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Introduction to GIS Methods
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Demographic and Socioeconomic Changes to Houston's Urban Fabric, Post Hurricane Katrina

One Sentence Project Summary

I analyze demographic and socioeconomic changes to Houston's population between 2000 and 2010, shedding light on not only the widespread and long-lasting impacts of Hurricane Katrina, but also the prominence of race and socioeconomic circumstance in shaping citizens' vulnerability to natural disasters.

Purpose and Background

New Orleans (NOLA) has a history of infrastructural developments needing improvement—especially in protecting against water-based natural disasters—and complicated racial dynamics that characterize its urban experience. Analyzing the defining, physical features of this site, its consequent dispositions and vulnerabilities to water, and its broader community history reveal the city's dire need for targeted planning, with the goal of adaptability in mind. Such planning is not intended for a static, stable system but rather aims at building *resiliency*: an ability, for various segments of an urban population, to bounce back from inevitable environmental dangers, such as Hurricane Katrina.

The catastrophe of Hurricane Katrina revealed a stark difference between the treatment of poor black communities and that of poor white ones. In New Orleans, eighty percent of the households located in the areas that were flooded by the storm were black. Every one of the public housing tenants displaced by the storm was black, too. Specifically, New Orleans had forty-seven census tracts characterized by *extreme*

poverty—where at least forty percent of the households have below-poverty incomes—and thirty-eight of them were flooded by the hurricane. These staggering statistics reveal a strong relationship between race, home ownership—which has ties to income—and susceptibility to environmental hazard. They also underscore the importance of reconciling the ways in which such systems of racial and socioeconomic oppression leave its victims in unjust conditions where they remain excruciatingly vulnerable to any kind of potential hazard, especially in moments of environmental despair. While white, higher-income individuals who had to relocate were more likely to move nearby (New Orleans metropolitan areas), black, low-income displaced residents were more likely to live in distant locations; Houston served as the predominant site to which these families were displaced, and welcomed too. The social demographics of its metropolitan area were also thereby altered by Hurricane Katrina, and directly shaped by the interplay between NOLA's racial and socioeconomic demographics in the aftermath of the storm.

Literature Review

In a period of rebuilding multiple facets of New Orleans's community—through infrastructure, resilience, and identity redevelopment efforts—it is important to acknowledge literature that reconciles these nuances, and approach them from different perspectives. In "Katrina's Window: Localism, Re-Segregation and Equitable Regionalism," David Troutt sheds light on legal localism as a modern manifestation of racial segregation, "an instrument effectively shielded from constitutional attack by the proxy of economic discrimination." He asserts the interconnectedness between the region's racial history, political structures that failed to protect its inhabitants, and consequent maintenance of racial and economic stratification that left low-income, black families in particular, in a position of extra susceptibility to the detriments of the storm.

Further, Troutt establishes the central role that consumption and access to amenities play in the racial distribution of homes—as the "primary means" by which

individuals with disposable wealth choose to live.” Though Lower Manhattan and New Orleans differ in financial drivers, economic activity, and directly comparable racial and cultural make-up, thematic similarities can be drawn between the urban recovery efforts made in both sites. In *Creating Battery Park City: Building a Landmark on Landfill*, Gregory Smithsimon presents discourse around the development of Battery Park City residential complexes, spanning the positive and negative extents to which the area is inclusive and commercially integrative, while also recognizing the inherent exclusionary premise on which these complexes were built. Smithsimon’s claims thematically align with those of Troutt, as he asserts that this mindset of exclusion manifests in Battery Park City’s social design, posing barriers with socioeconomic isolationary consequences, making it difficult to penetrate for anyone outside of the right social and wealth circles. Yet, it is important to recognize how Troutt takes his argument one step further, asserting not merely that such exclusion exists, but also that segregation is “concealed as an aspect of the [housing] market,” increasingly unchallenged, and perhaps forgotten, by the dominating culture of consumption.

Undoubtedly, the prioritization of private interests, and convenient consumption catering to the wealthier (and thereby, implicitly white) communities in New Orleans, has shaped the physical urban form of the region, and had ramifications in the aftermath of Hurricane Katrina. This prioritization, over the demonstrated needs of a larger, diverse body of vulnerable constituents—in both New Orleans and Manhattan—not only fosters exclusivity and limits diversity, but also exacerbates existing socioeconomic, and therefore racial, stratification in the urban fabrics of the respective regions. It also had a large impact on the displacement of individuals (black, and low income in particular) from New Orleans to Houston. In “Experiences of Hurricane Katrina Evacuees in Houston Shelters: Implications for Future Planning,” Mollyann Brodie presents results from a survey conducted of hurricane evacuees housed in Houston shelters just two weeks after the storm struck. In sharing the disproportionate numbers of evacuees as African American, as low-income, and as having no health coverage, she emphasizes the dire need for greater, targeted

attention and support against natural disasters, for this particular subset of any urban population, at risk to environmental (or even other) kinds of hazard.

