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Expulsive Greening: A Cross-Sectional Analysis of Green Gentrification in The Resilience Paradigm, Brooklyn 2010–2020

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A CROSS-SECTIONAL ANALYSIS OF GREEN GENTRIFICATION

IN THE RESILIENCE PARADIGM,

BROOKLYN 2010-2020

by

Rose Jimenez

A dissertation submitted to the Graduate Faculty in Earth and Environmental Sciences in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York

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Abstract

EXPULSIVE GREENING: A CROSS-SECTIONAL ANALYSIS OF GREEN GENTRIFICATION IN THE RESILIENCE PARADIGM, BROOKLYN 2010-2020

By

Rose Jimenez

Advisor: Juliana A. Maantay

Background: This project analyzes the spatial coincidence between gentrification typologies and urban greening in Brooklyn, New York from 2010 to 2020. Assets formed under the NYC Green Infrastructure Program were chosen as a proxy for urban greening to represent the spatial practice specifically within the 21st-century climate change resilience paradigm of development. **Methods:** First, five indexes measuring variations of economic and demographic conditions related to gentrification were applied to Brooklyn for comparative analysis: NOAA's Social Vulnerability Indicators of Gentrification Pressure, The NYC Heat Vulnerability Index, The Small Area Index of Gentrification, Typologies of Gentrification and Displacement, and The Housing Risk Chart. Then, for each index, a point-in-polygon count vector analysis was conducted using GIS software to determine the prevalence of green infrastructure assets within the varying gentrification categories. Finally, using the method of dialectical materialism, close readings of theoretical, governmental, and corporate literature were used to examine the forces driving development practices during that time. **Results:** Gentrification varies per spatial unit with each index application, owing to varying index factors. However, the highest socioeconomic, gentrification, and ecological risk hot spots, regardless of index used, tend to be in northern Brooklyn, while cold spots tend to be located in southern Brooklyn. Despite variability in gentrification hot and cold spots, every hot spot was highly associated with green stormwater infrastructure installed through the Green Infrastructure Program, while cold spots had few assets installed in their boundaries, if any. A review of the quantitative results against the reviewed literature indicate that NYC's "green" planning and policies are related to ongoing "green" gentrification trends in the United States.

Keywords: Brooklyn, Dialectical Materialism, Environmental Health, Green Gentrification, Landscape, New York City, Proxy Representations, Resilience, Uneven Development, Urban Greening

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A dissertation is as much about logistics as it is about data analysis and theoretical frameworks. During my research, a few of my colleagues and friends were exceedingly gracious in helping me figure out the logistics, prepare my proposal, obtain hard-to-find data, critique data visualizations, provide moral support, give me perspective on my work's purpose, advocate for students' rights, share dinner, or endure endlessly long phone conversations—without which I never would have gotten through grad school, let alone formed the ideas in this dissertation—Rachel Corey, Diane Enobabor, Kait Gierlich, Dr. Azur Jafari, Sam Lawson, Saidan Qi, Dr. Celeste Sangiorgio, Parisa Setayesh, Asya Stepnova, Dr. Gisselle Mejía, Alana Menendez, Miranda Meyer, Bernadette Muller, Dr. Vee Narinesingh, Aiyana Parker, Mad Todd, Paradorn Wongchanapai, and Artin Yip. Special thanks to my friends Jessica Downes, J.D., for her peer review and schooling me in environmental law, and Angie Winner, for her peer support and teaching in spatial analysis. I would be remiss to deny that all my colleagues, classmates, and teachers over the years have contributed to my full understanding of the world, whether agreeing with me, challenging me, or allowing me to think out loud. I hope I am fortunate enough to see these people throughout the rest of my career. Thank you.

It is also important to note that most of the data, archives, and forums I attended to use in this dissertation were publicly funded by government agencies or supplied by public libraries and archives—all paid for by taxpayer monies. I choose to use public data and advocate for open data and better data because it was paid for by the people and should be owned by and used for the people. Additionally, there is a robust set of indexes and research applied in this dissertation that I made extensive use of through their authors making them available through various research libraries' online archives. I also received training, software access, and support from the Lehman College department of Environmental, Geographic, and Geological Sciences and the Urban GISc Lab.

I would like to thank the Hispanic Alliance for the Professoriate in Environmental Sciences and Engineering (H-AGEP, NSF 16-552) for the rigorous pedagogical training, opportunities to teach at CUNY's wonderful community colleges, and the ability to engage in reinvigorating conversations together with faculty and students at The City University of New York and the University of Texas at El Paso during my last two years of study. Thank you to Profs. Seo and Hassebo, and our students at LaGuardia and Queensborough Community Colleges for making me a better teacher.

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Finally, absolutely no thanks to the early morning traffic jams outside my Brooklyn window during the last thirty-two years.

Foreword

When I was a little kid, I watched Kevin Arnold and his dad Jack build a tree house on *The Wonder Years*, and since my mom worked at a hardware store, I was adamant that we build a treehouse outside our building on Bay Parkway. Then, she had the misfortune of having to deal with my response after telling me that we had exactly zero agency over the tree that would allow us to build a tree house in it, let alone ownership over our block, building, or house. I wonder if I ever viewed "home" quite the same way again. While some people view apartment rentals as some steppingstone to home ownership or temporary lodging like a hotel or a dorm, for many of us it is simply a permanent precarity.

As scientists, we are told that an anecdote is a "sample size of 1"— it's not enough to prove something on a grander scale. What I call the "academic anecdote problem" is that adding an anecdote to your work might just show the foundation for your own bias. But how are we supposed to be intellectually separated from our own lived experience? Some people might feel scientists are a bunch of self-satisfied number crunchers and gerrymanderers, while others think scientists are a tiny group of elite people who should be revered. This is internalized by some scientists too—in classrooms and meetings and labs people talk about "the public" as some social class outside of academia. Well, I feel that I am wholeheartedly a member of "the public" even as I confer the title of "Doctor." Being a scientist is just a job a person has.

This is my conflict—scientists (especially geographers) are at once begged to stay unbiased while at the same time criticized for studying an area in which they are an outsider. I have the unique pleasure and burden of studying my hometown. Over the course of 20 years, my family's Brooklyn rent quadrupled, while our combined family income remained static. Our rent burden is ever-growing. And when rent goes up for the stores in our neighborhoods, so do the prices for our food, clothing, furnishings, and toiletries (if what you need is even available at a brick-and-mortar store nowadays). We never, ever missed a meal or a rent payment, but we did miss out on a chance at equity, stability, leisure, and peace of mind that accompanies reasonable housing costs. This includes being able to pursue passions instead of taking whatever job pays the bills.

And before South Brooklyn was my hometown it was a beach getaway, and before that, "Breukelen" was a colony created by Dutch settlers who displaced the Native Americans that called the place Navack. Kings Highway was a Native American trail. Will people's homes always have to be overtaken by whoever commandeers spatial, political, and economic power next? It's a constant threat that at any point your community can be seized under eminent domain. But I digress.

Under different circumstances, the hundreds of thousands of dollars we have spent on rent during my lifetime could have easily amounted to a home paid for in full, but the game of catch-up is one that many families may never win.

This project is dedicated to my family, especially my ma, Lisa Jimenez, who always took on the tremendous load of making sure I always had a place to come home to after a day of pursuing any and everything I could get my hands into running around this city.

Chapter 1 · Introduction

Flowers and trees growing from roof gardens and street tree beds should be warmly welcomed bright spots in the grey hardscapes of Brooklyn. But for many, ecological rejuvenation is a red flag for impending waves of gentrification that threaten to disrupt their housing stability and peace of mind.

Strategies to protect our waterways might be something that should fall under federal patronage, but cities in the United States often have to make strategic partnerships with private enterprise to fund them, and those businesses have their own financial priorities.

Site suitability studies for installing new infrastructure units tout objective and logical topological considerations, but when there are no tenant protections, empirical considerations still have socioeconomic impacts despite this "logic." Are we truly engineering or just building?

Statement of the Research Problem

What is the spatial relationship between urban greening practices and gentrification risk in Brooklyn, New York over the last decade? What is the landscape of urban greening, what is the landscape of gentrification, and to what extent do they coincide?

The increase in both magnitude and frequency of extreme weather events (superstorms, hurricanes, blizzards, and heat waves) has created a city planning paradigm of urgent ecological resilience against climate change. Urban greening practices are a big player in environmental mitigation, but urban greening and beautification can also be marshalled by the real estate sector to increase community attractiveness to developers, raise property values, and get tax breaks for green elements in new developments. In turn, these things may exacerbate gentrification—or co-constitutive demographic shifts and economic transformations—often associated with expelling or hurting longtime residents that cannot keep up with rising housing costs and other expenses.

The purpose of this research is to evaluate the extent to which municipally-sponsored urban greening is linked to ongoing trends of gentrification. Two themes in geographic theory literature speak to these issues. First, there is long-standing literature on the various city planning mechanisms that drive gentrification. Then, emerging literature speaks to the burgeoning geography of resilience against climate change hazards. A collage of close readings of scholarly, corporate, and governmental literature, including presentations from the city government to the public, and a spatial analysis of urban greening compared to gentrification risk, is fortified with illuminating themes from resilience planning principles in an attempt to understand how urban greening practice correlates to the emergent gentrification crisis in Brooklyn.

In 2005, in accordance with the Clean Water Act of 1972, the New York State Department of Environmental Conservation (DEC) ordered New York City to reduce untreated combined sewer overflows (CSOs) into open bodies of water. In response, starting in 2010, a new landscape of “green” stormwater infrastructure was planned and deployed across the city, offering some semblance of environmental betterment.

Green infrastructure is a stormwater management approach that uses a suite of structures, like green roofs or specially-engineered pavement, that operationalize naturalistic elements to capture and contain rainwater and stormflow to prevent water from entering the sewer system. In New York City specifically, this green infrastructure is meant to at once aid in compliance with the Clean Water Act, reduce overflows from combined sewers, capture loose trash and leaflitter, increase permeable surface area to moderate street flooding, ease urban heat island effects, and contribute to the ever-increasing necessity of resilience against climate change hazards, all while looking fresh and inviting. And yet, the economic transformations and demographic shifts that accompany an increase in neighborhood attractiveness related to these environmental amenities have been theorized to create “newly uneven socio-environmental riskscapes” (L. L. Colburn and Jepson 2012, 1).

The “environment” as we understand it has many spheres, inclusive of all “the surroundings or conditions in which a person, animal, or plant lives or operates” (“Oxford Languages” n.d.). While the ecological sphere of the environment might be sated by green infrastructure, the social and economic spheres of the environment may become more hazardous to financially vulnerable populations as gentrification occurs.

The impacts of climate change and gentrification have both been proven to disproportionately harm marginalized groups (e.g., people of color, those who are poor, single women, and people with disabilities) (Bullard 1994; Hamilton 1994; Oliver and Barnes 2012; Shokry, Connolly, and Anguelovski 2020; Santos, Chor, and Werneck 2010; De Mel 2019; The Eviction Lab 2022). So, while climate risk reduction solutions presumably reduce those climate risk hazards, the gentrification that might accompany them may actually (re)create the risk and marginalization that the solutions aimed to fix.

Gentrification that is significantly marked by urban greening, or “green gentrification,” is a phenomenon that has been observed to be accelerating rapidly in this resilience paradigm, but each permutation of urban green gentrification is unique to its locality and time because of the unique economy and ecology per locale. In the financialization of urban greening, climate mitigation practices that utilize naturalistic elements have been markedly tied up with real estate ventures (Zuk et al. 2015; Anguelovski et al. 2019; Lees 2003; Halasz 2018; Stein 2019; L. Graham, Debucquoy, and Anguelovski 2016; Maantay et al. 2020). Typically, urban greening studies focus on community gardens or parkland, or use satellite imagery to examine greening through vegetated land cover. This project is a slight departure from that, using not just vegetated green infrastructure, but examining a specific government program as it ends its first decade of implementation, and including types of green infrastructure that are "blue" (or unvegetated), but still mimic natural water processes for stormwater management.

