fair housing framework help to reveal the challenges that socially vulnerable populations face regarding flooding and housing? The second research question asks, how can policy decisions help remedy these newfound infringements? Both questions are explored in the study census tracts 46 and 48. The first question requires establishing the challenges of the study census tracts and understanding how they relate to the proposed fair housing framework. This requires assessing the conditions of housing as well as flooding and flood risk management in both places. The second question transforms these findings into actionable solutions. These research questions are intended to encourage policy or program changes as well as to empower and inform socially vulnerable groups through addressing the injustices that they face.

Research questions are not answered with causal links, because it would be an oversight to say certain flooding events and outcomes occur purely because a household is deemed socially vulnerable. Rather, these questions are explored critically through interviews, archival and academic research with a lens of achieving fair housing, methods of mitigating flood damage, all from the perspective of an urban planner with the curiosity of best practices and ideal scenarios.

Methods: Study Area Site Selections

The study areas for this project were intended to be two census tracts located in floodplains and considered to be socially vulnerable in Norfolk. Census tracts 46 and 48 were chosen via a multi-step process of elimination. I was first tasked with selecting a specific social vulnerability analysis for Norfolk. The Virginia Vulnerability Viewer was chosen given its ease of use and it was created by a professional and reliable source, the Virginia Institute of Marine Science at the College of William & Mary. The data in the index is sourced from US Census Bureau information, a common practice for SoVIs (Center for Coastal Resources Management & College of William & Mary, 2016). Within the Virginia Vulnerability Viewer, 16 census tracts were identified as socially vulnerable (Center for Coastal Resources Management & College of William & Mary, 2016). These 16 census tracts were then viewed in FEMA's National Flood

Hazard Layer (NFHL) in ArcMap to assess if they had significant flooding. Five census tracts were eliminated that did not appear to have significant amounts of flooding.

The remaining 11 study area candidates were narrowed down by comparing housing and income. Using Census data for "percent below poverty level", I chose to look at four of the highest scoring census tracts, since they all have levels of poverty at or above 40%. The University of California, Davis Center for Poverty and Inequality describes that census tracts with poverty percentages above 20% are considered to be poverty areas, so these four census areas would easily qualify as areas of concentrated poverty (Center for Poverty and Inequality Research, 2022). The four census tracts I identified were 35.01, 42, 46, and 48. I eliminated 35.01 and 42 after concluding that they did not contain a sufficient amount of flooding in FEMA's NFHL map compared to the other two. I therefore chose census tracts 46 and 48 to be my study areas.
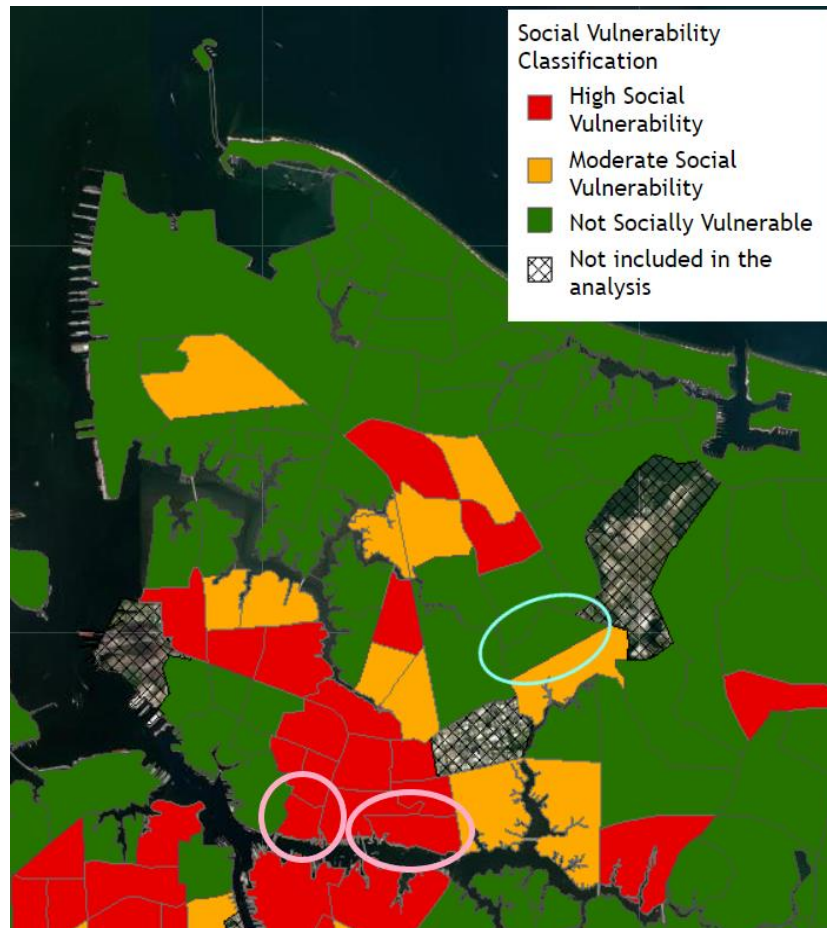

Figure 4: Virginia Vulnerability Viewer, showing Norfolk. Census tracts 46 and 48 are circled in pink. The control census tract used for demographic comparisons, census tract 59.03, is circled in light blue (Center for Coastal Resources Management & College of William & Mary, 2016).

Methods: Flooding History and Housing Conditions Analysis

In order to answer my first research question, "How can including the disparate impacts of floods as a fair housing infringement help expand our understanding of the challenges that socially vulnerable populations face regarding housing and flooding?", an analysis of both flooding history and housing conditions was necessary. For housing, I planned to gather information from HUD's database, Norfolk's AIR (Address Information Resource), Zillow, and any other government related websites to observe how buying, selling and renting was occurring.

I had anticipated that obtaining information about flood history would be more convoluted than find data related to housing conditions. I recognized that many online flooding resources focus on predicting future floods rather than accounting for previous ones. Thus, I planned to start by analyzing the flooding effects of past hurricanes and large storms since these are often well documented. I also expected newspaper articles would be particularly informative, especially about nuisance flooding, which occurs due to high tides in low lying areas.

Methods: Stakeholder Interviews

Interviews were included in this research as a method to better understand conditions related to flood risk management, social vulnerability, housing, and other relevant topics. The outreach group was comprised of a heterogenous group of academics, employees of the City of Norfolk, employees of the state of Virginia, realtors in the Hampton Roads area, non-profit organizations related to housing, or flooding, or water, FEMA and FEMA related departments, companies related to building construction, and a private company related to flood mapping. Stakeholders were chosen based upon presence in previous research or by being related to other stakeholders in some way. For example, multiple contacts had some involvement in the Ohio Creek Watershed Project while others were involved in St. Paul's Redevelopment. Stakeholders were contacted by both phone and email; depending on the information available online or provided by other contacts. All contacts could ultimately be divided into two categories, those considered to be more knowledgeable about flooding and those considered to be more knowledgeable about housing. Interview questions were flexible, but a general protocol was created as a starting point.

Table 1: Interview Protocol

Order	Question Topic	Purpose
1	Explain professional background	Explain how their work relates to this capstone.
2	Social vulnerability	How their work helps or plans for socially vulnerable populations.
3	St. Paul's Redevelopment and Ohio Creek Watershed Projects	Learn about interviewee's opinions or work related to these projects in study areas.
4	Vouchers and St. Paul's Redevelopment	The St. Paul's Redevelopment seemed to have sparked more conversation than the Ohio Creek Watershed Project. Learn more about the interviewee's opinion on prior or current situation in St. Paul's, especially regarding housing vouchers and other features of the lawsuit settlement.
5	FEMA/Flood maps/NFIP	Learn what the interviewee thinks is working or is not working about these programs.
6	Ideal scenarios	Understand what interviewee believes would be the optimal situation for Norfolk regarding flooding, housing, social vulnerability, etc.

Generally, the interview protocol attempted to ask the interviewee about their knowledge of relevant topics, how social vulnerability or disadvantaged populations might relate to their work, if they have any relation, opinion, or statement on census tracts 46 and 48, and other questions relevant to implementing policies or plans that would help address social vulnerability. Stakeholders related to the government were asked questions in an effort to understand how Norfolk is currently addressing flood risk management and social vulnerability. Aside from the general protocol, unique questions were selected for each interviewee depending on their knowledge and position related to various topics.

Interviews were coded to identify major themes. A selection of words was identified as being related to the major themes of this capstone as well as being repeated frequently in interviews. A tally was created to assess how often each interviewee mentioned these terms. This helped identify what each interviewee was most focused on and made it easier to later summarize their interviews. Questions and conservations were matched appropriately for each interviewees set of knowledge and the given time constraints. Once transcripts were tallied and summarized, keynotes of each interview helped build the findings and inform recommendations.

Table 2: Interview Coding Terms

Word(s)	
Flood, flooding	Displace(d)
Ohio Creek Watershed Project, Chesterfield Heights	Insurance
St. Paul's, Tidewater Gardens	Voucher
(Social) Vulnerability, Vulnerable, Disadvantaged	Redlining, Redline(d)
FEMA	Urban renewal
Floodplain	Housing, House(s), Home(s)
100 Year Flood, 1% Annual Flood	Map(s), Mapping
Disclosure	Flood Risk Management/Mitigation
Planning, Planner, Plan	

Methods: Limitations

The limitations of this research were primarily related to the challenge of accessing flood history data, which ended up being unreasonable for my timeframe and scope of resources. Data on previous flooding was limited and unspecific, and local knowledge appeared to play a more prominent role than expected. The most challenging part of this research however was the outreach process and attempting to convince stakeholders to interview.

Limitation: Lack of Flood History Data

I planned to research flooding in Norfolk by searching for flooding by specific addresses and analyzing major storms and hurricanes. Analyzing storms was ultimately unsuccessful due to the difficulty of understanding flooding amounts and specific locations in relation to storms. The National Weather Services published a report in 2017 called "The Hurricane History of Coastal Virginia", which includes a compilation of hurricanes that have affected the Hampton Roads region (National Weather Service, 2017). While informative, the report did not specify how much flooding occurred in Norfolk and where. Newspaper articles were also unsuccessful in explaining flooding due to their predictive rather than explanatory nature when it comes to flooding. For example, in early October 2022, Norfolk declared a state of emergency for anticipated flooding and news sites started circulating this information. Flooding occurred, but the high tide never fully reached the anticipated 6.5 feet, making the earlier claims faulty (Vargas, 2022).