Altogether, this scholarship highlights the demographic and socioeconomic urban dynamics of New Orleans, and implicit de-prioritization of black, low income individuals, who were disproportionately impacted by Hurricane Katrina as a result of inadequate urban planning and programming to support their demonstrated needs.

Data (Tables used are italicized below).

DP-1 Profile of General Demographic Characteristics: 2000
Census 2000 Summary File 1 (SF 1) 100-Percent Data

Profile of General Population and Housing Characteristics: 2010
2010 Census Summary File 1

- These two tables were used in the creation of 4 pairs of side-by-side maps, displaying total number counts, and also in calculating percentages of Houston's black and white population for census tracts in 2000 and 2010.

SELECTED ECONOMIC CHARACTERISTICS
2006-2010 American Community Survey 5-Year Estimates

Profile of Selected Economic Characteristics: 2000
Census 2000 Summary File 3 (SF 3) - Sample Data

- These two tables were used in the creation of 1 pair of side-by-side maps, displaying median household income for Houston's census tracts. There was not an equivalent table to the "Profile of Selected Economic Characteristics" in the 2010 decennial, but I was able to find the data through ACS instead.

Methodology

My initial plan was to compare racial and socioeconomic data in New Orleans between 2000 and 2010 (5 years prior and post Hurricane Katrina) to analyze changes in its urban fabric over time, affected in part by the storm. After pouring through several tables on American Fact Finder, I realized that the census tract boundaries vary drastically between each decade, that New Orleans subdivides its region by parishes instead of counties, and that there was not a viable shapefile for me to use from 2000. So, I pivoted directions: while still preserving my goal of examining the importance of resilience, urban planning, and racial and socioeconomic dynamics in vulnerability towards natural disasters, I began to look at scholarship and data around the site to which most of NOLA's black population was displaced: Houston.

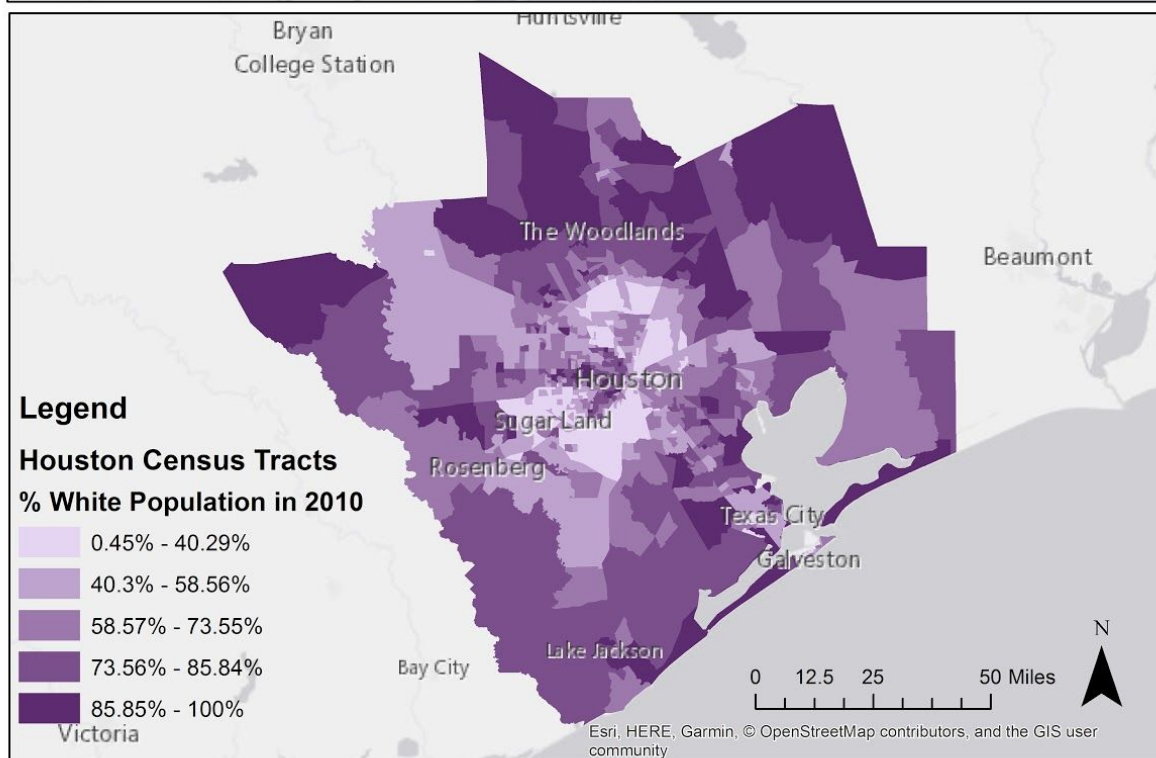
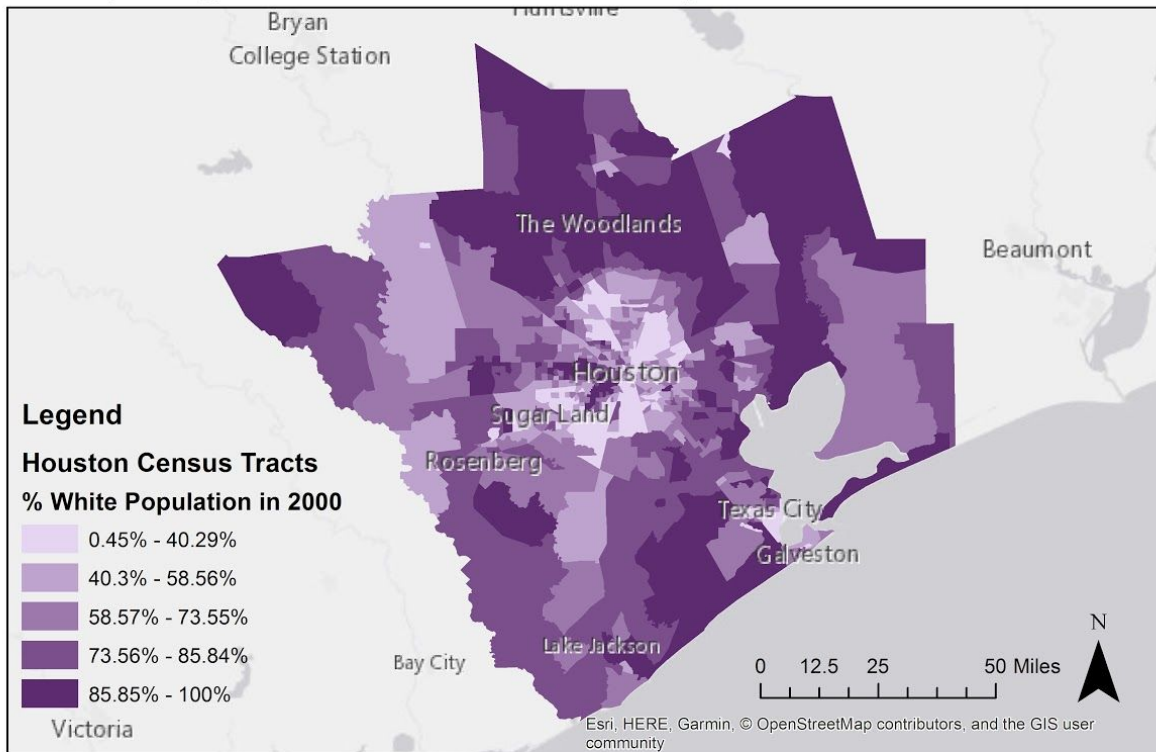
I downloaded my data from American Fact Finder. Since I was going to be creating a series of side-by-side choropleth maps, it was important for me to identify comparable tables that examined my variables of interest. I chose to use choropleth maps as they seemed to be the most impactful in visually revealing changes over a period of time. I paid particular attention to the ranges, such that viewers could easily identify changes between the two maps as time increased.