Methodological Inspirations

In Philadelphia, a framework comparing sites of *commission* (areas where green infrastructure was installed) versus sites of omission (areas where green infrastructure was not installed) for stormwater management infrastructure "demonstrate[d] that green resilience interventions from 2000 to 2016 are tightly enmeshed with processes that generate Sites of Commission through the correlation with gentrification in Philadelphia," (Shokry, Connolly, and Anguelovski 2020, 10). That is, areas that the real estate finance sector has predicted (and thus effectively decided) will gentrify or where ongoing gentrification will accelerate, were coincidentally chosen as sites of commission for green stormwater management infrastructure.

On the other side of the coin, the sites of *omission* are "forgotten places…that have experienced the abandonment characteristic of contemporary capitalist" transformations (Gilmore 2008, 31). In scholar-activist work, the method of dialectical materialism—close readings of government documents—was used to enrich and empower community activism by critically analyzing extensive technocratic planning documents that "merely fulfilled the law in letter but not in spirit" (Gilmore 2008, 48).

In Brooklyn, Maantay and Maroko used geographic information systems science (GISc) tools for a rigorous spatial analysis of green gentrification using community gardens as a proxy representation of urban greening. They ultimately found that while community gardens are spaces of intimate community building that also transform vacant and derelict land into useful green amenities, the linkages of new green space to property value appreciation led to gentrification that threatened the very people who fostered that green space (Maantay and Maroko 2018; 2015; Maantay 2002a).

Green infrastructure is a multiscalar application and so, using the above methods as inspiration, a comparative analysis of socioeconomic indexes will be used to employ this framework of evaluating sites of commission vs. sites of omission for linking social conditions to infrastructure installation at various scales in Brooklyn (Wijsman et al. 2021). This will help to contextualize the uneven distribution of resilience infrastructure, specifically, in a larger literature of uneven development. It will also treat Brooklyn as a collection of interconnected neighborhoods rather than at the county-level or as discrete neighborhoods, which currently dominates the literature, and hopefully help bring together that otherwise disparate qualitative geographic research that is neighborhood- or community-specific.

To understand green gentrification within the resilience paradigm, this project examines the spatial coincidence of urban greening practices and gentrification risk throughout the borough, and the planning practices that have contributed to it. Because there is a constant flux of intentional, unintentional, official, and unofficial changes in land use and land cover, green stormwater infrastructure assets managed through the New York City Green Infrastructure Program were chosen as a proxy representation for urban greening. This program has stakes at federal, state, community-board, neighborhood, block, and household levels, which will speak to linkages in investigating green gentrification in Brooklyn at various scales. This will offer a neater, more contextualized, static representation of urban greening that also can draw upon the impacts of authoritative city planning elements on gentrification.

While complying with the Clean Water Act and mitigating the overflow of raw sewage from CSOs are the main goals of green stormwater infrastructure installation in New York City, there are a number of fringe benefits built into its design principles. This dissertation aims to create a thread to show that technocratic planning decisions claiming to be based purely on physical geography are actually deeply entangled with private funding when they lack public funds and thus have harmful social consequences for some people while others get to enjoy these amenities.

Ecological prioritization is political. The people of New York City are suffering from a number of concurrent co-constitutive environmental crises, including segregation, poverty and wealth disparity, ill-health, and housing insecurity that are all worsening within our existing systems.

Site Selection

The National Oceanic and Atmospheric Administration's (NOAA) community social vulnerability indicators indicated that gentrification pressure aspects, especially related to housing disruption, have been steadily rising in northeastern United States coastal communities. In 2011, this gentrification pressure index indicated that the Housing Disruption element of gentrification reached the threshold to enter into their highest risk category (4 out of 4) in Brooklyn[1]. During the same time period, thousands of units of green infrastructure were slated to be installed across the borough, creating a natural experiment.

Drawing from this and a preliminary analysis of CSO volume changes in relation to green infrastructure deployment, the geographic extent of the project will be the New York City borough of Brooklyn, which is co-extensive with New York State's Kings County. The extent

[1] This conclusion is drawn from 5-year average U.S. census data and marine fisheries statistics from Sheepshead Bay, Brooklyn.

will be evaluated at three scales: county/borough, neighborhood clusters (also known as "community districts"), and census tracts.

Prospect Park, a very large area just north of the center of the borough, will be the landmark used to situate some Brooklyn area descriptions. "Northern Brooklyn" will be used to refer to areas north, west, and east of Prospect Park. "Southern Brooklyn" will be used to refer to areas south and southeast of Prospect Park. "Neighborhoods" will be defined by New York City's Neighborhood Tabulation Areas (NTAs)[2]. These neighborhood-level polygons were created by the City of New York using census tracts and Public Use Microareas (PUMAs) for New York City's long-term sustainability plan. It is important to note that this cartographic depiction of neighborhoods is not meant to be definitive of the transient cultural or economic extent of neighborhoods (NYC Planning 2020). Neighborhood boundaries may be better described as gradients or networks with a functional identity, lacking complete "economic or social self-containment," (Jacobs 1992, 117). However, NTA and PUMA polygons will be quite useful for analysis of census data and the datasets that are publicly available through the City's open data portal with seamless data assimilation.

Several factors lead to a borough-specific rather than a citywide study of the relationship between urban greening and gentrification, including the high density and diversity of the populations. In terms of conducting a study on CSO-mitigation efficacy of green infrastructure, Brooklyn and Queens are a contiguous landmass with a cohesive sewer network and were treated as a unit for that initial research. The other 3 boroughs are separated by rivers and bays and do not affect each other's CSO outputs. While they are counties of the same municipality, New

[2] formerly known as Neighborhood Projection Areas

York City is an archipelago, so rain in Manhattan, The Bronx, Staten Island, or any of the dozens of other small islands does not impact street-level stormflow in Brooklyn and Queens.

Administrative politics, planning prescriptions, and management practices are incongruent between Brooklyn and Queens, which does not suit the planning element of the study. While I believe this study can and should be replicated for each borough, the wealth of neighborhood gentrification studies, the diversity of industry, and the distinct differences between the northern and southern parts of Brooklyn, including a northern portion that is largely landlocked and the coastal southern portion that interfaces the New York Bight, piqued my interest in evaluating gentrification across the county as a whole. The idea of Brooklyn as a brand which has been alluded to journalistically but largely uncritiqued in academia, also motivated me to look at the borough (Shearman 2015; Metcalf 2013; Chandler 2014; Campanella 2019).

Brooklyn Administrative Geography

One of the five boroughs (administrative districts that make up New York City), Brooklyn can be broken down in a number of more conventional ways. While 2 boroughs are islands, and one is a peninsula connected to the rest of New York State, Brooklyn and Queens boroughs are physically connected to each other at the western end of Long Island. Brooklyn is coextensive with the New York State County if Kings. Generally, "Brooklyn borough" is used when discussing the area in its intracity context, and "Kings County" is used when talking about the area in the context of New York State. There are 18 community districts within Brooklyn that are coextensive with federal administrative PUMAS. Each community district is comprised of various neighborhoods, which are delineated by NTAs that are not completely authoritative neighborhood delineations, which are more fluid and cultural at the ground level, but used for administrative purposes. Each NTA is made up of a cluster of 2018 census tracts, each of which are home to approximately 4000 people ("Census Tracts" 2010). See Figure 1, Figure 2.

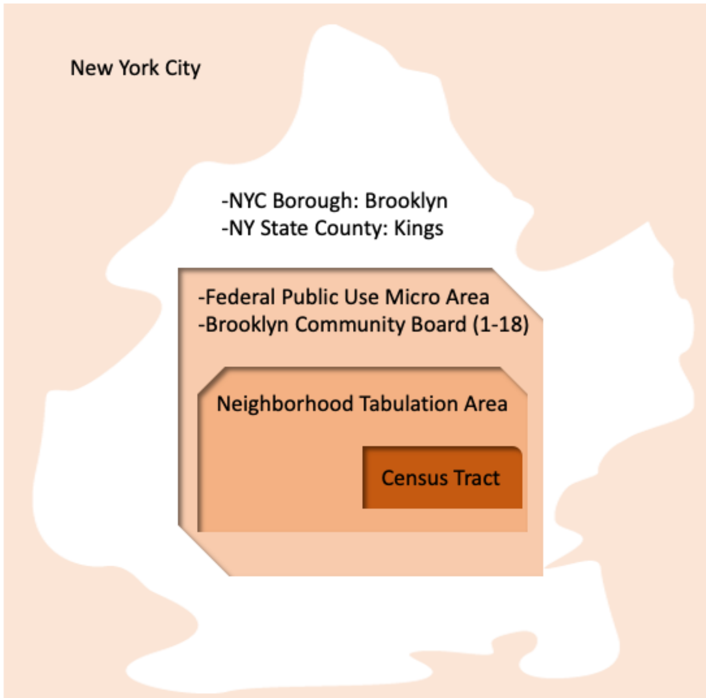

Figure 1: Brooklyn Area-Type Hierarchy for administration

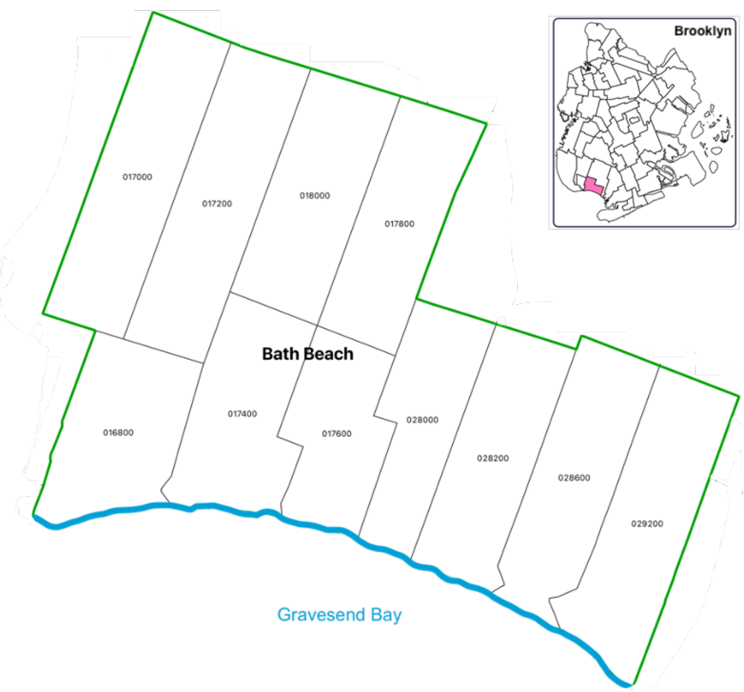

Figure 2: Bath Beach NTA with 2010 Census Tracts (numbered)

Project Overview

First, I wish to evaluate the effectiveness of green infrastructure installation in mitigating overflows from combined (sanitary and stormwater) sewer outfalls (CSOs) **to get a baseline for the success of their primary function**. So, in Chapter 2, I outline the form and function of CSOs. While these mechanisms are an engineering feat that has protected our wastewater treatment centers and sewer system, they contribute to water pollution across New York City, which poses its own set of ecological and political problems. Then, I describe green infrastructure deployment as a solution to the CSO problem, and site suitability considerations for green infrastructure. Finally, after providing geospatial data on the distribution of green infrastructure across Brooklyn, I measure the changes in CSO overflow volumes over time compared to rainfall and the timeline of green infrastructure implementation. Results from this analysis show that CSO volumes improved over the same time period as green infrastructure development, and some area-specific examples further support the idea that green infrastructure presence is related to these improvements.