There is no single database for previous flood history of specific addresses, neighborhoods, or any other geographic reference point related to Norfolk. I had anticipated that certain addresses or neighborhoods would have some records of flooding, but this was not the case. The investigation itself was informative due to the difficulty of finding information that should be public. Information regarding flood history as well as the likelihood of future flooding is scarce.

Limitation: The Power of Local Knowledge

Locals of Norfolk have a memory bank of flood history through lived experience and word of mouth. This leaves outsiders, like myself, without the same breadth of knowledge on risks and frequency of flooding. Research has consistently illustrated the usefulness of local knowledge in risk mitigation. Trogrlic et. al (2019) explain that it is a highly overlooked tool for flood risk management. Local knowledge has continually helped certain communities adapt to environmentally hazardous areas since settlements began. In modern times, local knowledge is increasingly important and worthy of further documentation and application (Šakić Trogrlić et al., 2019). Therefore, local knowledge is useful for those who possess it, but potentially debilitating for those who do not.

Limitation: Outreach and Interviews

Interview outreach was challenging and resulted in significantly fewer responses than expected. Many contacts did not respond at all. Some initially responded but did not follow up when it came to scheduling. This research would have benefitted from certain parties answering, and a more aggressive outreach approach with a more flexible timeframe would have warranted more robust results. Alternatively, other methods of data collection such as surveys or interviews with residents would have been helpful, but also was largely out of scope for the time and resources allocated for this project.

Existing Conditions

Census Tract 46 and the Ohio Creek Watershed Project

Figure 5: Census tract 46, single family homes in Chesterfield Heights. Taken by Molly Frey, January 10, 2023.

Census tract 46 contains two predominantly African American working-class neighborhoods, Chesterfield Heights and Grandy Village. Chesterfield Heights is a historic district, originally laid out in 1904 as an upper class neighborhood. However, neighborhood competition during WWI caused the lot sizes to shrink, making it affordable housing. Chesterfield Heights joined Virginia's Landmark register in 2002 and the National Register of Historic Places in 2003 (DHR, 2022). Grandy Village, which lies directly east of Chesterfield Heights, is a public housing community comprising 363 units (SeniorNavigator, 2023). Census Tract 46's Chesterfield Heights and Grandy Village experience frequent tidal flooding and rainfall-related flooding. The two neighborhoods are physically isolated since there are only two roads, Ballentine Blvd and Kimball Terrace, that provide access to the area. These roads flood easily and cut off access to the neighborhoods. Additionally, the shoreline in this area is continually eroding which exacerbates flooding (City of Norfolk, 2022b).

In 2014, the Virginia Sea Grant provided $50,000 to a nonprofit known as Wetlands Watch. The grant was used to fund research for the creation of a resilience plan for Chesterfield Heights. Students from Hampton University and Old Dominion University with backgrounds both in engineering and architecture teamed together to produce the designs that were submitted to the Tidewater Resilience Design Challenge. Impressed by the designs, the City of Norfolk incorporated them into a portfolio submission for HUD's National Disaster Resilience Design Competition. The Commonwealth of Virginia won, and Chesterfield Heights was awarded $120 million in grant funding (Garcia, 2016). This created the Ohio Creek Watershed Project, which plans to improve the roads and the shoreline of Chesterfield Heights and Grandy Village in addition to a new park and other infrastructure improvements (Norfolk Office of Resilience, 2022).

Census Tract 48 and St. Paul's Redevelopment

Figure 6: Census tract 48 in St. Paul's, where construction is ongoing. Tall buildings from downtown Norfolk can be seen in the nearby distance. Taken by Molly Frey, January 10, 2023.

Census tract 48 is a part of the St. Paul's area, which is typically grouped with census tracts 41 and 42 and contains several neighborhoods including Tidewater Gardens, Young

Terrace and Calvert Square. All three neighborhoods are over 70 years old, predominantly African American, contain public housing complexes and exist in floodplains (Geonzon, 2021). This capstone refers to census tract 48 synonymously with St. Paul's, and therefore typically includes census tracts 41 and 42 in this referral.

The City of Norfolk, Norfolk Redevelopment and Housing Authority (NRHA), and HUD partnered to propose a redevelopment project known as the St. Paul's Redevelopment (or St. Paul's Transformation Project), which plans to tear down the existing public housing in these neighborhoods in order to create a new mixed-use mixed-income area. The original plans called for over 1,600 affordable housing units to be demolished and only 600 to be rebuilt (Geonzon, 2021). The redevelopment is currently in progress, beginning with the relocation of the 618 families from Tidewater Gardens. Ground was broken for phase 1 of the plan on April 19, 2022 (Kavanagh, 2022).

Demographics

Table 3 shows the demographics and housing information of the two study census tracts 46 and 48 as well as a comparison to the averages of the City of Norfolk and a control census tract 59.03. Census tract 59.03 was included because it closely resembles the averages for the City of Norfolk, and it is not socially vulnerable and contains almost no flooding. Note that census tract 48 contains 0% homeownership because it consists only of public housing (US Census Bureau, 2020).

Table 3: Demographics of Census Tracts 46, 48, 59.03, and Norfolk City

	CT 46	**CT 48**	**CT 59.03**	**Norfolk City**
Population Total	1,991	1,430	1,834	238,005
Percent Black	85.8%	91.25%	45.3%	40.2%
Percent White	7.7%	1.9%	41.4%	43.2%
Percent Homeownership	29.8%	0%	59.9%	46%
Number of Housing Units	860	743	653	89,398
Median Household Income	$30,200	$13,442	$60,124	$53,026

All data comes from the 2020 US Census 5-Year Estimates (US Census Bureau, 2020).
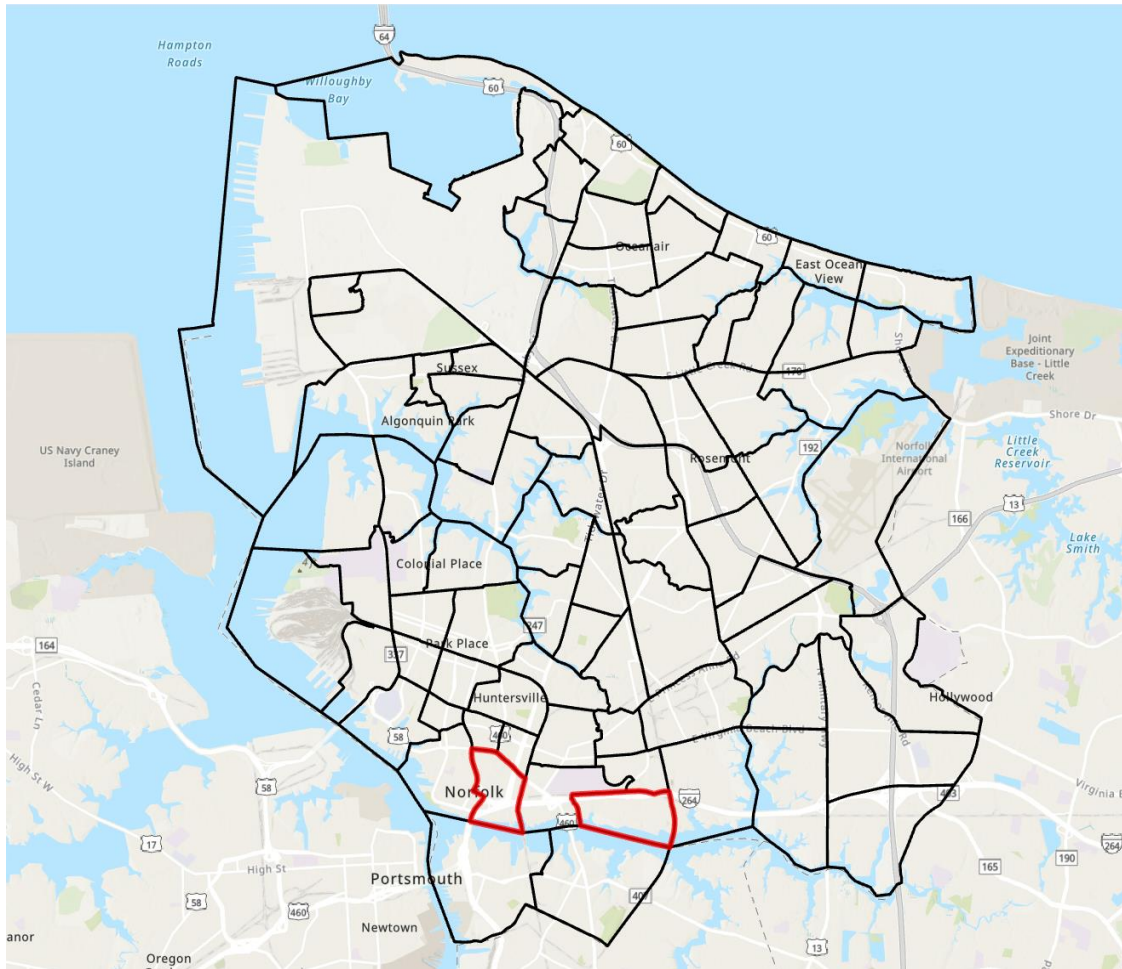
Figure 7: Census tracts of Norfolk based on US Census Data. Census tracts 46 (right) and census tract 48 (left) are outlined in red (The City of Norfolk, 2020).

Flood Risk Management (FRM)

Flood risk management (FRM) is a planning practice carried out by governments or communities to prepare for future flooding events by addressing the likelihood and severity of events and managing them with mitigation and adaptation strategies. Norfolk's FRM is handled by various levels of government. This includes the federal government via FEMA, the state of Virginia, regionally by the Hampton Roads Planning District Commission, and locally by the City of Norfolk through their Office of Resilience. Table 4 addresses the varying levels of government and responsible actors that have some influence on Norfolk's FRM, as well as adjacent agents such as Norfolk's Redevelopment and Housing Authority.