I chose to remove the boundaries of the individual census tracts to maximize the impact of the visual changes to the variable in question (black population, median income etc.). I also thought it looked more aesthetically appealing, and provided the viewer with a much more seamless experience in comprehending the information shared by the map. In each of the choropleth maps, I chose to put the 2000 data frame above the 2010, because it seemed more chronological and natural for viewers to read the data from top to bottom, reflecting that the information is representative of evolution over time. Lastly, in the four pairs of side-by-side maps that depicted racial data, I maintained similarity in the color scheme to help make it easier for the reader to recognize which maps convey information about Houston's black population (various shades of purple to reflect percentages and total counts) and

Houston's white population too (various shades of pink/red to reflect percentages and total counts).

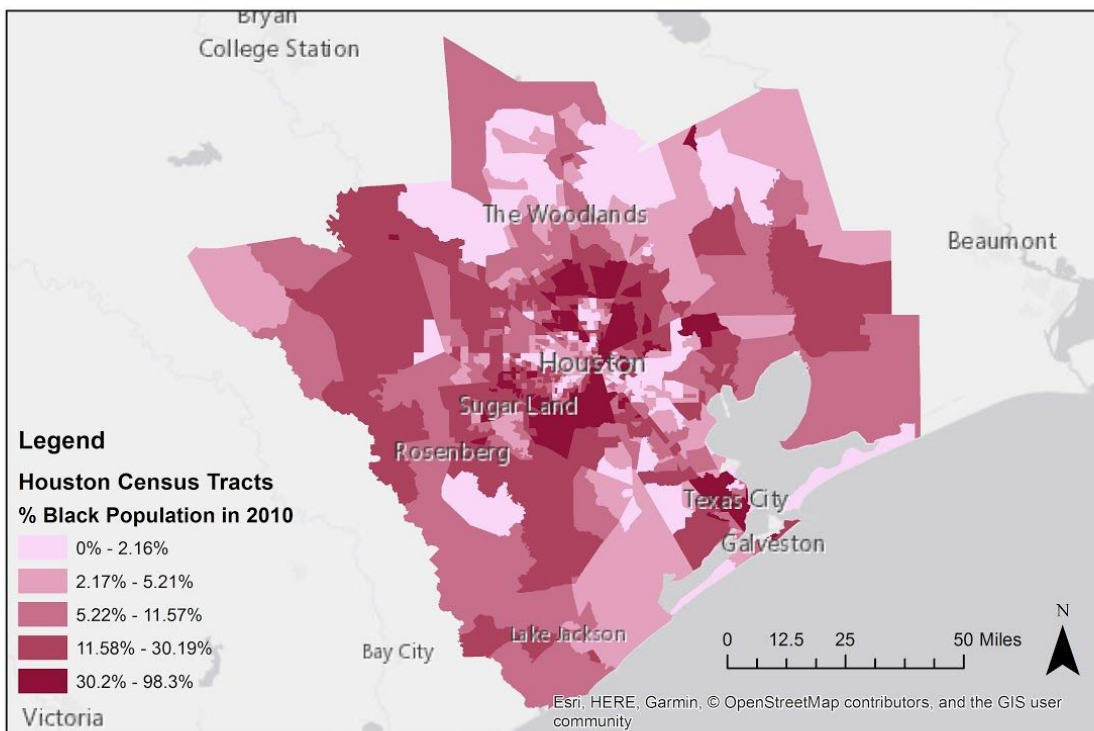
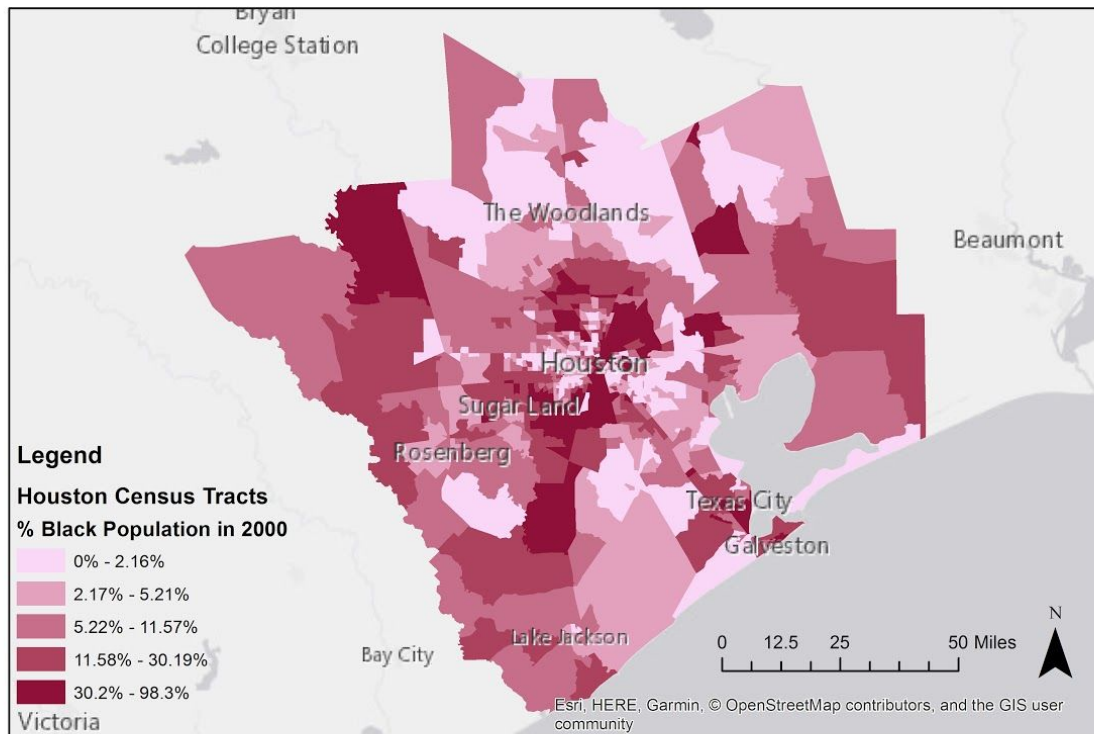
Findings (see below).