The next chapter takes a step back to explore geographic thought and critical geographic theory around landscape. In particular, I am interested in **urban greening as a tool that physically and symbolically reverses or repairs some of the environmental "greying" of the landscape that occurred through urbanization and industrialization**. That is, urbanization removed much of the vegetated, permeable, water-capturing surface area, and these urban greening practices restore that lost permeability and vegetation. This has been successful, as shown by CSO improvements. However, the principles of green design used for this infrastructure have more than CSO mitigation on the docket. Beyond the physical environment and complying with city, state, and federal environmental policies, green infrastructure incorporates green design elements that serve greater long-term city plans for urban rejuvenation, including green amenities for public and private use, influences on property values and rezoning, and development along the Brooklyn waterfront. This climate change resilience paradigm of development appears to have some internal contradictions in its goals.

In Chapter 4, I contextualize some of the market forces behind funding these green infrastructure projects and the contrivances for capital gain. Drawing from literature on political ecology and looking through planning principles guiding urban greening in New York City and Brooklyn borough specifically, I see that **raising property values and partnering with private investors are precepts listed right alongside ecological benefits**. Land management practices are also described in this chapter to discuss the precarious and potentially ephemeral nature of green infrastructure, as is discussed in some political ecology geographic theory, such as the spatio-temporal fix.

This is where I begin to draw my hypothesis: Because the funding for green infrastructure is intimately tied to property value change, which is presumed to raise housing costs, and rises in housing costs are a determinant factor in gentrification, **I hypothesize that sites of green infrastructure commission will spatially coincide with gentrification hotspots across Brooklyn**. At the county-temporal level, using a federal county-scale social vulnerability index that updates annually, I find that new thresholds for housing disruption raised to a new high level around the same time as greening proposals were announced. Because I see that gentrification-related housing disruption correlates more to the timing of green infrastructure plan announcements than to the timing of installation, I believe that gentrification is a planning issue that overly prioritizes urban greening as a marketing tool for real estate rather than strengthening communities through the re-creation of nature in urban environments.

As I learned from the analysis of green infrastructure distribution in Chapter 2, green infrastructure is unevenly developed across the county, owing to uneven geological factors and the uneven funding described in Chapter 4. Because of this, in Chapter 5 I begin a reading of literature that focuses on gentrification, green gentrification, gentrification in Brooklyn as a whole, and neighborhood-specific gentrification in Brooklyn. The literature tends to describe patterns of acute gentrification in areas closer to Manhattan and Queens (in the northern half of Brooklyn) at the turn of the 21st century, while case studies of social and demographic changes in southern Brooklyn tend focus on the earlier half of the 20th century.

From this reading, **I further hypothesize that there are close ties between urban greening and gentrification at smaller scales, such as the community district and census tract**. To test this, I use environmental modeling and spatial analysis techniques to compare urban greening prominence against several other gentrification indexes at various scales, which are detailed in Chapter 6. This requires two sets of data for comparison: one for urban greening and one for gentrification. While urban greening is a tangible element that can be mapped, it is still somewhat ephemeral and can be represented in a number of different ways. Drawing from the study of New York City's urban greening practices in Chapter 4, **assets from The New York City Green Infrastructure Program were chosen as a proxy** (or stand-in representation) for urban greening specifically in the resilience paradigm: 1) the geospatial data are readily available, 2) it was implemented specifically as a two-for-one deal to both mitigate a climate-related problem and support beautification efforts, and 3) it is government managed.

Representing gentrification on a map is a bit more complicated. Many methodological studies on measuring gentrification choose certain their own sets of important statistics to define gentrification and supply a replicable index that can be applied to various other areas using measurements and rates to color-code areas in the production of choropleth (color block) maps that indicate various index scores. Ultimately, I **apply five indexes to Brooklyn**: one at the county level, two at the community district level, and two at the census tract level, all of which can be seen in *Results Atlas 1*. While there is variation in the distribution of gentrification risk across the county, in indexes that use a hierarchy or level-based system to assign gentrification scores (i.e. scores 1 to 5, where 5 is the highest-level risk category), higher rates of gentrification tend to be concentrated in the northern half of the borough, especially in community districts 1 and 5 (Greenpoint/Williamsburg/East New York) while there is less risk in southern areas like community districts 10 and 15 (Bay Ridge/Dyker Heights/Gravesend/Sheepshead Bay).

In the next phase, I overlay the green infrastructure shapefile on each of the five indexes, finding **a high spatial coincidence between acute instances of gentrification and green infrastructure units despite the variability in gentrification rates in each hierarchy-based socioeconomic index**.

Chapter 7 is an interpretation of the results. In the county-level index, you can see the rate of gentrification risk related to housing disruption reached a new threshold of risk in the same year that green infrastructure implementation took place. In all three index applications that break risk into 5 hierarchical levels, green infrastructure placement was highly concentrated in areas scored in the two highest levels. Compared against a typology-based gentrification index, green infrastructure tended to be clustered in low-income areas **in the early phases of the gentrification process** (as opposed to late-stage gentrification types, like super gentrification). This chapter also offers some notes on resilience, project limitations, and future research aspirations.

In the concluding chapter, I tackle some key thoughts, including the confluence between social and physical sciences, the causality dilemma in green gentrification, and a synthesis of the theoretical and material research.

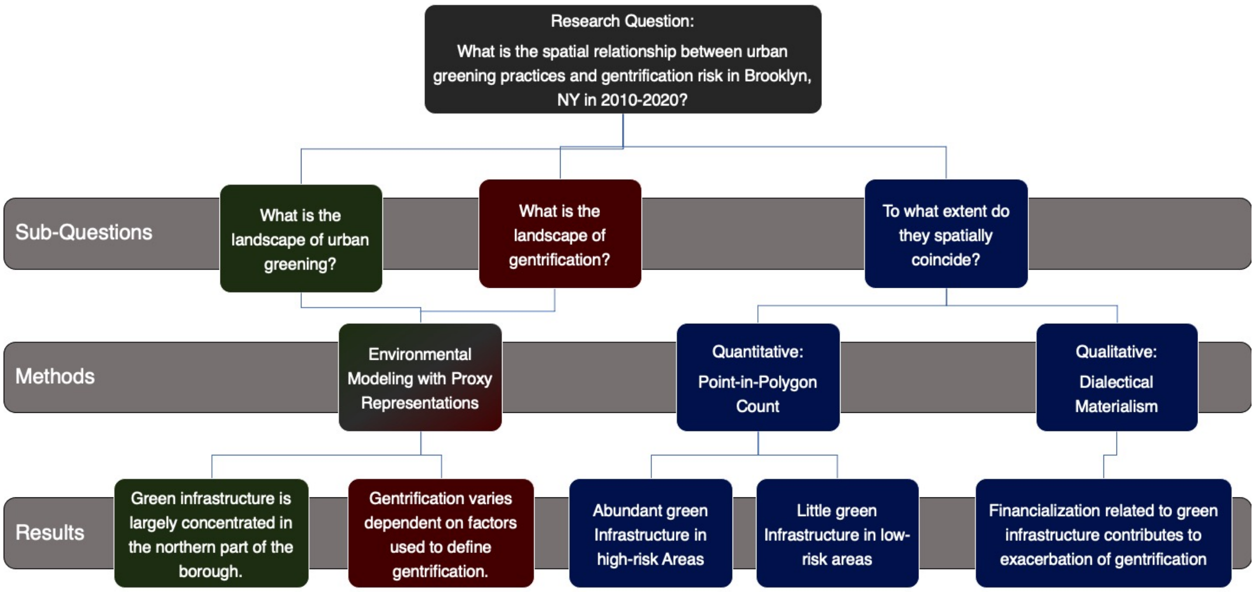

Figure 3: Concept Map: Research Questions

Chapter 2 · State of the Art

It is the national goal that the discharge of pollutants into navigable waters be eliminated by 1985.
Clean Water Act
Section 1251(a)(1)

CSOs: What They Are and How They Work for New York City

Much of New York City's sewer system handles a combination of both sanitary wastewater[1] and street-level storm flow. During storms, excess stormwater directly enters the sewer system via sewer grates. If there is high domestic or commercial water use during inclement weather or snowmelt, the stress put on the system is at its highest. There is a point where too much water in the sewers causes overload, so there are a variety of points that act as a sump system wherein excess water gets discharged into various waterways to relieve the system when it is overtaxed. These discharge points are called combined sewer outfalls (CSOs). Home to nearly half the state population[2] and having unique coastal conditions compared to the rest of the state, CSO overflow volumes are much higher in New York City than elsewhere in New York State.

The mix of untreated excess stormwater and sanitary wastewater in the sewer system that is released into open bodies of water contains large debris, particulate matter, and a plethora of chemical material from domestic, commercial, and industrial activities. This troublesome paste includes leaves, everyday litter, micro-plastics, lipids, human and animal excrement, discarded

[1] "Sanitary wastewater" refers to untreated/raw effluent from toilets, tubs, and sinks that contains human waste.
[2] 8.5-million people live in New York City out of all 19.75-million people in New York State

food, detergents, petrol, pharmaceuticals, salt, viruses, bacteria, parasites, and any other material you might imagine is washed off the streets of New York City (or flushed down our toilets).

Though CSOs are vital to preventing damage at wastewater treatment plants and the sewer system by preventing back-ups and explosions, the resultant pollution has contributed to New York City being out of compliance with the U.S. Clean Water Act (CWA) water quality standards (Cherrier et al. 2016; Sapienza 2011). In particular, CSO overflows do not fulfill CWA Section 101(a)(2): "it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water" (U.S. EPA 2002). Pollution poses health risks and lessens usefulness, recreational potential, and aesthetic value of waterbodies (Boyd 2015, 339). Swimming, wading, fishing (and eating that fish), baptisms and other religious ceremonies, and other activities in water that is contaminated by raw sewage can expose people to *Escherichia coli* (E. coli), Shigella, Giardia, norovirus, Cryptosporidium, strains of *Staphylococcus aureus*, including methicillin-resistant *Staphylococcus aureus* (MRSA), and other germs and parasites that cause recreational water illnesses (RWIs) like diarrhea, dermatitis, and infections (Young, Juhl, and O'Mullan 2013; NYC Health 2020). Exposure to degraded environments is also linked to mental health distress (Etman et al. 2016).

Two approaches to CSO overflow reduction would improve CSO outputs and address the waterbodies' "'Highest Attainable Use' pursuant to the 2001 EPA Guidance on Coordinating CSO LTCPs with Water Quality Standards Review" (Sapienza 2011, 7). One is a reduction in the total volume of CSO volume, and the other is a reduction in the concentration of pollutants in the CSO discharge. Green stormwater infrastructure described herein largely focuses on a reduction in the volume of CSO discharge, while separate management regimes are needed for

CSO pollutant concentrations in New York City (“Final Reports of the Tibor T. Polgar Fellowship Program 2020″ 2021).

As illustrated in Figure 4, each combined sewer outfall is associated with a particular drainage zone that relays water to it, and empties into a particular body of water. For example, outfall ‘OH-018’ receives water from drainage zone ‘OH-018’, which empties into The Narrows (the strait between Brooklyn and Staten Island). However, stormflow may move quite a distance at street level, creating conditions where flooding and storm in one area may also affect surrounding drainage zones. So, to effectively combat stress on an outfall and its surrounding outfalls, targeted intervention should be taken in and/or around the associated drainage area.