Table 4: Programs and Plans Related to Norfolk's FRM and Housing

Level of Government	Responsible Actor	Relevant Documents, Plans, Projects
Federal	FEMA	National Flood Hazard Layer (NFHL), National Flood Insurance Program
Federal	HUD	Fair Housing Act (FHA), Affirmatively Furthering Fair Housing Rule (AFFH)
State	Commonwealth of Virginia	Virginia Coastal Resilience Master Plan, Statewide Flood Disclosure Laws
Regional	Hampton Roads District Planning Commission (HRPDC)	Hampton Roads Hazard Mitigation Plan
Local	City of Norfolk – Office of Resilience	Norfolk Resilience Strategy, Ohio Creek Watershed Project
Local	Norfolk Redevelopment and Housing Authority	St. Paul's Redevelopment

FEMA's National Flood Hazard Layer (NFHL)

Figures 8 through 10 show this via FEMA's National Flood Hazard Layer. Both census tracts are largely covered by either the 1% (orange) or 0.2% (blue) Annual Chance Flood Hazard zones.
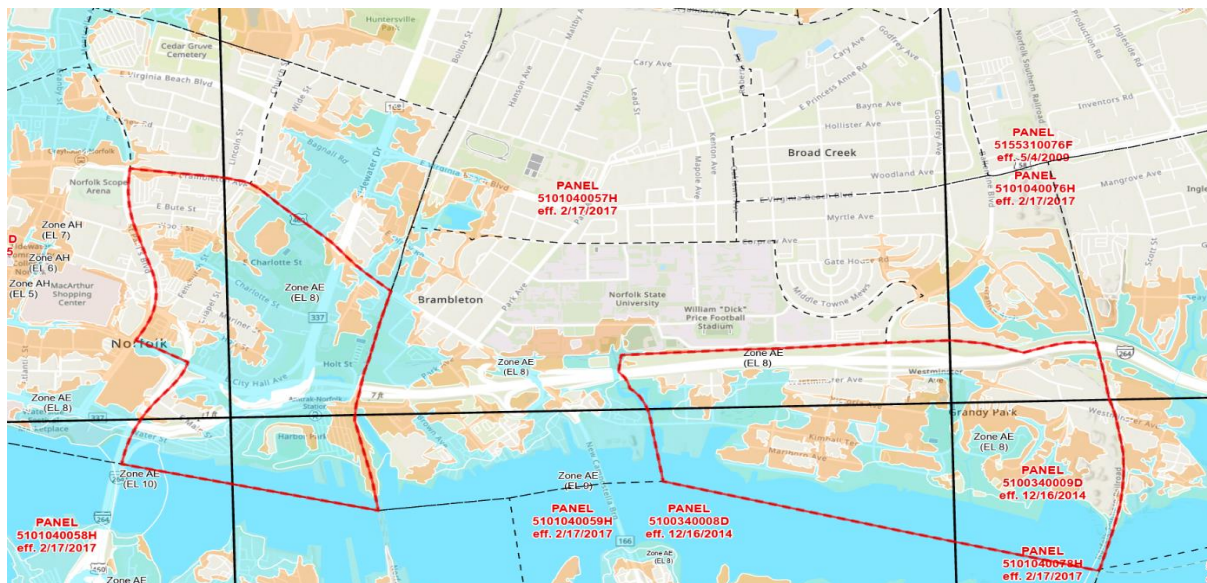
Figure 8: FEMA's NFHL showing census tract 46 (right, red) and census tract 48 (left, red). Blue represents the 1% Annual Chance Flood Hazard and orange represents the 0.2% Annual Flood Hazard (FEMA, 2021; The City of Norfolk, 2020).

Figure 9: Census tract 46 (outlined in red) on FEMA's National Flood Hazard Layer. Blue represents the 1% Annual Chance Flood Hazard and orange represents the 0.2% Annual Flood Hazard (FEMA, 2021; The City of Norfolk, 2020).
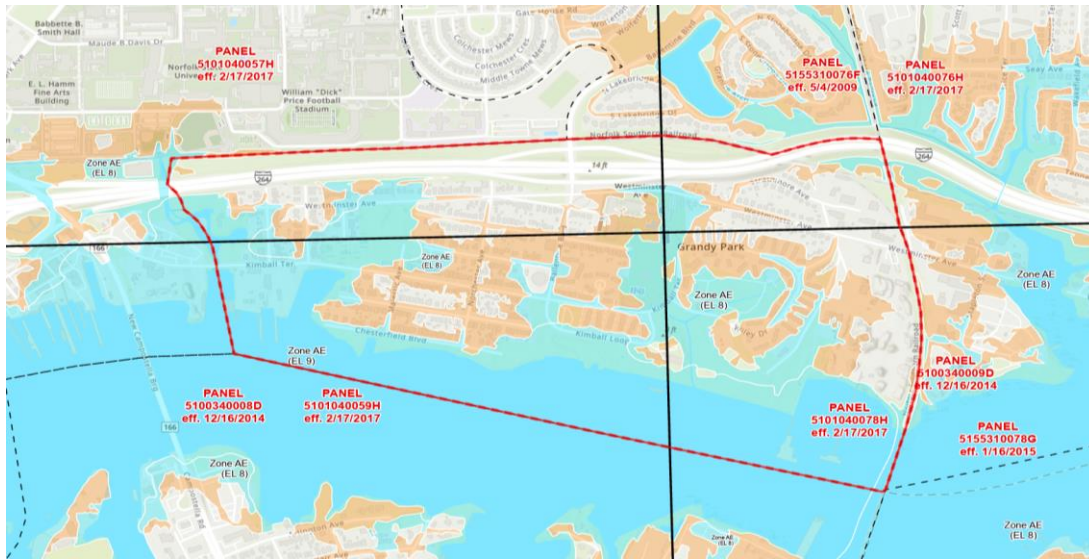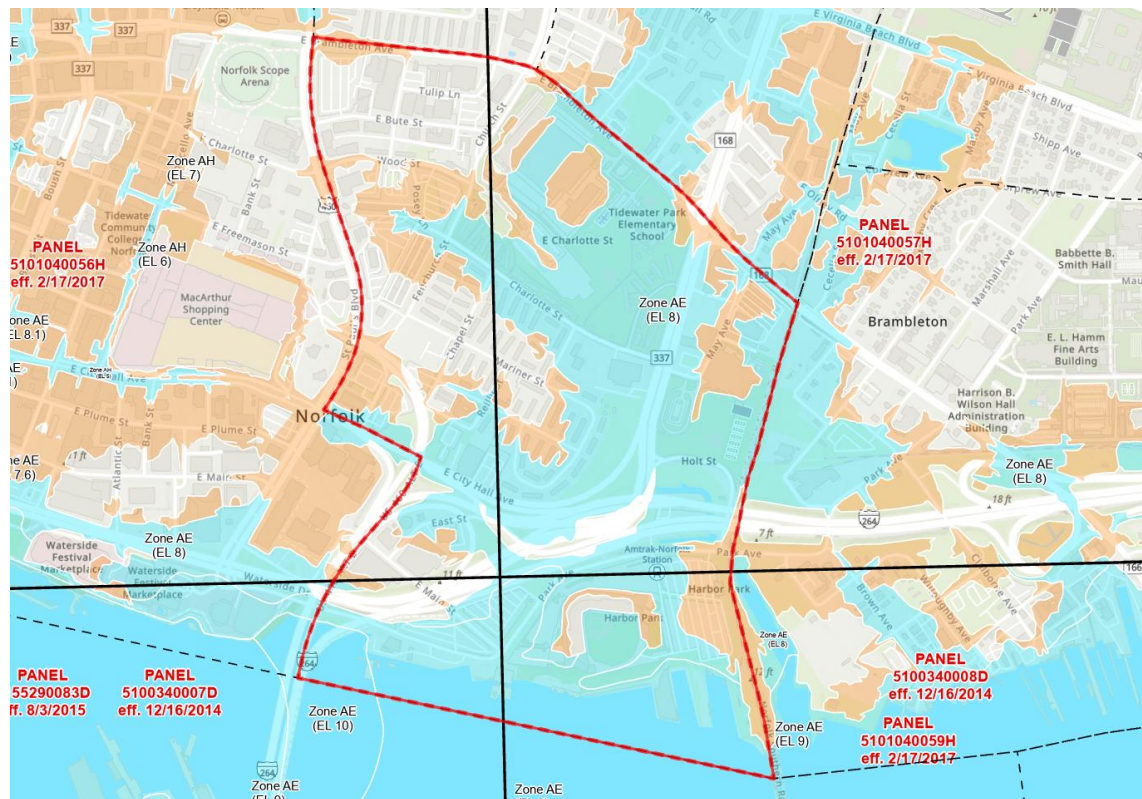

Figure 10: Census tract 48 (outlined in red) on FEMA's National Flood Hazard Layer. Blue represents the 1% Annual Chance Flood Hazard and orange represents the 0.2% Annual Flood Hazard (FEMA, 2021; The City of Norfolk, 2020)