Comparing % of Houston's White Population in 2000 vs. 2010



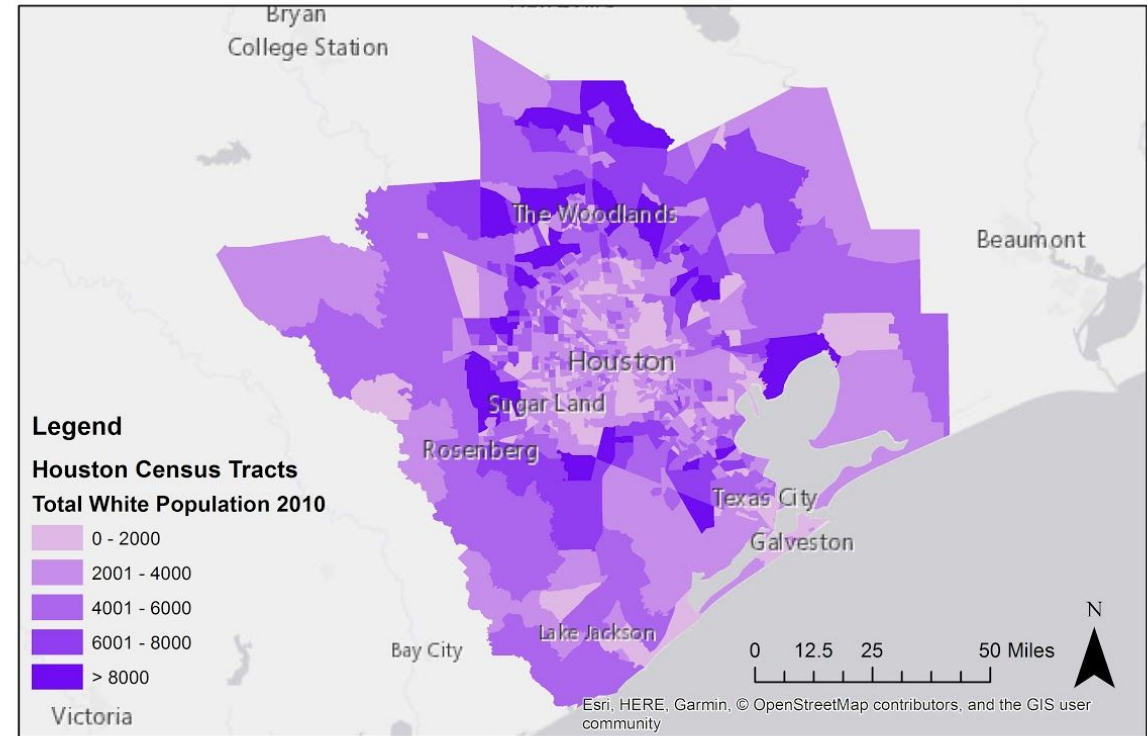
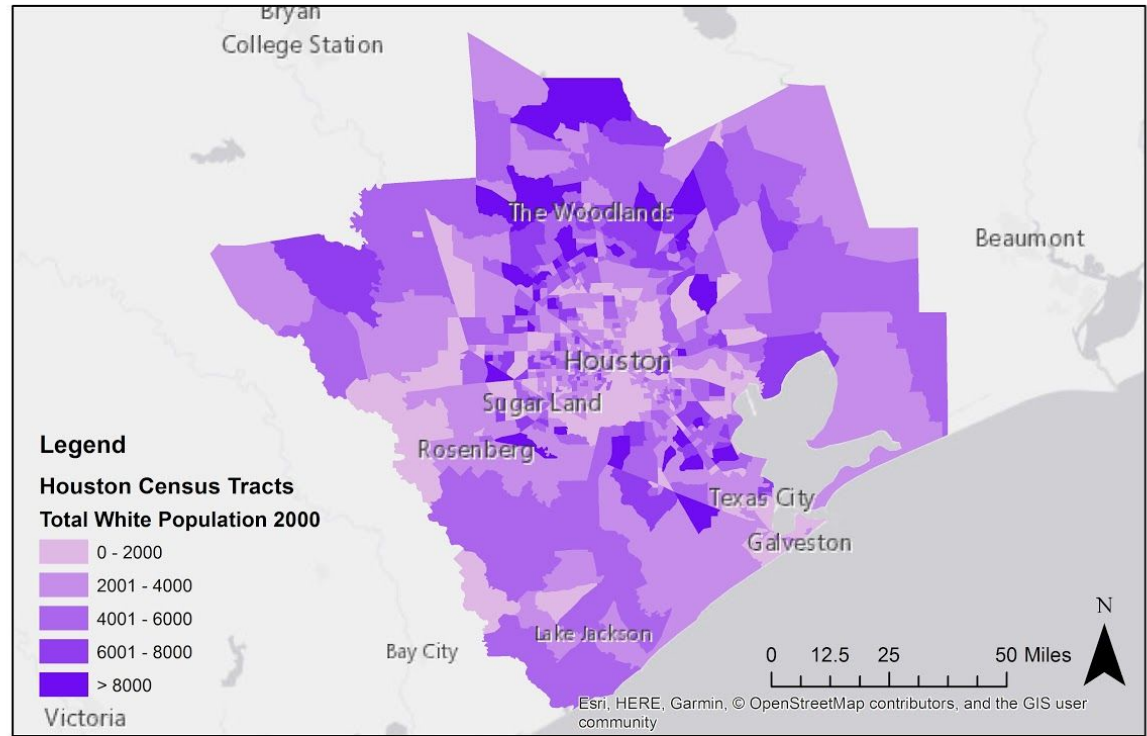
Source: U.S. Census, 2000 and 2010