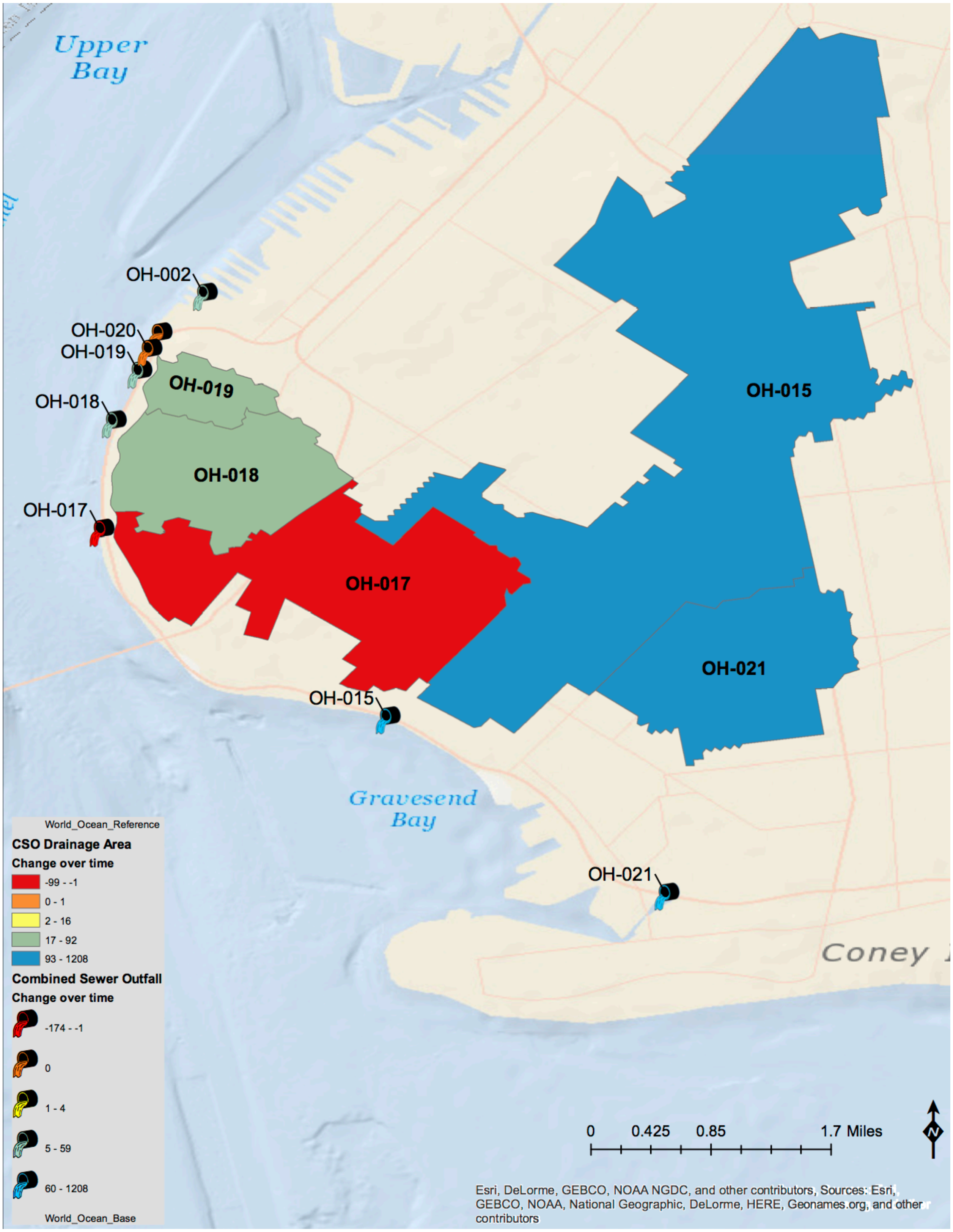

Figure 4: CSO drainage Zones impacting Gravesend Bay, Brooklyn

Green Infrastructure Solutions to the CSO Problem

Green infrastructure is a water management approach wherein the natural water cycle is protected, restored, and/or mimicked (American Rivers 2021). In 2007, the EPA issued a memorandum to encourage green infrastructure approaches that "infiltrate, evapotranspirate or reuse stormwater, with significant utilization of soils and vegetation rather than traditional hardscape collection, conveyance and storage structures" (Grumbles 2007) as a solution to Clean Water Act non-compliance. Rain gardens, bioswales, green and blue roof technology, and various types of specially-engineered ground terrain (permeable pavement, special soils, etc.) accomplish this by increasing the amount of permeable surface, which was diminished with paving, urban development, and industrialization. The concrete, tar, and metal modernist utilitarian elements of industrialization denote a "greying" as part of the aesthetic and purpose. Largely naturalistic elements (soils, tree beds, grasses), as well as an "eco-friendly" aesthetic and purpose mark the infrastructure approach as "green." Urban greening (re)creates or reintroduces greenery lost during the greying processes not only ecologically, but also in the social realm by increasing attractiveness and capabilities for recreation, leisure, and the human relationship with nature. These "co-benefits" have been theorized to boost political salience and financial feasibility because they fall in line with green design principles that satisfy requirements for both financial sponsors and government regulations (Shokry, Connolly, and Anguelovski 2020).

In 2010, New York City made a "20-year citywide commitment to green infrastructure" (Sapienza 2011) in a Bloomberg-era New York Waterfront Development Plan, also known as "Vision 2020." The New York City Department of Environmental Protection (DEP) also introduced the New York City Green Infrastructure Program as a response to the CSO problem. The program includes the design, construction, and implementation of green stormwater infrastructure designed to capture and retain rain, and capture and/or control stormwater runoff. Installation began in 2013 (NYC Dept. of Environmental Protection 2018). Green infrastructure's purpose is to passively capture water, stalling the point at which the sewer system reaches critical mass and activates the sump system that releases raw sewage into open bodies of water. These structures also capture incidental litter and leaflitter that otherwise clogs sewer catch basins and causes dangerous street flooding on a regular basis (Agonafir et al. 2022).

Site Suitability for Green Infrastructure

Determining site suitability for green infrastructure deployment is extremely complex. City planning, zoning ordinances, and building codes dictate what can be developed where. Developers fund and design projects, while engineers and economists determine site suitability. Land ownership determines where the city itself has permission to break ground. Right-of-way (ROW) (or curbside) units are essentially all created on public property, while many rooftop units are coordinated on with private property owners. Then, geophysical and structural site suitability must be determined. For example, ROW bioswales, which are deep water-capturing wells that use a mix of bioretention cells (that use biotic material like soil, plants, and microbes to filter water) and subsurface storage tanks built into tree beds, require complicated excavation, so sewer quality and surrounding topography must be examined in those site suitability studies. But if the underlying geological formation is unsuitable, it can be impossible to break ground, or worse, brittle or poorly demolished subsurface could crack, flooding basements or parts of the subway system or causing sinkholes. In much of upper Manhattan, the schist-type bedrock was determined to be too hard to break for bioswales at all, for example.

For green and blue roof potential, roofs are examined for their load-bearing capacity, including their slope (Kaplan 2006). Blue roofs have water-capturing rock basins that hold water and allow it to evaporate later. Green roofs are have beds covered in vegetation and planting medium which primarily capture water and prevent storm water runoff (SWR) from entering rain gutters. Green roofs also have the potential to moderate building temperatures (which relieves heating, ventilation, and air conditioning (HVAC) system stress within the structure), reduce urban heat island effects (UHIE), and improve urban aesthetics. Some green roofs are also used to grow food or serve as private pavilions for building residents[3]. Of course, all these structures pose leak and collapse risks, as well.

Land-use classification for green infrastructure is as important to analyze as financial investments because areas with the least amenable natural topology or building structures for green infrastructure are deprived of urban greening. A built environment unsuitable for retrofitting green infrastructure, such as roofs that are damaged, structurally unsound, or too steep to hold the tanks, poses the same problem. Newer buildings, such as those in areas that have been rezoned for residential uses and have brand new buildings, accommodate green and blue roof technologies as built-in standards, while older buildings might need extreme modification or demolition to integrate green roof technology. A land-use classification study for extensive vegetative roof acreage potential (EVRAP) in the Bronx to propose green roof installation through GISc was unique from preceding land-use classification analyses because it focused on modifying the built environment rather than predeveloped or natural landscapes. Because urban greening is unevenly developed, its intended benefits will also be distributed unevenly. That EVRAP project:

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[3] Buildings can also offer pavilions as public-use areas for tax breaks, although this is exceedingly complicated and can be easily hidden from public knowledge or wrongly marked as closed.

> “…could not assess potential for the entire range of buildings because each existing building would need to be defined in the database by criteria such as load-bearing capacity, roof slope, and access. Cumulative calculation of square footage by lot parcel and by land-use class provided by the main output, creating a hierarchy of landscapes for further GIS analysis and providing supporting baseline data for current initiatives at the neighbor and county level,” (Kaplan 2006, 359).

The use of GISc software has expanded rapidly in government agencies, private enterprise, grassroots organizations, videogaming, and hobbyists (Boulos et al. 2017; Kaplan 2006). Many GISc projects have resulted in centralizing and digitizing a massive volume of disparate qualitative and quantitative data, publicizing it, and expediting its use. New York City has provided maps, infographics, and GISc applications displaying their Green Infrastructure Program and other citywide management systems, but most of those applications are driven by location data. Qualitative data is available in quarterly reports.

Historical hardcopy records of the sewer system that are used for this work were prepared with different standards, with different datasets, and under various jurisdictions and agencies:

> “Changes in managing responsibility and improvements in engineering design techniques have produced a system infrastructure that varies considerably in age, materials, and structure. Records of the sewer system were prepared with different standards, and with different datum for each borough. So, a GIS approach was used to map and represent the sewer system, rather than rely on 190,000 disparate original drawings and documents,” (Crino, Rutberg, and Farag 2006, 377–78).

Both of these integrated (physical and social) applied geography projects were made possible (and organized to be digestible) by this extensive data acquisition, data aggregation, and data assimilation work. Site selection relies on completing such projects.

The New Green Infrastructure Landscape

In Brooklyn, 4052 green stormwater infrastructure units were sited (see Figure 6). Of these, 2575 are bioswales. There are a total of 26 different types of green infrastructure that I categorize in six ways: bioswales, rain gardens and greenstreets (Figure 5), green and blue roofs, specially-engineered surfaces, subsurface storage systems, and subsurface pipes (see Figure 7).

Figure 5: A stormwater Greenstreet in Williamsburg, Brooklyn. Photo by Rose Jimenez 2022