Redlining and Urban Renewal
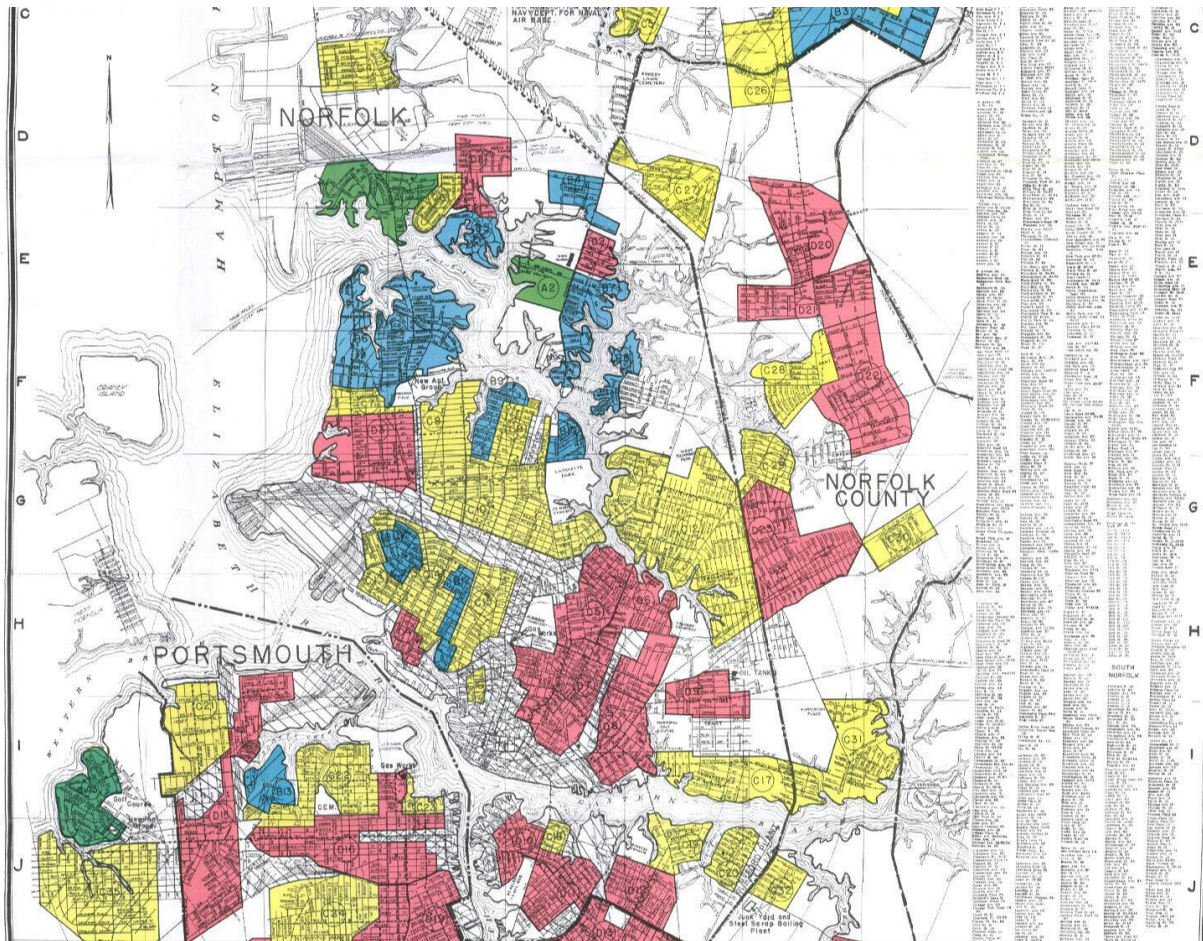
Figure 11: Norfolk's 1940 Redlining Map (Finn, 2018).

As described in the "Literature Review", in the 1930s and 1940s the US government engaged in redlining, a practice where neighborhoods were mapped and rated for desirability, primarily based on racial prejudice (Rothstein, 2017). Figure 11 shows the original redlining map for Norfolk and Figure 12 highlights census tracts 46 and 48. Census tract 48 was rated the worst for investment with a red "D" rating, and census tract 46 received slightly better as a yellow "C" rating but was still considered unfavorable for investment (Finn, 2018).

Following redlining, in the 1950s and 1960s the US employed a program known as urban renewal. Urban renewal was born out of a growing concern of substandard housing and poor living conditions and lifestyles these "blighted" and "slum" areas produced (Digital Scholarship Lab, 2018). Urban renewal began with positive intentions but ultimately led to a massive displacement of peoples as thousands of homes were destroyed without replacement or relocation assistance. Displaced populations and those most likely to face the harshest effects of urban renewal were people of color and/or low-income persons. Urban renewal in Norfolk displaced 5,194 families by the late 1960s, and 85% of these families were people of color (Digital Scholarship Lab, 2018). "Project No. 1" occurred partially in Census Tract 48 where

2,940 families were displaced, 99% of these families were of color (Digital Scholarship Lab, 2018).

Low-income persons and people of color are both considered to be socially vulnerable to natural disasters and were the most vulnerable to displacement in both redlining and urban renewal (Digital Scholarship Lab, 2018; Stafford & Abramowitz, 2016). Census tract 48 demonstrates how displacement operates in racialized geographic patterns. The displacement of people of color continually occurs in the St. Paul's area of Norfolk, reincarnated by new programs and projects, funded by the government, but at the expense of the socially vulnerable populations.
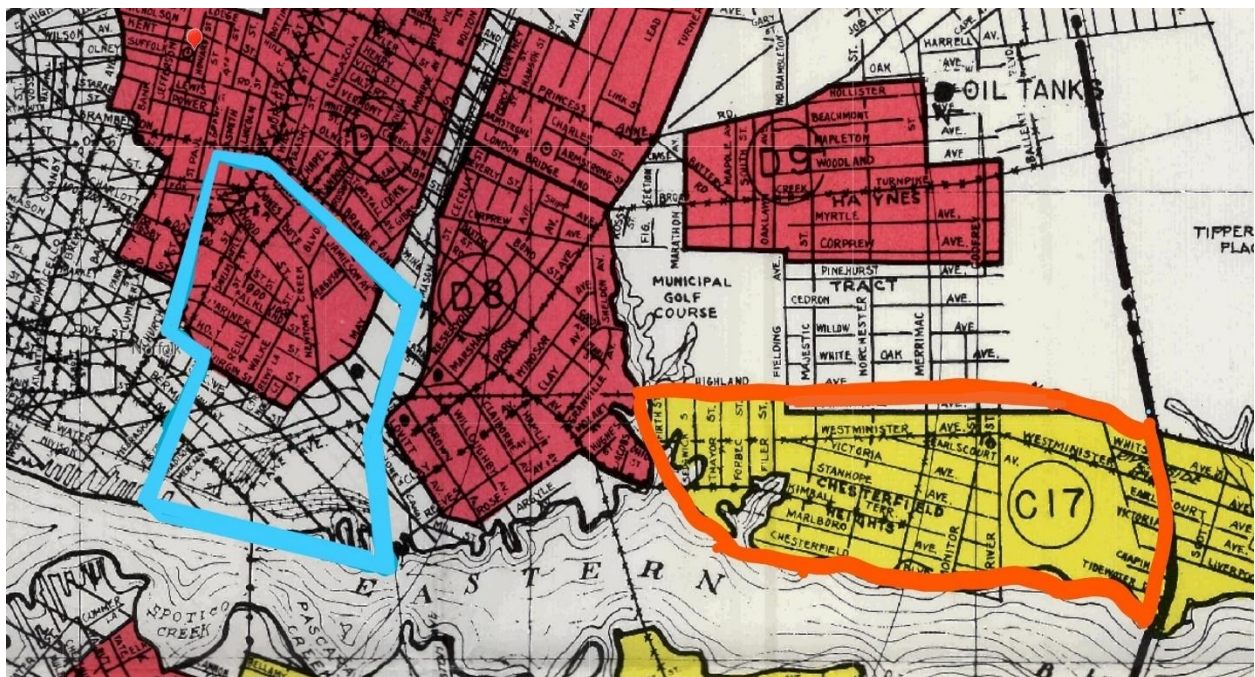
Figure 12: Norfolk's redlining map with Census tract 48 (left, in blue) and census tract 46 (right, in orange). The eastern lines for census tract 48 are approximate due to the current day boundaries being based on highway US-460 which was not present when the original redlining map was made in 1940. The eastern line was drawn based upon the census boundary limits placed on St. Paul's Blvd and E City Hall Ave (Finn, 2018; The City of Norfolk, 2020).

Findings

The analyses of the study areas showed that census tract 48, or the St. Paul's area, is a contentious topic due to its redevelopment lawsuit, the displacement of residents, and the overall details of the redevelopment. Census tract 46, or the Chesterfield Heights area, faces less criticism as the project is fundamentally different in planning and outcomes. Interviews revealed trends in both FEMA maps and Virginia's flood disclosure laws to be considered inadequate. The City of Norfolk still prevails and puts its best foot forward tackling flooding and prioritizing accommodating socially vulnerable communities.

FEMA Flood Maps Considered to Be Inadequate

Ben McFarlane of Hampton Roads District Planning Commission discussed in his interview that FEMA flood maps do not adequately explain flood risk and are in need of improvement. McFarlane explained that increasing flood disclosure is important, but disclosure without adequate maps would not fully be effective in explaining risk. He describes that maps for the Hampton Roads area are focused on storm surge models, and therefore mainly show flooding risk for events like major hurricanes, completely overlooking stormwater system flooding. McFarlane explained, "if you have a storm water system that is undersized, and it backs up or is poorly designed, that's not going to show up on those maps. Flooding can come from multiple directions, have multiple causes, and the maps aren't telling you the whole story" (B. McFarlane, personal communication, January 19, 2023).

Over the last two decades academic literature has continued to criticize the construction and use of FEMA's flood maps. Kousky (2018) identifies that FEMA's special flood hazard layers (SFHL, another name for the 1% flood layer) can lack up to date information for accurate flood predictions. Kousky notes that the drawing of hard lines of the SFHL allows builders and buyers to believe land immediately on the other side of the boundary is safe, when really these lines are flexible (Kousky, 2018). McFarlane also noted that the special flood hazard layer only shows the 1% annual chance storm, so it does not account for anything more frequent than that. He stated that these maps are created for the purpose of flood insurance, not a flood risk management program, and this may have some problematic implications for what they portray (B. McFarlane, personal communication, January 19, 2023). This anecdote also appears in academic literature, such as in a piece by Sarah Pralle (2019). Pralle writes, "because mapping takes place within the context of the National Flood Insurance Program, the conversation at the local level often centers on the costs of revising the flood hazard zones rather than the risks associated with flooding" (Pralle, 2019). Both statements from Praelle and McFarlane allude to how current flood maps are more focused on the financing of the aftermath of flooding rather than mitigating future flooding.

An older but still relevant study from Burby (2001) addresses that local governments have not done an adequate job of steering away development from flood zones, and the provision of flood insurance continues to allow new construction in these zones (Burby, 2001). This

argument could be applied to Norfolk since they have chosen to demolish and rebuild in the St. Paul's area. Virginia has recognized that between 2020 and 2080 potential flood loss will increase 1,300% from $0.4 to $5.1 billion (FEMA et al., 2022, p. 5:33). However, in Hampton Roads, where flooding will be the most costly and intense, flood insurance rates continue to fall in most jurisdictions. Hampton, Newport News, Williamsburg, Virginia Beach, Chesapeake, and Norfolk all saw decreases, among other jurisdictions. Norfolk saw a 4% decrease in policies between 2015 and 2021 (FEMA et al., 2022). Meanwhile, FEMA's NFIP is openly $20.5 billion in debt to the US Treasury (FEMA, 2022). FEMA and its NFIP are in dire need of rewiring and rethinking in order to address the upcoming damage and costs floods will entail. The Natural Resources Defense Council (NRDC) is a non-profit environmental agency that has already begun advocating for FEMA to improve their maps. NRDC has been rallying support from the scientific community as well as the general public to demand change. Most recently, they have created a petition demanding change that caused FEMA to call for public comment on their practices (NRDC, 2022).