Comparing % of Houston's Black Population in 2000 vs. 2010



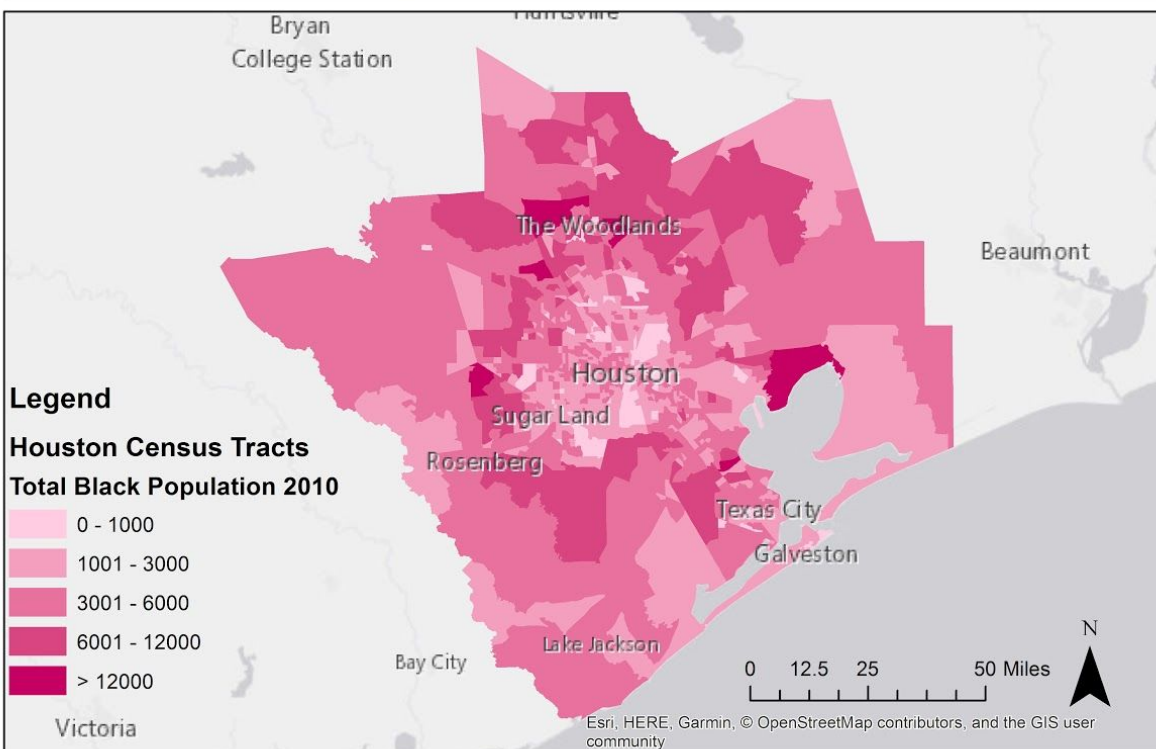
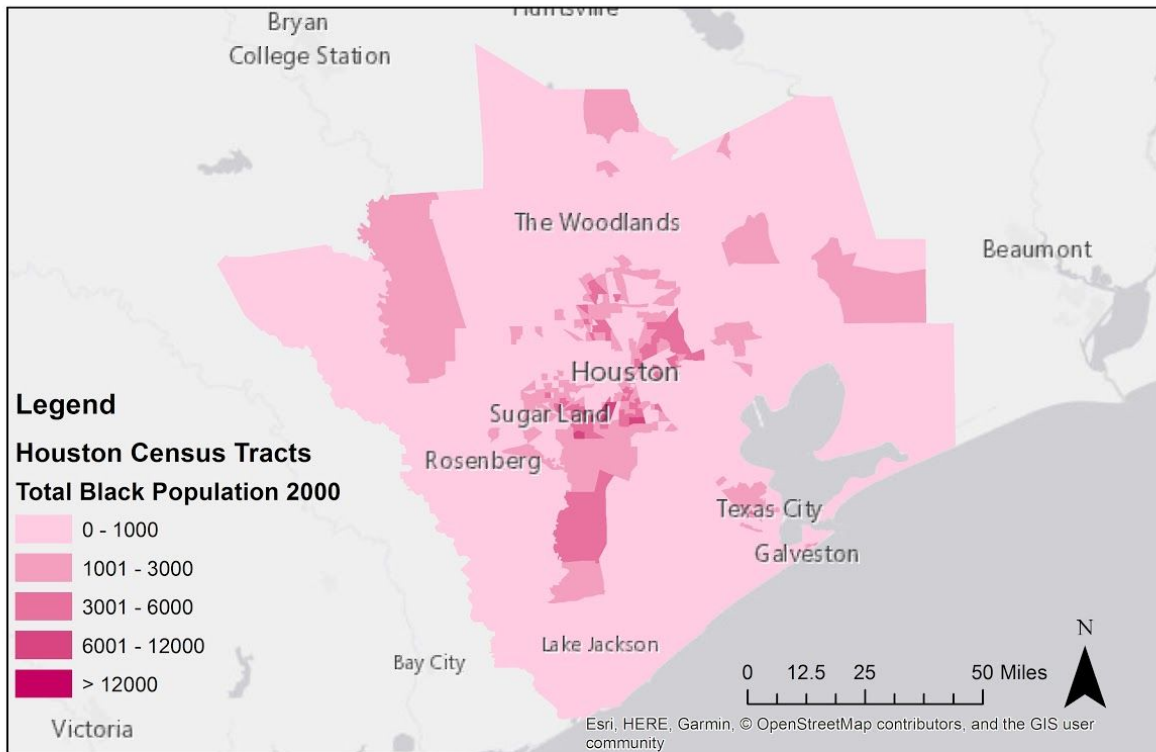
Source: U.S. Census, 2000 and 2010