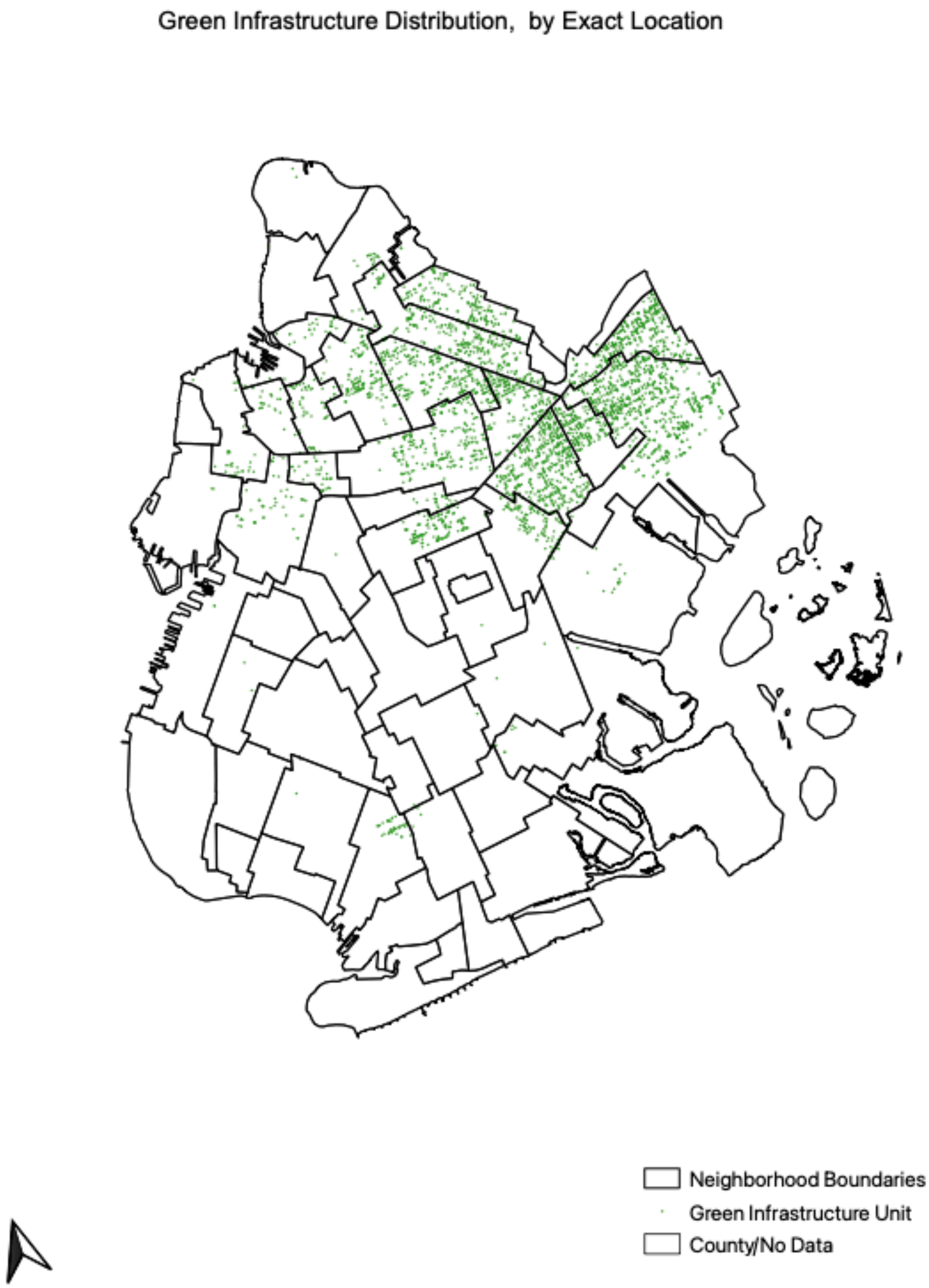

Figure 6: Green Infrastructure Assets in Brooklyn, By Location. Point displacement added to symbology to ensure minimal point overlap. Data Source: NYC DEP via NYC Open Data, 2016

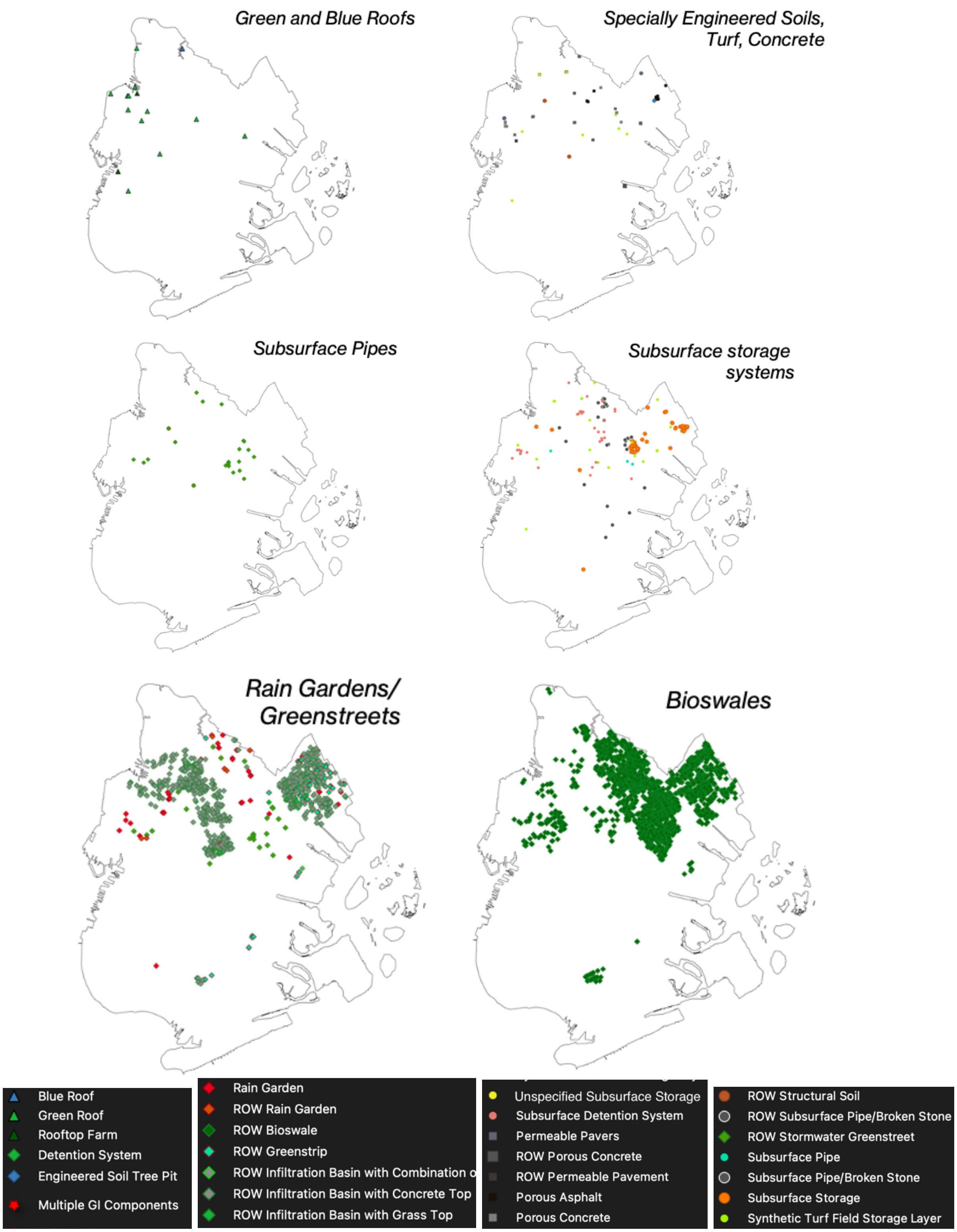

Figure 7: (continued from previous page). Distribution of Green Infrastructure Program Assets, by type, in Brooklyn. Data Source: NYC DEP via NYC Open Data, 2016

The Green Infrastructure Program assets are highly concentrated in the north and northeast community districts (CDs) of Brooklyn. Northeast Brooklyn CDs tend to have hundreds of units installed within them, and CD 5 has the most by far, with 1458 units installed. South Brooklyn communities have fewer than 40 units each, with CD 10 and CD 13 having zero green infrastructure units (see Figure 8).

To a certain extent, it is understandable that CSO improvements were slightly more urgent in the northern part of Brooklyn that borders Queens. This area is more landlocked and has several tight canals and creeks that have high (slower) flushing times—or water stratification turnover rates— because their underwater contours lead to challenges with removing pollutants naturally. In southern Brooklyn, the larger, more open bodies of water in the New York Bight (The Narrows, Gravesend Bay, Sheepshead Bay, Jamaica Bay, the Lower New York Bay, and the Atlantic Ocean) have a lower (faster) flushing time and thus better natural capacity to cycle out pollutants (Monsen et al. 2002; Boyd 2015).

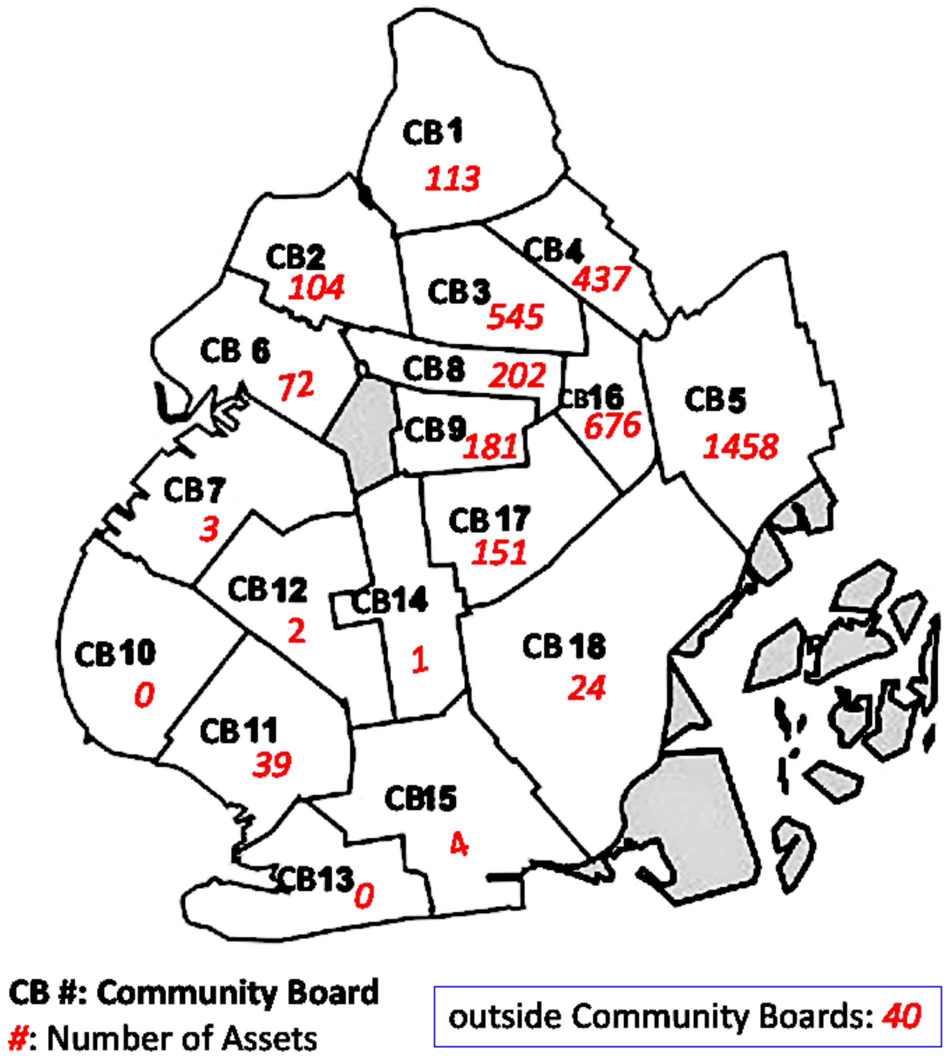

Figure 8: number of Green Infrastructure Program assets, by community district. Data Source: NYC DEP 2016 and NYC DDC 2018 via NYC Open Data