Insufficient Flood Disclosure Laws in Virginia

Information regarding previous flooding is hard to come by in Norfolk, yet residents are expected to inform themselves on the matter. Virginia has been known for having laws that protect the seller over the buyer when it comes to flood disclosure. Prior to January 2022, Virginia did not have a requirement for those selling or renting a house to disclose any previous flood information to the prospective renter or buyer. The law states:

> Purchasers are advised to exercise whatever due diligence they deem necessary, including (i) obtaining a flood certificate or mortgage lender determination of whether the property is located in one or more special flood hazard areas, (ii) review of any map depicting special flood hazard areas, and (iii) whether flood insurance is required, in accordance with term and conditions as may be contained in the real estate purchase contract (NRDC, 2023).

Those living in a flood zone were required to purchase flood insurance, yet it was the buyer's responsibility to seek out this information. This lack of flood disclosure placed the responsibility on the dweller of the home rather than the seller or landlord, who most likely already has this information (NRDC, 2023).

Virginia made an important update to the law effective in January 2022. Virginia Code, Section 55.1-708.2, requires "the owner of residential real estate property located in the Commonwealth who has actual knowledge that the dwelling unit is a repetitive risk loss structure shall disclose such fact to the purchaser" (Commonwealth of Virginia, 2022). While this update is an improvement, the law is still problematic in ways. First, "repetitive risk" is defined as "two or more claims of more than 1,000 were paid by the National Flood Insurance Program within a

rolling 10-year period, since 1978" (Commonwealth of Virginia, 2022). This would appear to cover many cases of flooding; however, the term "actual knowledge" is debatable. "Actual knowledge" was defined in a Supreme Court decision in 2020 as "when a plaintiff is aware of the relevant facts, not when he should be" (Wessler et al., 2020). This statement allows sellers to not be held liable for transferring the knowledge of previous flooding, since sellers are not required to know when a property has flooded. It also gives sellers permission to claim they did not know about flooding in court. While this update requires disclosure of repetitive loss, it still does not require the seller to disclose if the home is in a floodplain and requires flood insurance. The Natural Resources Defense Council is currently taking on this issue by advocating for states to improve their disclosure laws and calling for a national flood disclosure requirement through the NFIP (NRDC, 2023).

In this capstone's previous "Methods: Limitations" section, the power of local knowledge is discussed as possibly the most robust source of flooding information for Norfolk, and therefore an impediment to any outsiders of the region. This limitation coupled with poor disclosure laws can present potential implications for those moving to Norfolk. A socially vulnerable family moving to Norfolk may lack this local knowledge and with the absence of realtors communicating about flood conditions, a scenario could arise where these vulnerable individuals buy or rent a house in a flood prone area without knowledge of potential risk. A costly flood can be the tipping point into financial turmoil for a low-income family with a tight budget.

Study Area Neighborhood Projects: Negative Outcomes for Socially Vulnerable Populations Occur When Protections are Non-Existent

The outcomes of flood risk management projects are highly dependent on their plans for socially vulnerable populations, and in this case, how they address housing. This was demonstrated by both study areas, census tract 46 and 48, containing neighborhood projects related to flood risk management. Census tract 48 has the St. Paul's Redevelopment Project and 46 has the Ohio Creek Watershed Project. However, the Ohio Creek Watershed Project does not include changes to housing (removing or adding) whereas St. Paul's Redevelopment is purposefully centered on redeveloping housing. Both census tracts have similarities in demographics, and both are considered socially vulnerable, but the residents of St. Paul's had more negative outcomes than the residents of Chesterfield Heights due to this difference in housing. Without necessary protections and prioritization of socially vulnerable populations, flood resiliency and housing redevelopment projects have the capability to leave these groups in worse positions than before.

Figure 13: A public housing complex located at Young Terrace. Taken by Molly Frey, January 10, 2023.

Prior to the approval of St. Paul's redevelopment, residents in the area's public housing were vocal about their feelings of discontent. These voices initially went unheard, and it took a lawsuit to enact change. In early 2020, residents from the St. Paul's Quadrant Tenant Group filed a lawsuit against Norfolk, NRHA, and HUD, and HUD's secretary Ben Carson. Residents claimed that it was Norfolk's racial segregation that forced Black residents into the areas they have been residing. Now, with the redevelopment project, Black residents are once again going to be displaced and deprived of economic resources and housing stability. They also argued that the redevelopment project will reduce the amount of affordable housing available for Black residents. They claim that these upcoming deprivations that the redevelopment will bestow upon Black residents is a violation of the Fair Housing Act and the Administrative Procedure Act (The US District Court For The Eastern District of Virginia—Norfolk Division, 2020).

I interviewed an associate professor of Geography and Department Chair of Sociology, Social Work, and Anthropology at Christopher Newport University, Johnny Finn to learn more

about this topic. Professor Finn was hired by the plaintiffs to write an excerpt report to help them reach a settlement in the St. Paul's court case. Finn says the court case began because the redevelopment planned on tearing down more units than it planned to rebuild, and it was doing so in a 2-4 year timeframe, a long time to be without housing. Finn states that because St. Paul's comprises public housing, it has the lowest median home value and median income for any census tract in Norfolk. However, St. Paul's is surrounded by some of the highest value commercial and residential real estate in Norfolk, including the Freemason Historic District, the MacArthur Center, Harbor Park Baseball Stadium, and the Neon District (J. Finn, personal communication, January 27, 2023). Finn explained that the principle is a rent gap, since developers can acquire this land cheaply and develop it to be highly profitable; demonstrating the protection and prioritization of capital over impoverished populations (J. Finn, personal communication, January 27, 2023). If the socially vulnerable populations of St. Paul's would have had legal protections to begin with, those impoverished populations may have been prioritized over capital gains.

St. Paul's Redevelopment repeats the same patterns of racialized displacement that has occurred for many decades within the St. Paul's area. The original plans for St. Paul's Redevelopment act similarly to urban renewal, where the government has prioritized demolition over rebuilding. The City of Norfolk's website describes the public housing communities of St. Paul's to be "obsolete" and that "the neighborhood experiences pervasive flooding, given an aged infrastructure system in need of replacement" (City of Norfolk & NRHA, 2021). Labeling the currently occupied affordable housing units in St. Paul's as obsolete is threatening to those that live there as well as diminishes the use value of these apartments in favor of exchange value. As the lawsuit stated, racialized planning practices are what landed Black residents in these areas in the first place (The US District Court For The Eastern District of Virginia—Norfolk Division, 2020). An aged infrastructure system does not cause flooding, but rather is one of many reasons St. Paul's has a tough time withstanding and recovering from a flood. Building new in a flood prone area raises concerns that several decades from now, these structures will deteriorate just like the public housing did. Perhaps buildings in Norfolk are fated to this life cycle, but if so, it will be crucial to plan for and include disadvantaged populations in these future plans.

The City of Norfolk states, "the apartments are physically isolated, lack some basic amenities, and do not present a community of opportunity despite their location next to downtown" (City of Norfolk & NRHA, 2021). If the purpose of the redevelopment was to solve these issues, the original plans should have done so for the residents affected by them. Fixing these problems by pushing out the previous low-income Black residents in service of higher income tenants promotes displacement, gentrification, racial segregation, and environmental racism. Finn addresses how the combination of less units being rebuilt and the placing of residents in other areas discredits the disruption of networks these residents face (J. Finn, personal communication, January 27, 2023). The previous Black residents can be forced into possibly worse housing conditions due to cost restrictions and separated from their friends, family, work, and what they call home. Finn commented on this, saying "research has shown that

disrupting highly vulnerable communities, especially in housing, has long-term effects. It disrupts social networks, informal networks of care, transportation and the reliance on public transit, childcare of neighbors and family members, and access to jobs" (J. Finn, personal communication, January 27, 2023). Even if residents are relocated to less vulnerable areas, they lose these networks of care.

The lawsuit was settled for $200,000, and included implementation of more housing, relocation assistance, and vouchers were expanded for those living in the neighborhood so that they could resettle in the new development with subsidies (The US District Court For The Eastern District of Virginia—Norfolk Division, 2020). In his interview, Chief Resilience Officer Kyle Spencer highlights that the St. Paul's Redevelopment is handled by the St. Paul's Transformation Office. Currently, the redevelopment plans for one-to-one replacement and rebuilding of units. The project is an effort to create a mixed-income neighborhood and rebuild away from the most flood prone parts of the area, which will be transformed into a blue/greenway where runoff will properly enter the Elizabeth River (City of Norfolk, 2021; K. Spencer, personal communication, March 20, 2023). Choice Neighborhood Vouchers have been introduced as an effort to help residents both return or locate elsewhere. The City of Norfolk created a program known as People First for the specific purpose of relocating original public housing residents both temporarily and permanently. The City is spending 3 million dollars a year to operate the program, which commits to following residents up to five years (K. Spencer, personal communication, March 20, 2023).

The outcomes of the court case have improved the situations of those originally living there, but the underlying structural issues of environmentally hazardous spaces and racialized poverty still persist. Finn pointed out the pre-existing long waiting list for vouchers, high percentages of Black populations, low household income, high poverty and childhood poverty rates contribute to a situation where "the status quo already was not acceptable" in St. Paul's (J. Finn, personal communication, January 27, 2023). He believes that remedying an area like St. Paul's requires examining "the underlying structural causes that create such profound patterns of racialized poverty, especially in urban spaces" coupled with massive public investment in low-income housing (J. Finn, personal communication, January 27, 2023).

Figure 14: A sign in Chesterfield Heights for the Ohio Creek Watershed Project. Taken by Molly Frey, January 10, 2023.