Comparing Houston's Total White Residents in 2000 vs. 2010



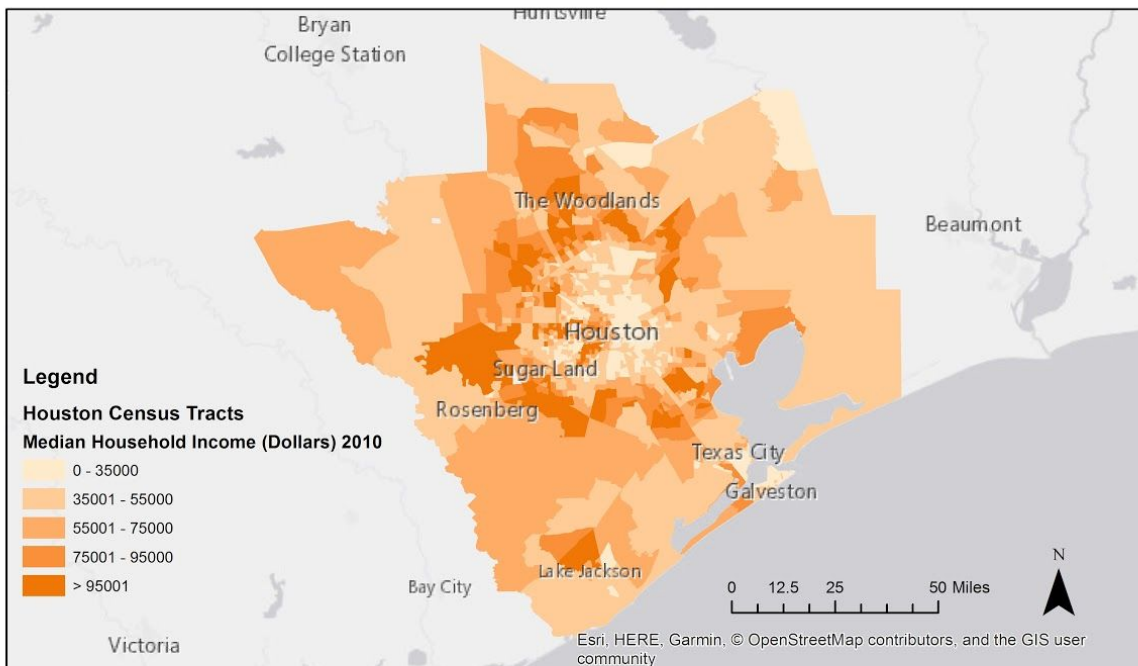
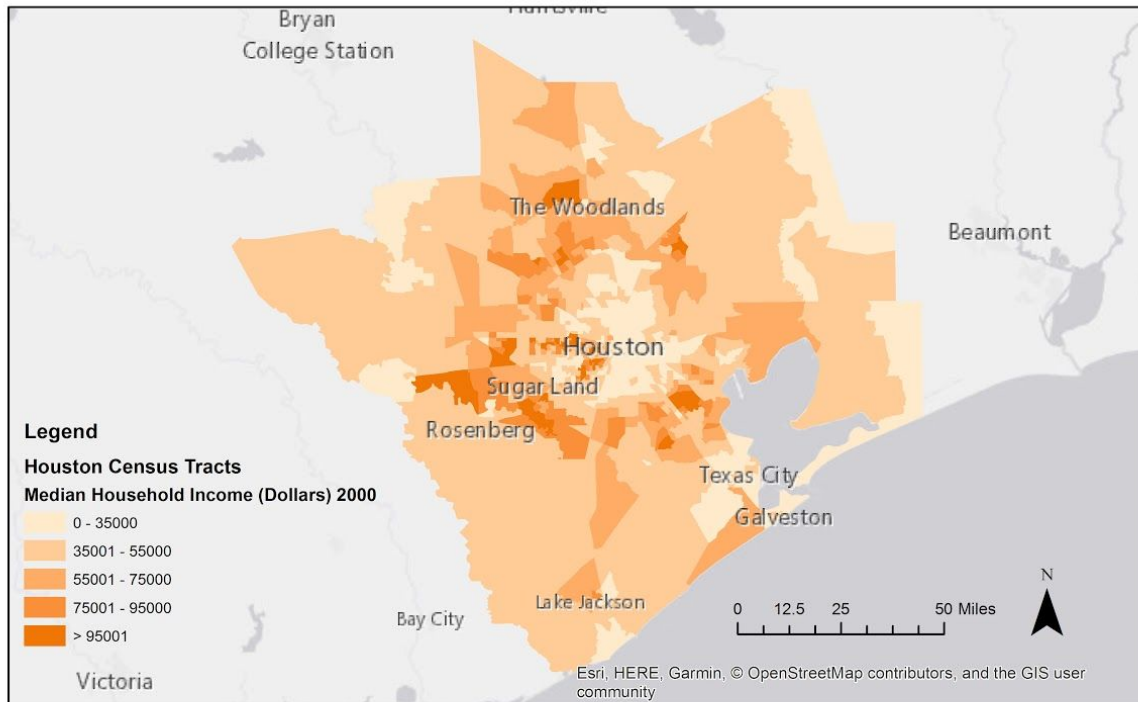
Source: U.S. Census, 2000 and 2010