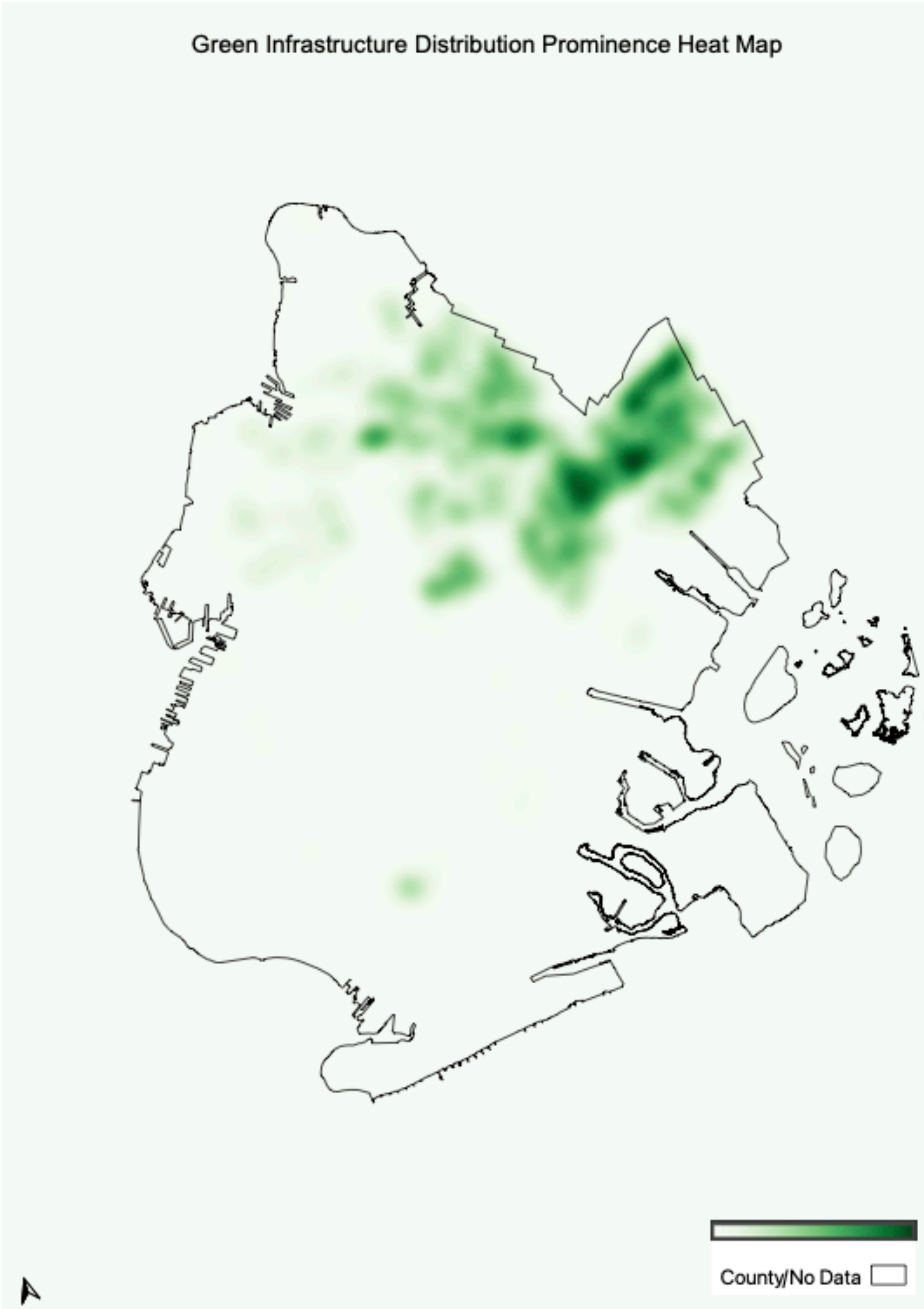

Figure 9: Green Infrastructure prominence map. Data Source: NYC DEP via NYC Open Data, 2016

CSO Changes in Brooklyn and Queens

SWR intervention provided by green infrastructure reduces the amount of water, debris, and stress on the sewer system (i.e., grey infrastructure) by stalling reaching the water budget—or surface capacities—that would otherwise trigger CSO overflow (Boyd 2015, 35–36; NYS DEC 2018). Surface capacities are increased by green infrastructure units capturing water, preventing it from flooding and/or entering sewer grates. In turn, CSO overflow volumes are decreased by a combination of that increased surface capacity and upgrades to sewers and wastewater treatment plants (WWTP). Diminishing pollutant concentrations is achieved through a combination of 1) upgraded WWTPs, 2) a decrease in high-pollution waterfront industries, and 3) environmental regulations on remaining waterfront industries (i.e., petroleum and chemical storage facilities, waste transfer stations, shipping), including better options for storage through the New York State DEC.

In addition to continued use of traditional methods of reducing CSO volumes, such as holding tanks and tunnels, the New York City Green Infrastructure Program proposes to capture the first inch of rainfall on 10% of the impervious surface in CSO watersheds over 20 years (Vision 2020, p. 67). Most of this technology relies on passive filtration (using gravity and capillary action to capture water rather than the use of pumps or components that require electricity), which either holds water or allows infiltration into the surrounding soil/groundwater.

Upgrades to the grey infrastructure will also be implemented, but they take much longer and cost a lot more money. This includes a plan to optimize the existing system of grey infrastructure with drainage plans and survey and rehabilitation of 149 miles of interceptor sewers, inspection and repair of flood gates, and measures to prevent lipid build-up that obstructs sewers (Vision 2020, p. 67) in a phenomenon known as "Fatbergs." Green infrastructure is meant to be an interception at least until that grey infrastructure is upgraded.

In areas where the bathymetry—or underwater terrain— has been significantly altered (filled, dredged, etc.), CSO discharge mitigation alone would not result in significant water quality increases. Poor bathymetry can stifle natural processes the water would otherwise use to circulate and flush/expel wastewater loads (Rosenzweig et al. 2018). These areas require alternative and/or additional mitigation strategies. So, the waterbodies that 1) have poor bathymetry and 2) are associated specifically with Vision 2020 residential developments[4] are subject to individualized water management investments by the city.

In a preliminary statistical analysis using modeled CSO overflow volume data from the city of New York (2006 to 2016), normalized against rainfall, average CSO volumes have significantly decreased since the beginning of the implementation of green stormwater infrastructure in 2013 (see

Figure 10). In 2006, the average CSO is estimated to have released over 69-million gallons of wastewater, while in 2018, that number was reduced to an average of 56-million gallons. Rainfall remained consistent over the time period, which would mean that in conjunction with other changes to the terrain, green stormwater infrastructure installation is linked to the ~19% reduction in sewer overflow in these CSOs.

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[4] These include Newtown Creek, Gowanus Canal, Coney Island Creek, Paerdegat Basin, and Fresh Creek (Boyd 2015; NYC Department of City Planning 2011, 64–66).

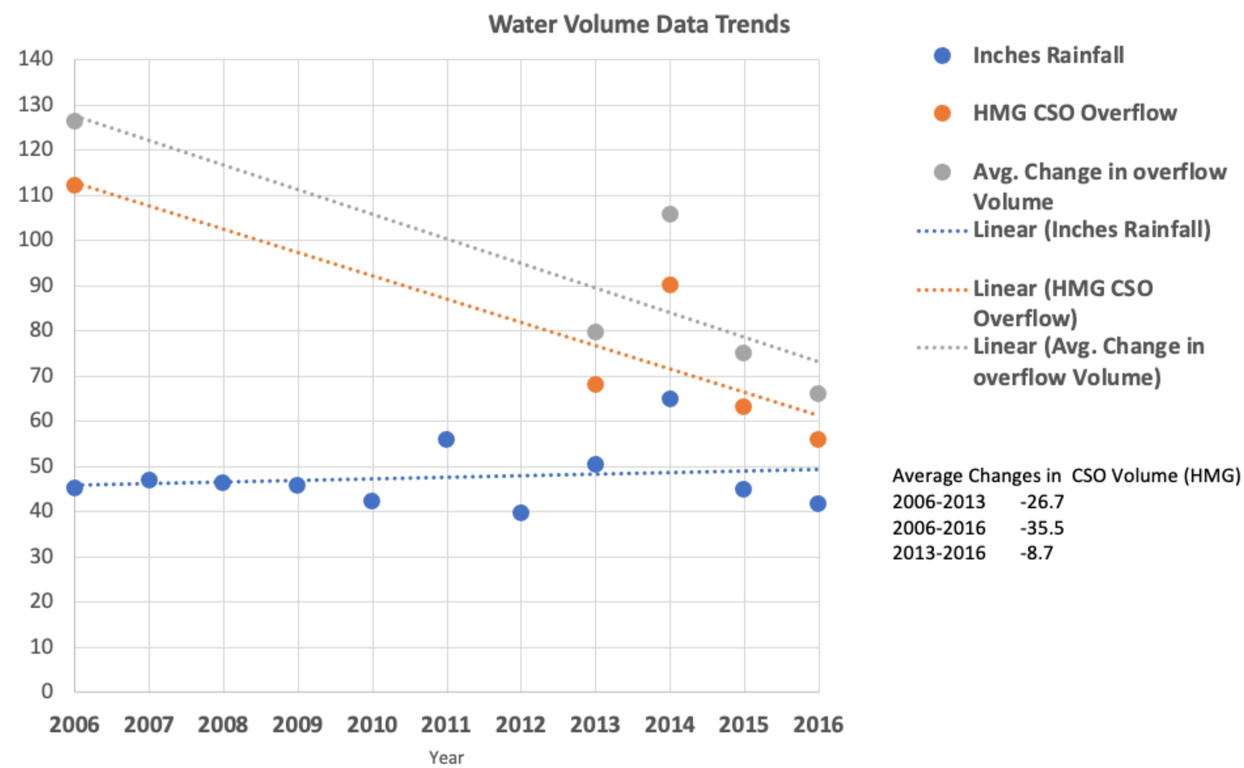

Figure 10: Modeled CSO Overflow Volume trends, compared to rainfall, 2006, 2013, 2014, 2015, 2016. Data was acquired and aggregated from annual State Pollution Discharge Elimination System (SPDES) permit reports, 2012-2018, and is an aggregate of all the CSOs in Brooklyn and Queens (NYC Department of Environmental Protection 2019).

It is very important to note that CSO volumes supplied by the NYC DEP are modeled estimates. That is, there are not direct measurements of all CSO outputs. As described by NYC DEP representatives during a public workshop, the volumes in 2013-2016 are the same projected model that was used in 2006, but adding additional parameters accounting for green stormwater infrastructure installation (Cohn, Ranheim, and da Silva 2018). So, the 2006 volumes are estimated from a hydrological and hydraulic (H&H) model using weather-dependent CSO scenarios known as the Infoworks CS (Sapienza 2011; NYC DEP n.d.).

As of 2018, New York City's wastewater treatment plants could manage and treat 1.3-billion gallons of water to Clean Water Act standards during dry weather events. During wet weather, “they have the capacity to partially treat and fully disinfect up to 3.7 billion gallons” of water per day (NYC Department of Environmental Protection 2019). As both magnitude and frequency of extreme weather events occur in the coming years, New York City’s sewer system will be up against an unprecedented amount of stress and need these ongoing interventions and more (De Mel 2019).

None of these interventions are infallible or individually restorative, although they have a combined major palliative effect. Unfortunately, solutions in one area threaten to exacerbate environmental issues in other places both within and outside of the New York area. For example, while former industrial zones have become residential zones in Brooklyn and Queens, many of the industries have moved to the Bronx, where zoning has been changed from residential to manufacturing, exacerbating environmental injustice there (Maantay 2002a, 100). In anticipation of sea-level rise and extreme weather events, additional green infrastructure is deemed necessary, but so should be environmental justice mandates in land-use classifications (Vision 2020, p. 65).

Vision 2020 has impacts for the entire New York City waterfront, but breaks it into Neighborhood Reach Strategies: locally targeted strategic plans within the greater plan. Brooklyn’s waterfront has six management regimes (see Figure 11). Each of these reach areas is linked with extensive environmental remediation, including some investments specifically linked to planned and prospective residential development. “CSO investments are projected to reduce CSO discharges by 8.5 billion gallons per year, relative to the mid-1990s,” (NYC Department of City Planning 2011, 9), which in turn reduces viral, parasitic, and bacterial illness risk. Because of this, areas with green infrastructure, and coastal areas with green infrastructure in their CSO drainage area are likely to benefit from green infrastructure’s many palliative ecological effects.