The Ohio Creek Watershed Project is useful in imagining a contrasting situation to St. Paul's Redevelopment. Intentional or not, by not having changes to housing, the Ohio Creek Watershed Project may be portraying what a flood risk management project would look like for a socially vulnerable community that was protected against displacement and disruptions. Those living in Chesterfield Heights and experiencing the construction of the Ohio Creek Watershed Project have not faced displacement like those who lived in Tidewater Gardens Apartments in St. Paul's and had their home destroyed. Kyle Spencer, Chief Resilience Officer for Norfolk's Office of Resilience, stated that the Ohio Creek project did not include housing changes due to Chesterfield Heights being a historically preserved neighborhood with an adequate housing stock (K. Spencer, personal communication, March 20, 2023). It could also be hypothesized that this outcome occurred due to the project originating from students focused on flood resilience instead of capital-oriented developers.

Even without explicit displacement, Finn discusses the possible limitations of the Ohio Creek Watershed Project in terms of gentrification. He notes that Chesterfield Heights is in better

condition than the St. Paul's area, but it is still a predominantly Black working-class neighborhood with relatively high levels of poverty compared to the rest of the City. Finn explains that "in the context of sea level rise, black and other non-white communities should reap the benefits of public spending infrastructure just as white communities do…But there is research in other cities like Philadelphia and Baltimore where these kinds of projects are essentially multipliers for the forces of gentrification" (J. Finn, personal communication, January 27, 2023). There is an "unintended consequence of kickstarting other economic processes that lead to gentrification related displacement" (J. Finn, personal communication, January 27, 2023). Finn summarizes that it is important to be making these infrastructure investments in predominantly minority and high poverty communities, but these improvements require awareness and caution about the displacement and gentrification that they may cause (J. Finn, personal communication, January 27, 2023).

Figure 15: Construction of the Resilience Park in the Chesterfield Heights/Grandy Village neighborhoods as a part of the Ohio Creek Watershed Project. Taken by Molly Frey, January 10, 2023.

This comparative analysis revealed several findings. Firstly, there is a crucial link between flood risk management and housing that should not be overlooked. Secondly, the treatment of St. Paul's residents prior to the lawsuit highlights that there are currently no legal protections that exist for socially vulnerable populations. Residents of St. Paul's had to argue for

reparations in court, showing that there is a necessity for legal action to protect these vulnerable groups. Without social vulnerability being recognized as an infringement to fair housing, the St. Paul's Redevelopment created plans with a focus on rebuilding for capital, not the original residents' wellbeing. The St. Paul's Redevelopment is a prime example of what happens when socially vulnerable communities are not put first. Whereas in the Ohio Creek Watershed Project, displacement is absent, since the housing stock was left alone.

Norfolk is a Leader in Flood Resiliency

Despite various opinions and challenges, it must be noted that Norfolk is considered to be a leader in flood resiliency, and they are taking steps to incorporate social vulnerability into their work. Chief Resilience Officer Kyle Spencer stated that most of the work the Office of Resilience does through federal or state grant programming requires certain populations, such as socially vulnerable populations, to be a target of their work. The Office of Resilience laid out their Resilience Strategy in 2015 with the goals of tackling flooding, deconcentrating poverty, strengthening neighborhoods, and creating new job opportunities. Spencer stated that their office focuses first on the most socially vulnerable populations through the use of DEQ or EPA index mapping products. He noted his office recognizes the previous patterns of racialized planning such as redlining in many Norfolk neighborhoods, and that his office is trying to break apart and undo these historical practices. Spencer highlighted that Norfolk has led the way in creating new zoning ordinances and codes in promotion of flood resiliency. Norfolk's flood zone ordinance requires new homes to meet certain height requirements, while the resilience quotient requires developers and builders to receive minimum flood resilience scores in order for site plans to be approved (K. Spencer, personal communication, March 20, 2023).

Norfolk as well as the greater Hampton Roads region works hard to recognize inadequacies and imbalances early on and address them head on. Ben McFarlane stated that the HRPDC is trying to fill in the gaps that FEMA flood maps have left. The HRPDC is currently working on producing maps for localities that show flood likelihood for smaller increments, like 1, 2, or 5 years. They create these with their own geospatial data in addition to FEMA's and any state provided data. McFarlane also described how the HRPDC is trying to improve real-time information distribution about flooding to improve safety by implementing roadway sensors to detect flooding. This could also contribute to overall flooding data by tracking patterns. The GPS driving app WAZE currently has a program where they provide the people of Norfolk phone updates on roadway flooding, and the HRPDC looks to do something similar to this. McFarlane stated that it is important for the HRPDC to address current risk while predicting future risk. Their ultimate goal is to provide localities the appropriate information and tools related to FRM to help inform their decision making process (B. McFarlane, personal communication, January 19, 2023).

Recommendations

     Recommendations are based upon the vision statement and divided into goals, objectives, and actions. This capstone brings together two typically separate areas of expertise, housing and flooding. Recommendations are intended for the client, the fair housing non-profit HOME of VA. All recommendations are rooted in improving fair housing standards by recognizing the disparate impacts of social vulnerability as a fair housing infringement. For this reason, some recommendations may appear to simply be about flooding, but their intended outcomes will improve fair housing conditions. All recommendations either directly or indirectly support fair housing.

VISION STATEMENT: To create changes in policy, planning, and programs for the purpose of furthering fair housing for socially vulnerable groups facing disparate impacts of floods.

This is rooted in the findings from Norfolk, VA, but is intended to create reparations for socially vulnerable populations elsewhere experiencing flooding or other natural hazards.

GOALS:
1. Expand legislation to recognize and protect socially vulnerable populations from the disparate impacts of flooding.
2. Promote local programs that incorporate flood resilience and social vulnerability.
3. Utilize education and research to further the framework of this capstone.

Goal 1: **Expand Legislation to Recognize and Protect Socially Vulnerable Populations from the Disparate Impacts of Flooding.**

Objective 1.1: Recognize Social Vulnerability as an Infringement to Fair Housing via AFFH.

In order to protect and provide adequate relief for socially vulnerable populations, fair housing legislation must acknowledge those affected by social vulnerability and mitigate their negative outcomes. The most practical method of achieving this goal is to add social vulnerability to HUD's proposed rule, "Affirmatively Furthering Fair Housing" or AFFH (HUD, 2023a). Since AFFH is a rule, it falls under the responsibility of HUD in the Executive Branch of the US government. AFFH not only requires jurisdictions receiving federal funds to attempt to eliminate discrimination, but to take meaningful actions to identify and remedy geographic patterns of racialized poverty or lack of opportunities or access, and so on (HUD, 2023a). Most recently, HUD has asked jurisdictions to describe these actions in an "Equity Plan" which gets included in their planning documents that renew every one to five years (such as comprehensive plans, annual action plans, or public housing agency plans) (HUD, 2022). If the new rule is accepted, the enforcement and contents of this document will ultimately be the responsibility of HUD. However, identifying necessary requirements of the proposed rule is useful in order to achieve this proposed goal.

Action 1.1.1: Begin establishing parameters for a new housing rule under AFFH that requires jurisdictions to document explicit discussion of environmental equity with respect to housing.

Action 1.1.2: Identify necessary requirements embedded in this new proposed rule, such as the identification of where socially vulnerable populations are located and what types of natural hazards affect them.

Action 1.1.3: Undergo rule making process with Congress in order to pass the new rule.

Action 1.1.4: When the proposed rule is approved, begin to analyze jurisdictions' reports to identify possible trends, connections, and conclusions.

Objective 1.2: Expand and Improve Flood Disclosure Laws.

Prospective buyers have a right to know their risks when choosing a home. Better transparency of flood risks could produce major cost savings for low-income individuals or families and could reduce the amount of people who are both socially vulnerable and at risk of flooding.
Virginia made a major improvement by adding the requirement to disclose if a dwelling unit has experienced two or more claims to the NFIP (NRDC, 2023). The current law, however, does not require the seller to disclose if the home is in a floodplain, which must be added. If this is not present, it places the responsibility on the buyer or renter to learn if they are in a floodplain and need flood insurance. This means a renter or buyer may not be fully aware of the risks or costs of living in a given home. This can be a determining factor for some prospective buyers.

A nationwide requirement would eliminate the absence of disclosure laws many states have and would bring uniform requirements, improving millions of Americans' housing safety conditions. The National Resources Defense Council is already advocating for this (NRDC, 2023). To see this through, a bill would have to be created, introduced, and undergo the process of becoming a law (US Congress, 2023). Not only would these proposed laws help socially vulnerable groups, but it can be argued that overall they would decrease infrastructure costs, injuries, and deaths associated with flooding. It would be easier to enact legislative change on the state level than the federal level, so while the national requirement would have a further reach, an expansion of the state requirements may be more practical.

Action 1.2.1: Advocate for the expansion of existing Virginia flood disclosure laws to require the disclosure of floodplain status to prospective buyers.

Action 1.2.2: Advocate for additional local requirements of realtors such as including flood insurance prices in the overall cost of a home.

Action 1.2.3: Advocate for a national flood disclosure requirement through the National Flood Insurance Program.

Objective 1.3: Urge FEMA to Improve Data and Release Schedule of Flood Maps.

While the National Flood Hazard Layer is not necessarily a piece of legislation, it is created by the governmental agency FEMA and holds power and authority similar to legislation. It is a highly powerful map since many localities across the country use it for flood risk management. It is one of the only nationally recognized flood maps and it determines who does and does not need flood insurance. However, stakeholder interviews mentioned that they are often considered to be lacking in accuracy and presentation of data as well as their ability to be released on schedule. Ben McFarlane specifically noted how localities could benefit from flood maps that show higher frequencies than just the 1% annual flood (B. McFarlane, personal communication, January 19, 2023). Additionally, there is a need for more data on the locations and identification of socially vulnerable populations, which could be added through map overlays.

This issue is becoming more visible; the NRDC is currently advocating for FEMA to improve their maps (NRDC, 2022). Improved maps would not only empower localities to make more informed decisions regarding flood risk management, but they would improve HOME's understanding of the intersections of flooding and social vulnerability, making it easier to draw conclusions and take action. Socially vulnerable populations cannot receive proper assistance if the location of flood prone areas and social vulnerability cannot be properly identified.

Action 1.3.1: Advocate for flood maps to include information on more frequent floods than the 1% annual flood (the 100-year flood).

Action 1.3.2: Advocate for FEMA flood maps to be released more frequently, particularly to be on schedule.