Comparing Houston's Total Black Residents in 2000 vs. 2010



Source: U.S. Census, 2000 and 2010

Comparing Houston Median Household Income in 2000 vs. 2010



Summary: My analysis reveals the following racial changes between 2000 and 2010: decreases in both Houston's white and black population as a percentage of its total population, a slight increase in the total count of Houston's white population, and a dramatic increase in the total count of Houston's black population. Given that the percentage of the black population increase did not mirror the same drastic result found with the total numbers, there must be other factors contributing to Houston's population growth at large (with other races, too). My analysis with the last set of maps reveals an increase in the median household income over time; the most concentrated parts of this increase manifest in a circle, forming a small ring around the city center. Notably, this ring does **not** overlap with the similar but larger ring—densely populated with black individuals (located further away from the city center)—seen in the choropleth maps prior, affirming an inverse correlation between black population and high median household income.

Limitations

Readers of this map should be aware of the limitation that there exist other factors that shape changes to a population over a period of time, that certainly affect the data I used and could also influence some of the takeaways. They should also note that decennial data for median household income was not available for 2010, so I used ACS from 2006–2010 instead, as listed in the data section of my report. Conversely, ACS was not available for 2000, so I could not find an equivalent data table between the two years for this particular variable, though the respective tables I used are titled similarly—they are just representative of different bulks of time, and come from different surveys. Lastly, I was also limited by the lack of consistent data available for New Orleans, which prevented me from proceeding with my original plan of analysis.

Recommendations/Conclusions

Severe environmental events, like earthquakes and hurricanes, tend to reveal and exacerbate underlying social conditions of a given area. The catastrophe of Hurricane Katrina revealed a dramatic difference between the treatment of black and white communities. Low-income, black individuals and families were forced to leave the city for good; with a lack of attention or specific support provided from politicians to individuals suffering from the hurricane who lived in the poverty-stricken areas in particular, their voices were ultimately becoming erased from the narrative of the city's rebuilding efforts.

My findings, though not directly focused on New Orleans, affirm the lack of previous black presence in NOLA, by depicting a significant increase in total black population in Houston. The permanent elimination of certain neighborhoods—and hence, certain identities, income brackets, and families altogether—removes responsibility from the government to serve the people who are most vulnerable to potentially devastating forces. Furthermore, the elimination of these neighborhoods also lessens the urgency of actions local politicians take, while masking nuances and reducing the complexity of the issues they previously were (supposed) to defend their diverse body of constituents from. In this regard, I conclude that the governing bodies of New Orleans failed the people they needed to protect the *most*.

The inevitability of natural disasters like Katrina is certain, and preventing them, for the most part, remains out of human control; however, what remains within our control is learning from history, and improving for the future. Katrina revealed the deep inequities in New Orleans' society. Adopting a targeted approach, that is more actively conscious of how intersectional social conditions—like race and socioeconomic status—affect that particular community's susceptibility to natural hazard, will be imperative for local municipalities to improve future urban planning and infrastructure development efforts. Some of the regions of NOLA that these displaced families were originally living in, because of their particular economic constraints, were dangerously

flood prone. Instead of instructing residents to simply not live in those kinds of areas, the government should take a more active role in prohibiting residential life in such areas at all, to protect its citizens—especially those who need it most—from that level of extreme susceptibility. Increasing discourse around these issues will also, hopefully, work towards holding accountable the individuals and groups with power on a political, urban development, and resiliency-building scale, to emphasize the urgency with which they should recognize (via policy) the community-specific nuances that have been overlooked and overshadowed for far too long.

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