Reach 13♛: Newtown Creek

Reach 14N: Brooklyn Upper Bay, North

Reach 14S: Brooklyn Upper Bay, South

Reach 15: Southwest Brooklyn

Reach 16: Coney Island & Sheepshead Bay

Reach 17♛: Jamaica Bay & The Rockaways

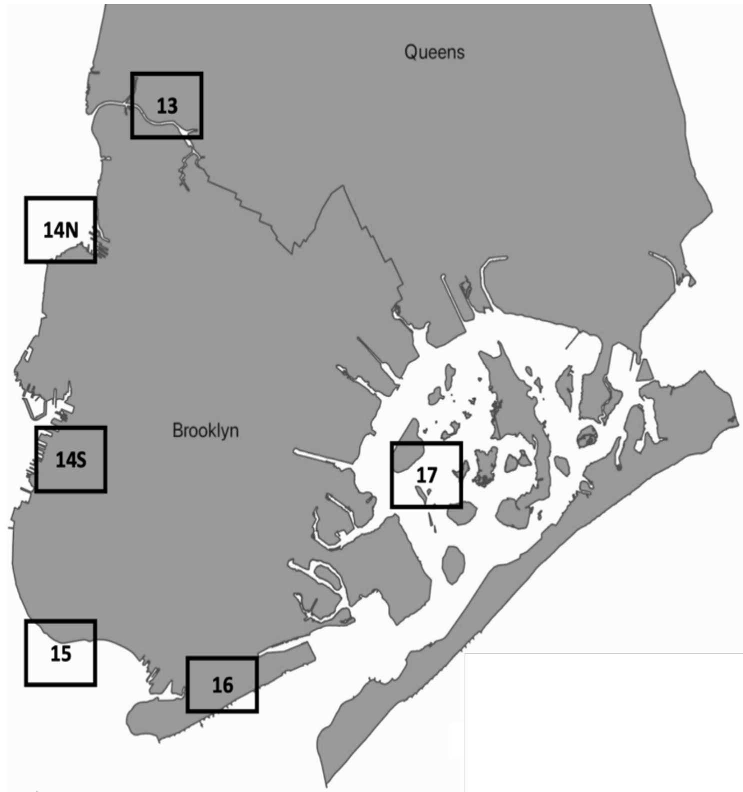

Figure 11: Brooklyn Neighborhood Reach Areas from Vision 2020. ♛= Area shared with Queens borough. Boxes refer to approximate center point of reach extent along the coast.

New York City's projected models of CSO discharge show that areas with green infrastructure installed have had significant improvements in CSO discharge volumes, while areas without it have stayed the same or worsened. In the Canarsie/Starrett City area for example, drainage zone 26W-003 had hundreds of green infrastructure units installed, and the associated CSO produced about a hundred million gallons less discharge in 2016 as compared to 2006. Conversely, there were fewer than 20 units installed in nearby drainage zone 26W-005 in the East New York area, and the associated CSO had an increase of about a hundred million gallons of sewage discharge in 2016 compared to 2006[5] (see Figure 12). At the very least, this shows a disparity in benefits from ecosystem services related to green infrastructure.

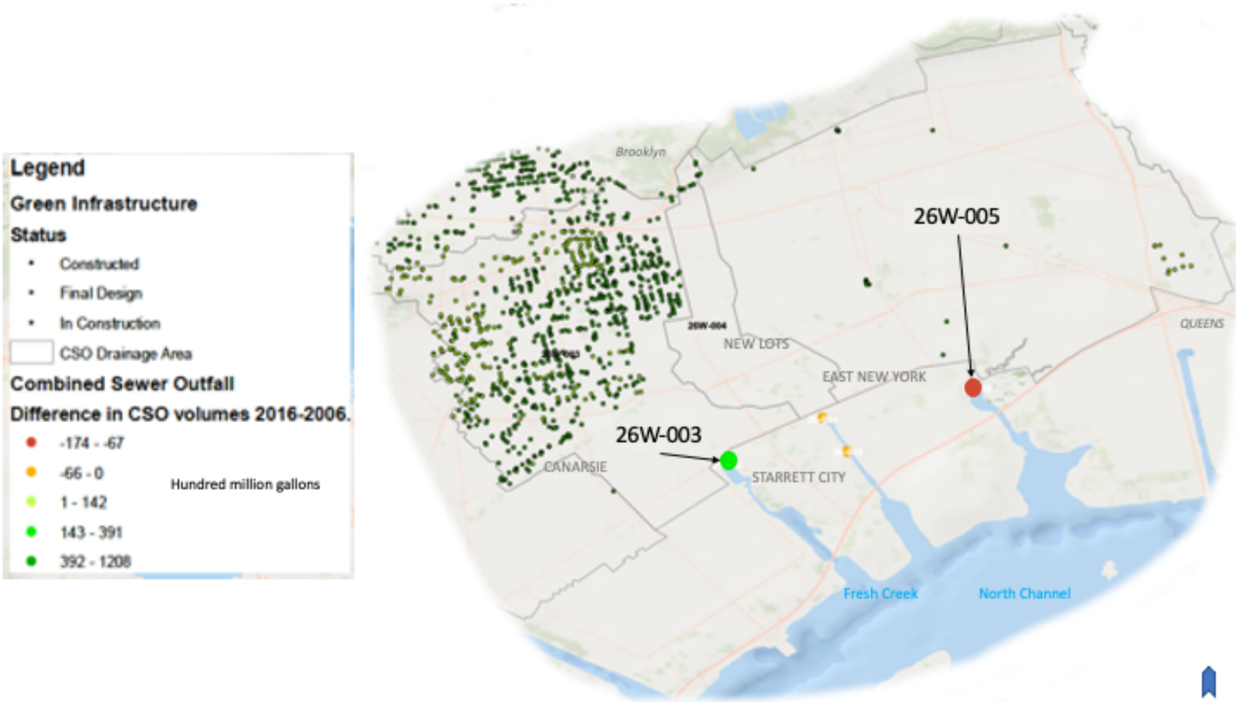

Figure 12: CSO Volume Changes 2006 to 2016, ft. Green Infrastructure Installation. Data Source: NYC DEP (2018) via NYC Open Data

Growing improvement in water quality increases the recreational value of waterways, as necessitated for CWA compliance. New York City water quality is acceptable for recreation most of the time during dry weather, but CSO overflows cause short-term spikes in bacteria levels after heavy rainfall (Boyd 2015; Brosnan and O'Shea 1996). There are strategies in place to try to protect residents from these hazards. Beaches are only designated and advertised for bathing if they are an adequate distance away from CSOs and subject to rigorous monitoring and advisory systems to relay hazard warnings to the public. The city also installed signage on the

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[5] Further analysis is needed to explain this increase in CSO overflow volume. The increase is likely due to increased residential crowding in this area during the timer period.

water and land sides of the 422 CSOs (NYC Department of City Planning 2011, 69). Water quality data on 20 parameters from 85 sample stations are taken on a regular basis and available to the public. The city also launched wet weather alerts and a CSO warning system through NY-Alert and New York City-based warning systems to ask those who have opted into receiving the messages to halt their domestic water use during inclement weather in their area. But at the DEP workshop where experts and scholars were called to submit advice and suggestions to optimize this program, questions arose as to whether asking individuals to curb their personal water use on demand based on modeled outputs based on weather forecasts would be effective, tactful, or fair (Cohn, Ranheim, and da Silva 2018).

Sewer damage and street flooding are life-threatening issues. From 2012 to 2018, a number of devastating summer sink holes in Bay Ridge, Brooklyn over a chronically damaged sewer pipe system were large enough that they engulfed multiple parked cars (DeJesus 2018). In June 2021, chronic flooding of a basement garage of a 136-unit Miami, Florida apartment building rocked the nation after the flooding destroyed the foundation leading to a collapse that killed a dozen people and injured nearly 150 more (Redlener 2021; Baker, Singhvi, and Mazzei 2021; Porter 2021). Just weeks later on July 8, 2021, Topical Storm Elsa caused some frightening subway floods in New York City. Dozens of people were retrieved by rescue teams from highways during life-threatening flash floods (Shanahan and Wong 2021; Bekiempis 2021). People with literally no other way to get home risked their lives just to get on a train at the end of the workday in water hip-deep across Harlem and the Bronx, where site suitability for bioswales was also unviable—but there have to be other solutions. Uneven street flood mitigation blamed solely on topography is almost too insulting to explain.

Chapter 3 • Semiotic Landscapes of Urban Climate Resilience

We're lookin' pretty and gritty 'cause in the city we trust…
An Open Letter to NYC
(*An Open Letter to NYC* 2004)

Geography of Landscape

A landscape is the product of our culture and society, and so if we look really hard at it, we can see a reflection of that society. There are a lot of different ways to use geography and be a geographer. Geographers used physical geography, geology, and topography to site green infrastructure. City planners are geographers who use socioeconomic geography to site new commercial and residential buildings, businesses, and open spaces, and to zone or rezone areas for certain purposes. Geography is used to determine spaces that will be left as reserves, demolished, and/or renovated. Geographies are used to determine property and land values and calculate property and land futures. *Critical* geography and geographic theory aim to assess and critique these material spatial practices, spatial formations, landscapes, and land cover/land use dynamics.

"The dream of an unworked natural landscape is very much the fantasy of people who have never themselves had to work the land to make a living," (Cronon 1996a, 75). The concept of landscape is a useful framework to describe how certain elements—labor, weather, politics, economy, activism—go to work on the land. Sauer called landscape the object of the study of geography and wanted it to (somehow) remain objective from politics, though his framework still called for using the existing landscape as a way to understand the subjective political culture that made it (Sauer 1963, 343).

Landscape is the means by which geographers do history. "The landscape itself appears inert: ready to be dismembered and packaged for export. In contrast, the challenge…is to make the landscape a lively actor. Landscapes are simultaneously natural and social, and they actively shift and turn the interplay of human and nonhuman practices," (Tsing 2005, 53). Landscape theory applies a historical lens to the formation of a spatial phenomenon. Drawing from Mitchell's use of this heuristic landscape framework, we can work "to get 'behind'" the physical landscape of green infrastructure to understand how it was landscaped (spatially produced) and how it aids in landscaping (participates in producing the gentrification landscape) (Mitchell 2003, 236).

Grey and Green Urbanism

Industrialization produced a grey urban landscape. Urban greening coinciding with economic and demographic transformations created a green gentrification landscape in many cities. But not all urban greening is cut from the same cloth. While urban farms and community gardens are linked to a strengthened social fabric of a community (Albro 2019; Binelli 2013; Jimenez 2015; Maantay and Maroko 2018), and rejuvenated parks are often late-stage investments in a gentrified area (Zuk et al. 2015), New York City's municipal Green Infrastructure Grant Program funds private green spaces, such as private green roofs and street-level areas contracted out to private developers.

In the process of urbanization, the natural, often "green," landscape is replaced by a "grey" built environment. As a result, about 72% of New York City is covered by impervious surface, which will not absorb or capture any flood or stormwater, causing it to flow down streets and run off into waterbodies (NYC Dept. of Environmental Protection 2018). Green infrastructure serves to reproduce the green and/or permeable acreage lost to the impervious concrete and tar landscape, perhaps also offering people the opportunity to commune with a naturalistic environment.

Despite its palliative end-goals, green infrastructure construction still has a myriad of costs, disturbances, and risks for residents in the shorter-term, such as noise pollution, reduced sidewalk navigation from damaged or shrunken sidewalks, or underground containment systems leaking or flooding their homes, causing wall collapses, ice in cold weather conditions, and general confusion and discomfort (Eckman et al. 2013). Sidewalk obstruction from new ROW green infrastructure creates mobility issues and trip hazards for residents, especially those who have difficulty walking or who use assistive mobility devices like wheelchairs (Etman et al. 2016), especially in the fall and winter when the sidewalks may also be covered in slippery leaflitter and ice. Additionally, wildlife habitat potential is advertised to attract "pollinators such as birds, butterflies, bees, and other beneficial insects" (Gowanus Canal Conservancy and Trees of New York 2018, 32), but captured trash and certain botanicals can also attract stray animals and vermin like rodents or roaches. Noise pollution, garbage piles, sanitary system insufficiency, water pollution, and air pollution have been collective burdens and risks in New York City since the onset of industrialization in the 1800s, (Merchant 2005; 1996; Bryant 2020).

Many residents have been publicly outspoken about the issues, from unsightly trash in the bioswales, to the disruption of daily construction noise, to deterring customers from entering small businesses. Residents and small business owners alike have gone toe-to-toe with construction crews during bioswale installation (Nir 2017; J. Rosenberg 2016; Eckman et al. 2013; Brady 2017).

The person with a jackhammer has just been sent on a job and the storefront owner is just trying to keep foottraffic pointed toward their business, and they're fighting each other for momentary power on the sidewalk, in a potentially dangerous interpersonal conflict. These laborers are on the frontlines while absentee corporate landlords and developers sit in offices unknown and unscathed.