Action 1.3.3: Advocate for social vulnerability overlays on maps.

Action 1.3.4: Advocate for other relevant overlays, such as high concentrations of poverty, people of color, redlining, areas of urban renewal, or any other relevant data.

Goal 2: Promote Local Programs That Incorporate Flood Resilience and Social Vulnerability.

Objective 2.1: Continuation of Student Programs as a Tool for Creating Social Vulnerability and Flood Risk Management Plans.

Students are a great resource of creativity and productivity. Grant funding originally launched Hampton University and Old Dominion University students to create designs for the Ohio Creek Watershed Project (Garcia, 2016). The collaboration of university students in Norfolk to create designs and projects for flood resilience proved to be useful. Therefore, it would be advantageous to engage in community outreach to continue these types of programs with a specific focus on social vulnerability and housing. This objective is flexible, as HOME can choose the target community for this type of outreach. Norfolk could benefit from this program, but it also could be applied to Richmond or another area. This new program may require additional grant funding or reallocating of current funds. This capstone can be a reference point for the type of work to be completed.

This objective may encourage students to pursue careers in related fields, potentially expanding a given location's workforce and brainpower to improve flood resilience and fair housing. At the very least, it would allow an expansion of local knowledge and conditions of flooding and social vulnerability, which is a highly important tool previously discussed in this capstone's "Methods: Limitations: The Power of Local Knowledge".

> Action 2.1.1: Community engaged outreach to universities or schools to encourage projects related to fair housing, social vulnerability, and flooding.
>
> Action 2.1.2: Advocate for a recurring fund to be set up to support these programs (particularly relevant in Norfolk, where such a program has already seen success).
>
> Action 2.1.3: Educate students on social vulnerability, flooding, and fair housing.
>
> Action 2.1.4: Provide students with particular target areas or issues to be explored and solved through projects.

Objective 2.2: Expand Mobility Assistance to Account for Social Vulnerability and Flood Risk.

The previous objectives will produce new data sets for the identification and locations of socially vulnerable folks and flood prone areas. This presents an opportunity for HOME to provide assistance to improve the housing conditions of these folks, particularly through mobility assistance. HOME's "Move to Opportunity" program helps voucher recipients find neighborhoods that are appropriate and favorable to them (HOME of VA, 2023). This program can be expanded to help accommodate voucher recipients who have faced repeated flooding to relocate in neighborhoods with improved opportunities and less flood risk. This accommodation can be added to the program by adding application questions about resident's experience with flooding in their current dwelling. Applicants may also be asked to indicate and rank negative and positive housing-related factors that matter to them when relocating to a new neighborhood. If applicants indicate flooding as one of their highest concerns, new neighborhoods will be selected for them that are less flood prone. If applicants indicate they experience frequent flooding but do not rank flooding as their highest concern, their proposed relocation neighborhood may not eliminate those with potential risk, but information about flood risk would be provided.

Actions 2.2.1: Add application questions about applicants' experiences with flooding in their current residence. Assess their priorities and preferences in housing-related factors, including flooding.

Action 2.2.2: When identifying new neighborhoods for the applicant, take into account flood risk via flood maps. Try to identify areas that are less flood-prone than their previous neighborhoods.

Action 2.2.3: Educate the applicant about the potential flood risks of their new neighborhood.

Goal 3: Utilize Education and Research to Further the Framework of This Capstone.

Objective 3.1: Educate Renters and Homeowners on Flood Risk and Resilience Through Workshops and Pamphlets.

Knowledge is powerful in both the worlds of flood resilience and fair housing. HOME already provides educational workshops on housing-related topics. For instance, their "Housing Stability Workshop" allows the public to learn virtually about their entitled fair housing rights, tenant responsibilities, how to contest eviction, and housing stability resources, amongst other topics (HOME of VA, 2023). Providing a workshop about flood resilience would educate renters and homeowners alike on their rights, risks, and ways they can prepare, react, and recover from flooding. This advice would come from a fair housing perspective and would aim to be helpful particularly for socially vulnerable folks. Attendees would be pointed in the direction of resources such as flood maps, flood insurance, and so on. Renters could learn about how to talk to their landlord about flooding and conditions of their lease, while homeowners may be educated on ways they can make physical improvements to their house to better withstand flooding. Additionally, pamphlets on these topics can be made available online or in-person. HOME will likely need to conduct research or possibly outsource personnel to teach this workshop, however this is necessary for HOME to branch out into the intersections of environmental justice and fair housing.

> Action 3.1.1: Begin compiling learning materials for the workshop through research, potentially appoint an expert to teach the class.
>
> Action 3.1.2: Identify information that would be helpful to renters and homeowners on flood resilience, while keeping in mind how this information would be pertinent to vulnerable populations.
>
> Action 3.1.3: Begin offering classes online. Construct and distribute pamphlets.
>
> Action 3.1.4: Encourage attendees to provide feedback and follow up on if they found the course useful and how they might have used their newfound knowledge. Adjust course as feedback is received.

Objective 3.2: Continuation of this Capstone's Framework via Future Research.

This capstone proposes many new ideas that are beyond the scope of time and resources to fully research or draw conclusions from. The idea that the disparate impacts of floods are a fair housing infringement to socially vulnerable populations is a powerful idea but one that needs further research and evidence, especially in other places besides Norfolk. If socially vulnerable groups, and groups defined by a legally protected characteristic, are limited to environmentally hazardous neighborhoods, they are not being meaningfully included in that community. Researchers should explore this question in the future, since this project only explored the conditions of two socially vulnerable census tracts, not the entirety of Norfolk or other areas. A comprehensive analysis is needed to assess if the majority of the socially vulnerable population in Norfolk lives in a flood area. Similarly, there is a serious fair housing issue if those in search of affordable housing are limited to primarily living in flood prone areas. Once something like this can be proven, it would be advantageous for researchers to apply this theory elsewhere to create a compelling argument for social vulnerability as a fair housing issue. This would lay the groundwork for creating a proposed rule for the AFFH as well.

Action 3.2.1: Complete a comprehensive analysis of Norfolk to see if the majority of the socially vulnerable populations live in a floodplain.

Action 3.2.2: Research how much affordable housing is limited to flood prone areas in Norfolk.

Action 3.2.3: Collaborate with researchers elsewhere to understand patterns of disparate impacts of natural hazards to socially vulnerable areas.

Action 3.2.4: Bring awareness to the intersections of fair housing and environmental hazards and the necessity to conduct further research on social vulnerability and housing.

Implementation

       The implementation table shows how goals, objectives, and actions would take place. "Responsible Parties/Suggested Partners" include details on other organizations HOME either has to coordinate with or would benefit from working together. Recall that the National Resources Defense Council (NRDC) was identified as already advocating for many policies this capstone recommends, and therefore they are suggested several times as suggested partners. Other advocacy groups doing similar work could also be considered potential partners as well. "Local research specialists" can be understood as in-house researchers for HOME or otherwise. "Researchers elsewhere" entails researchers in a location with similar conditions of social vulnerability and natural hazards. "Required Action Category" describes the type of necessary action that must take place, and the four categories are detailed below. The "Time Range" column includes the predicted amount of time that the action will take, and the three timeframes are described below. Timeframes are flexible, and some actions show a range of possible timeframes (i.e. S-M). Many actions are policy based and therefore challenging to predict. Additionally, some policy changes are already underway so they may be likely to have shorter timeframes compared to newly proposed policy.

Action Categories:
> **Advocate policy**
>
> **Research/analysis**
>
> **Community outreach**
>
> **Education/awareness**

Approximate Time Ranges:
> **S**= Less than 2 years
>
> **M**= 2-5 years
>
> **L**= 5+ years

Implementation Table

	Action	Responsible Parties/ Suggested Partners	Required Action Category	Time Range: S / M / L
	Objective 1.1: Recognize social vulnerability as an infringement to fair housing via AFFH.			
GOAL 1: Expand legislation to recognize and protect socially vulnerable populations against the disparate impacts of flooding	**Action 1.1.1**: Begin establishing parameters for a new housing rule under AFFH that requires jurisdictions to document environmental equity with respect to housing.	HUD	Advocate policy	S
	Action 1.1.2: Identify components of proposed rule. Such as the identification and location of socially vulnerable populations and the natural hazards that affect them.	Research specialists elsewhere	Advocate policy Research/analysis	S
	Action 1.1.3: Undergo rule making process with Congress.	HUD, US Congress	Advocate policy	S-M-L
	Action 1.1.4: Upon approval, begin to analyze jurisdictions' reports to identify possible trends, connections, and conclusions.	Research specialists elsewhere	Research/analysis	L
	Objective 1.2: Expand and improve flood disclosure laws.			
	Action 1.2.1: Advocate for the expansion of existing Virginia flood disclosure laws to require the disclosure of floodplain status to prospective buyers.	NRDC	Advocate policy	S-M
	Action 1.2.2: Advocate for additional local requirements of realtors such as including flood insurance prices in the overall cost of a home.	Local government	Advocate policy	S-M

	Action 1.2.3: Advocate for a national flood disclosure requirement through the National Flood Insurance Program.	NRDC	Advocate policy	S-M
	Objective 1.3: Urge FEMA to improve data and release schedule of flood maps.			
	Action 1.3.1: Advocate for flood maps to include more frequent flooding information than 1% annual flood (the 100-year flood).	NRDC	Advocate policy	M-L
	Action 1.3.2: Advocate for FEMA flood maps to be released more frequently and on schedule.	NRDC	Advocate policy	S-M
	Action 1.3.3: Advocate for social vulnerability overlays on maps.	NRDC	Advocate policy	S-M
	Action 1.3.4: Advocate for other relevant overlays (i.e. concentrations of poverty, people of color, redlining, urban renewal, etc.)	NRDC	Advocate policy	S-M

GOAL 2: Promote local programs that incorporate flood resilience and social vulnerability	**Objective 2.1: Continuation of student programs as a tool for creating social vulnerability and flood risk management plans.**			
	Action 2.1.1: Community engaged outreach to universities or schools to encourage projects related to fair housing, social vulnerability, and flooding.	Local government, local schools	Community outreach Education/awareness	S
	Action 2.1.2: Advocate for a recurring fund to support these programs.	Local government	Community outreach Advocate policy	S-M
	Action 2.1.3: Educate students on social vulnerability, flooding, and fair housing.	Local schools	Community outreach Education/awareness	S
	Action 2.1.4: Provide students with particular target areas or issues to be explored and solved through projects.	Local schools	Community outreach Education/awareness	S
	Objective 2.2: Expand mobility assistance to account for social vulnerability and flood risk.			
	Action 2.2.1: Add application questions about flooding in current residence. Assess applicants' priorities and preferences in housing-related factors, such as flooding.		Community outreach	S

	Action 2.2.2: Identify new neighborhoods for applicant that account for flood risk, identify less flood prone areas.		Community outreach	S
	Action 2.2.3: Educate applicants about the potential flood risks of their new neighborhood.		Community outreach Education/awareness	S
	Objective 3.1: Educate renter homeowners on flood risk and resilience through workshop and pamphlets.			
	Action 3.1.1: Begin compiling learning material for the workshop, potentially appoint an expert to teach the class.	Experts in flood resilience, local research specialists	Education/ awareness Research/analysis	S
	Action 3.1.2: Identify information that would be helpful to renters and homeowners on flood resilience, particularly information pertinent to vulnerable populations.	Experts in flood resilience, local research specialists	Education/ awareness Research/analysis	S
	Action 3.1.3: Begin offering classes online. Construct and distribute pamphlets.	Experts in flood resilience	Community outreach Education/ awareness	S
GOAL 3: Utilize education and research to further the framework of this capstone.	**Action 3.1.4**: Encourage attendees to provide feedback about course and what was useful. Adjust course as feedback is received.		Research analysis	M
	Objective 3.2: Continuation of this capstone's framework via future research.			
	Action 3.2.1: Complete a comprehensive analysis of Norfolk to see if the majority of the socially vulnerable populations live in a floodplain.	Local research specialists	Research/analysis	S
	Action 3.2.2: Research how much affordable housing is limited to flood prone areas in Norfolk.	Local research specialists	Research/analysis	S
	Action 3.2.3: Collaborate with researchers elsewhere to understand patterns of disparate impacts of natural hazards to socially vulnerable areas.	Local research specialists, research specialists elsewhere	Research/analysis	M
	Action 3.2.4: Bring awareness to the intersections of fair housing and environmental hazards and the necessity to conduct further research on social vulnerability and housing.	Local research specialists, research specialists elsewhere	Research/analysis Education/ awareness	M

Conclusion

The disparate effects that socially vulnerable populations face during flooding is a fair housing infringement due to the inextricable link between housing and flooding. Socially vulnerable populations are composed of vulnerable groups such as people of color and low-income persons. In the case of Norfolk, Virginia, this newfound inequality and the related factors that contribute to it are demonstrated through the findings. The study areas 46 and 48 both contain projects related to flood risk management but handle housing differently. Census tract 46 focuses on non-housing related improvements while census tract 48 and the larger St. Paul's area portrays the patterns of racialized placement and displacement in environmentally hazardous areas. Stakeholder interviews further illuminate the current innovations in Norfolk as well as larger concerns with flood risk management, such as criticism of FEMA maps and flood disclosure laws. The recommendations address the importance of updating policies and programs to reflect how social vulnerability can be understood as a fair housing issue. Most notably, adding the disparate impacts of natural hazards to socially vulnerable populations to HUD's Affirmatively Furthering Fair Housing Rule, and expanding legislation to include all natural hazards in affected cities of the United States.

References

Center for Coastal Resources Management, & College of William & Mary. (2016, July 21).

    Virginia Vulnerability Viewer.

    https://cmap2.vims.edu/SocialVulnerability/SocioVul_SS.html

City of Norfolk. (2022a). *Facts About Norfolk*. City of Norfolk.

    https://www.norfolk.gov/430/Facts-About-Norfolk

City of Norfolk. (2022b). *Ohio Creek Watershed Project*. City of Norfolk.

    https://www.norfolk.gov/3867/Ohio-Creek-Watershed-Project

DHR. (2022, May 10). *Chesterfield Heights Historic District*. Virginia Department Historic

    Resources. https://www.dhr.virginia.gov/historic-registers/122-1201/

Digital Scholarship Lab. (2018). *Renewing Inequality*. Family Displacements through Urban

    Renewal 1950-1966.

    https://dsl.richmond.edu/panorama/renewal/#view=0/0/1&viz=cartogram&city=norfolkV

    A&loc=15/36.8521/-76.2789&project=1616

Dillman, J. (2020, November 5). *HUD's New Affirmative Furthering Fair Housing and*

    Disparate Impact Rules. Fair Housing Project.

    https://www.fairhousingnc.org/newsletter/huds-new-affirmative-furthering-fair-housing-

    and-disparate-impact-rules-go-into-effect/

ESRI. (2022). *Hybrid Reference Layer* [Map].

    https://cdn.arcgis.com/sharing/rest/content/items/30d6b8271e1849cd9c3042060001f425/r

    esources/styles/root.json

Fainstein, S. S. (2015). Spatial Justice and Planning. In S. S. Fainstein & J. DeFilippis (Eds.),

    Readings in Planning Theory (pp. 258–272). John Wiley & Sons, Ltd.

https://doi.org/10.1002/9781119084679.ch13

FEMA. (2021). *FEMA's National Flood Hazard Layer (NFHL) Viewer* [ArcGIS].

https://hazards-

fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5

529aa9cd

Finn, J. (2018). *Redlining in Virginia* [ArcGIS].

https://www.arcgis.com/apps/View/index.html?appid=909e8528cd3a4df190756596dcf5d

693

Finn, J. (2023, January 27). *Johnny Finn Interview* [Zoom].

Geonzon, J. (2021, April 29). *Norfolk's New Energy: The City's Latest Plans Create Problems*

for Its Longest Residents | Pulitzer Center. Pulitzer Center.

https://pulitzercenter.org/stories/norfolks-new-energy-citys-latest-plans-create-problems-

its-longest-residents

HOME of VA. (2023). *Move to Opportunity*. HOME of VA. https://homeofva.org/get-

help/move-to-opportunity/

HOME of VA. (2022). *Our Mission*. HOME of VA. https://homeofva.org/who-we-are/our-

mission/

HOME of VA. (2023). *Fair Housing*. HOME of VA. https://homeofva.org/get-help/fair-housing/

HOME of VA. (2023). *Resources*. HOME of VA. https://homeofva.org/get-help/resources/

HUD. (2023). *Affirmatively Furthering Fair Housing*. HUD.Gov / U.S. Department of Housing

and Urban Development (HUD). https://www.hud.gov/AFFH

Laska, S., & Morrow, B. H. (2006). Social Vulnerabilities and Hurricane Katrina: An Unnatural

Disaster in New Orleans. *Marine Technology Society Journal*, *40*(4), 16–26.

https://doi.org/10.4031/002533206787353123

Lee, J. Y., & Van Zandt, S. (2019). Housing Tenure and Social Vulnerability to Disasters: A

Review of the Evidence. *Journal of Planning Literature*, *34*(2), 156–170.

https://doi.org/10.1177/0885412218812080

McFarlane, B. (2023, January 19). *Interview with Ben McFarlane of Hampton Roads Planning*

District Commission [Interview].

Morrison, A., Westbrook, C. j., & Noble, B. f. (2018). A Review of the Flood Risk Management

Governance and Resilience Literature. *Journal of Flood Risk Management*, *11*(3), 291–

304. https://doi.org/10.1111/jfr3.12315

NAACP. (2021, August 16). *Turning the Tide: Advancing Racial Justice in Federal Flood*

Infrastructure Projects | NAACP. https://naacp.org/resources/turning-tide-advancing-

racial-justice-federal-flood-infrastructure-projects

NRDC. (2022, January 27). *NRDC Pushes FEMA for Climate-Smart Flood Maps and Standards*.

https://www.nrdc.org/bio/joel-scata/nrdc-pushes-fema-climate-smart-flood-maps-and-

standards

NRDC. (2023). *How States Stack Up On Flood Disclosure*.

https://public.tableau.com/views/FloodRiskDisclosureLaws_Final_2020_02_17/Revised?

:embed=y&:showVizHome=no&:host_url=https%3A%2F%2Fpublic.tableau.com%2F&:

embed_code_version=3&:tabs=no&:toolbar=no&:animate_transition=yes&:display_stati

c_image=no&:display_spinner=no&:display_overlay=yes&:display_count=yes&:langua

ge=en&:loadOrderID=0

Rothstein, R. (2017). *The Color of Law*. Liveright Publishing.

Sanyal, B., Teitz, M., Rosan, C. D., Fishman, R., Hack, G., Sagalyn, L. B., Fischler, R., Fischler,

R., Vale, L. J., & Beatley, T. (2012). *Planning Ideas That Matter: Livability,*

Territoriality, Governance, and Reflective Practice. MIT Press.

http://ebookcentral.proquest.com/lib/vcu/detail.action?docID=3339462

SeniorNavigator. (2023). *Assisted-Rental Housing, Grandy Village*.

https://powhatan.seniornavigator.org/program/16567/assisted-rental-housing-grandy-

village

Stafford, S., & Abramowitz, J. (2016). An Analysis of Methods for Identifying Social

Vulnerability to Climate Change and Sea Level Rise: A Case Study of Hampton Roads,

Virginia. *Natural Hazards*, *85*, 1089–1117. https://doi.org/10.1007/s11069-016-2622-4

The City of Norfolk. (2020). *Census Tracts 2020*. https://norfolkgisdata-

orf.opendata.arcgis.com/datasets/ORF::census-tracts-2020/about

US Census Bureau. (2020). *Census Tract 48, Norfolk city, Virginia*. United States Census

Bureau. https://data.census.gov/cedsci/profile?g=1400000US51710004800

Virginia Department of Conservation and Recreation, & Office of Governor Ralph S. Northam.

(2021). *Virginia Coastal Resilience Master Plan*.

https://www.dcr.virginia.gov/crmp/document/virginiacoastalresiliencemasterplan.pdf

Virginia HUD. (2018). *Analysis of Impediments to Fair Housing Choice in the Commonwealth*

of Virginia. https://www.dhcd.virginia.gov/sites/default/files/Docx/consolidated-

plan/analysis-of-the-impediments-to-fair-housing.pdf