In Red Hook, Brooklyn, tree canopy dropped by approximately two-thirds from 2019 to 2020 after a contractor removed 457 trees "to make room for transformers, staging and subsystem … infrastructure" (Barnes, Blondel, and Lundi 2021, 28) related to green infrastructure and waterfront development projects. The resulting "tree graveyards," (Barnes, Blondel, and Lundi 2021)—piles of downed trees in otherwise vacant or derelict lots—were staged in front of The Red Hook Houses (a public housing project), eventually sold to another agency, and caused much trauma to the residents who were exposed to the cascading failures: vacant/derelict land (VDL), the tree graveyard, grand-scale construction, and gale-force winds in a pandemic (Barnes, Blondel, and Lundi 2021; Maantay and Maroko 2015; Petroski 1985). The lack of canopy at the Red Hook campus during extreme heat (EH) events with surface temperatures over 90º made the landscape unusable for recreation—which could have been respite for local residents in summer of 2020, which was especially dangerous owing to the isolation necessitated by Coronavirus Disease 2019 (COVID-19) pandemic restrictions when they were mostly sequestered to their homes and block group.

The interim time between the onset of a project and its completion is an acute disturbance to nearby residents. A, let's say, 2-year construction project may seem short in a >30-year development plan, but means two years of sleep disturbance and inaccessible recreation areas for people who have to live there during that time. Time-restricted noise ordinances prioritize people who sleep during hours that appeal to those working out of the home from 9:00am to 5:00pm, but do nothing for those working second and third shifts (such as a 3pm-11pm work schedule) or doing domestic work. Sudden rouses and other sleep disturbances from noise have risks to cardiovascular and mental health with the same severity as sleep apnea and asthma (Halperin 2014). The hazards of constructing health-promoting amenities are disamenities. After years of construction noise, residents may be priced out and have to leave, while new people in the neighborhood get to just walk in—"oh what a nice area this is!"

The years are short, but the days are long: green infrastructure is not a quick enough fix that existing residents do not bear any brunt of distress from construction processes. The newcomers get only the finished product.

Simulating Nature in Urban Environments

Exposure to neighborhood green space has a positive relationship to mental health outcomes in an area (Beyer et al. 2014). The increase in time at home and in isolation from social networks during the COVID-19 pandemic emphasized that access to green space near the home was a major influence on physical health, mental health, and safety (Fagerholm, Eilola, and Arki 2021; Adams, Macey, and Thornton 2021; Barnes, Blondel, and Lundi 2021; Benjamin, Cruz, and Veglia 2021). Planners, marketers, and developers explicitly use this principle in designing and marketing urban green spaces (Willamette Partnership and National Recreation and Park Association 2021; Bakhtiari 2019).

The concept of producing, recreating, or simulating nature in urban environments has been extensively examined (Cronon 1996b; D. Rosenberg and Harding 2005). Some argue that urban greening creates a visual simulation of nature (usually in the form of green spaces) that serves to camouflage the actual physical and emotional disconnect that urban dwellers have from a truer form of nature, and hopes to create an opportunity for people to interface with some semblance of nature (Olwig 1996; Hayles 1996). However, this is not just a simulation. It is 4052 small productions of nature across Brooklyn that might allow residents to be relieved from urban fatigue. Again, green infrastructure recreates some of the "natural" water processes that are lost during urbanization. Studies have shown that while visual stimulus from scenic vistas is linked to mental health and neighborhood attractiveness, other sensory stimuli—sounds, smells, and tastes, including inhalation in higher air quality conditions—also promote mental and physical health, and warrant more study (Yagley et al. 2005; Franco, Shanahan, and Fuller 2017).

There are three ways in which the built environment can contribute to positive mental health impacts: 1) features for social interaction and control (like those found in community gardens), 2) social support (as found in healthy home and community centers), and 3) restoration or "recovery from cognitive fatigue and stress. Laboratory and field studies have demonstrated that exposure to natural elements such as trees, water, and natural landscapes replenishes cognitive energy" (Evans 2003, 545).

The aestheticized elements of green resilience are highly curated. Designers and GIS analysts use terrain modeling to simulate viewsheds and aesthetics of new development (Maantay and Ziegler 2006). The design principles for waterfront public spaces related to New York City's plan to green the city operationalize the aesthetic part of the landscape to construct an experience (Hayles 1996, 410–11). For example, some factors in the constructed viewshed include creating large open gateways that can be seen from downhill, varying the relationship between walkways and the waterfront, avoiding waterfront edge railing that would interfere with sightlines of seated patrons and avoid evoking the separation between the natural and built environment, and encouraging "the experience of the land from the water and the water from the land [to] treat the edge as a zone of exchange, not separation" while also incorporating edge technology that anticipates storm surge and walls of protection against seas level rise (NYC Department of City Planning 2011, 27). But for whom is the experience constructed?

Design Principles for Waterfront Public Spaces

The following principles are intended to guide the development of publicly accessible waterfront open spaces. Design measures reflecting these principles should be incorporated where appropriate and to the extent possible.

Access:

- Provide opportunities for the public to get to the water's edge.
- Make open spaces and upland connections inviting—entrances to open spaces in particular should clearly convey that the public is welcome.
- Vary the relationship between walkways and the waterfront edge, especially in areas where plantings can be installed next to the water.
- Connect shoreline path systems.

Amenities:

- Provide a sufficient quantity and variety of seating, including seating with backs and armrests, as well as companion spaces for those using wheelchairs or similar devices.
- Offer amenities and activities appropriate to the neighborhood and context.
- Install lighting that does not create excessive glare.
- Employ fences and sea rails that are as transparent as possible; avoid placing top rails at the eye level of those seated.
- Provide views of the water from lawn areas, unobstructed by benches or trees.
- Consider a varied landscape design vocabulary, including edge treatments, as appropriate to the program, site, and context.
- Incorporate or reference significant historic features or natural conditions associated with the site.
- Comply with City policies that discourage the use of tropical hard woods; encourage the use of sustainable and renewable materials.
- Provide both sunny and shaded spaces.

Environment:

- Promote the greening of the waterfront with a variety of plant material, including shrubs and groundcover, for aesthetic and ecological benefit.
- Use water- and salt-tolerant plantings in areas subject to flooding and salt spray.
- Maximize water-absorption functions of planted areas.
- Preserve and enhance natural shoreline edges.
- Design shoreline edges that foster a rich marine habitat.
- Design sites that anticipate the effects of climate change, such as sea level rise and storm surges.

Water Access:

- Provide connections between land and water, including opportunities for water recreation where appropriate.
- Provide water-dependent and water-enhancing uses at the water's edge such as fishing sites, boat launches, and get downs to the water.
- In the design of the spaces, encourage the experience of the land from the water and the water from the land. Treat the edge as a zone of exchange, not separation.
- Encourage dock construction and tie-up space for recreational, educational, or commercial vessels, as appropriate to the context, on piers, platforms, and bulkheaded shorelines. Provide ladders or other means of safely accessing the water or watercraft on such sites.

Figure 13: New York City's "Design Principles for Waterfront Public Spaces" as delineated in Vision 2020: New York City Comprehensive Waterfront Plan. (NYC Department of City Planning 2011)

Green design aesthetics are a major tenet of green resilience in New York City and other urban areas (Kaplan 2006; Zuk et al. 2015; Zukin 2011). Design has a vocabulary that is value-laden. As distinct from a concept like beauty, the philosophy of aesthetics is linked to semiotics that convey particular values to an audience, whether stemming from a particular design paradigm or creating allusions to certain periods or historic figures. Green infrastructure has intrinsic aesthetic value and also contributes to the aesthetic values interpreted when looking at the landscape. The extrinsic value of the green infrastructure is the varied contributions to a green resilience aesthetic. The semiotic function of green aesthetics signals to potential residents of the modern gentry that the area fits in with their values—the area is perhaps up-and-coming, health-promoting, modern, quiet, comfortable, and useful for recreation (Zuk et al. 2015; Mead, Cosgrove, and Daniels 1989). The accessibility of green space and effectiveness of health promotion from urban green space only really works when the space is perceived as attractive and safe (Cohen et al. 2014).

Grey infrastructure exemplifies modernist architecture characterized by concrete hardscapes, modularity, and utilitarianism, as a distinct departure from Victorian-style personalization and frills. Modernist architecture is marked by modularity—an element can be dropped almost anywhere. Green infrastructure architecture elements are postmodernist—it uses utilitarianism from modernist design, but it takes a departure that integrates design choices meant to be distinct to the place where it is placed elevating their status to environmental amenities in a way intentionally under-aestheticized utilitarian projects do not (Gregory 2012, 567). That is, beyond their stormwater intervention function, they are supposed to be visually appealing. While modernism and modernization are concerned with architecture that is purposeful and marked by efficiency and intentionally "strict geometries" (Creswell 2013, 172) whose modular nature can be placed anywhere, postmodernism is concerned with designing for local context with a "relativistic" multipurposeness (Gregory 2012, 567).

Each green infrastructure unit design must complement the suitability and character of the site. So, green roofs can only be built on buildings that can withstand them, bioswales can only be installed where the water table is low enough and the bedrock is penetrable, and green streets can only be built where there is an enormous public street space. A regular street is amenable to bioswales holding one tree, while triangles and traffic circles can accommodate small but lush rain gardens (refer back to Figure 5: A stormwater Greenstreet in Williamsburg, Brooklyn. Photo by Rose Jimenez 2022. An anti-essentialist attitude associated with postmodernism is taken toward green amenities: while their intrinsic purpose is to mitigate water pollution, their extrinsic purpose is beautification.

The philosophy of aesthetic value judgements has been widely debated for centuries, owing to the impossibility of empirical measurement or objective confirmation as can be accomplished in, say, mathematics (Slote 1971; Ginsborg 2019). However, the material spatial practices of aesthetics and their semiotic functions used in green infrastructure design and justification are quite empiric.

So, while modernist development models are critiqued for being products of technocratic governance—rooted, authoritatively, in technological advancements rather than holistically — green infrastructure is framed as a move to a postmodernist "paradigm of urban ecological security" that moves past technocracy (Hodson and Marvin 2009). However, green infrastructure siting that claims to be rooted in purely topological considerations is technocratic as well (Vargas-Hernández and Zdunek-Wielgołaska 2021).

Maybe the postmodern aesthetic serves to camouflage that fact, which is why green gentrification theory poses:

> "…economic and neighborhood attractiveness co-benefits …boost political salience and financial feasibility. Yet, as social-ecological resilience is frequently framed in the context of reducing vulnerability to "natural" disasters and extreme events, it is thus decoupled from the political-economic landscape of cities' historic and ongoing patterns of uneven and unsustainable growth," (Shokry, Connolly, and Anguelovski 2020, 1).

Bioswales: Design Principles in Practice

Consider the bioswale. Comprised of a tree or other native vegetation, stormflow inlets, overflow outlets, a gravel bed, subsurface retention stones, and subsurface pipes, bioswales are curbside rain gardens that serve as a staple component of the NYC Green Infrastructure suite.

As further detailed in the schematics (Figure 14), the top section is comprised of a tree, soil, and vegetation that act as the main aesthetic components, and also as a tool for bioretention and capturing excess stormflow and its contained pollutants. Roots absorb water up through the plants while the soil holds and percolates water through to subsurface components, which include permeable hardscaping and pipes that release some of the captured water into the combined sewer. Some of the water transpires through the tree and plants. The perimeter of the bioswale is a low impermeable concrete barrier with curb inlets/outlets, iron tree guard, and signage.

The purported benefits of bioswales exemplify many design principles for resilience planning: reduced UHIE, reduced stormwater treatment needs, green jobs, wildlife habitat, carbon sequestration, improved air quality, reduced building energy, and neighborhood beautification (Gowanus Canal Conservancy and Trees of New York 2018; Eckman et al. 2013).

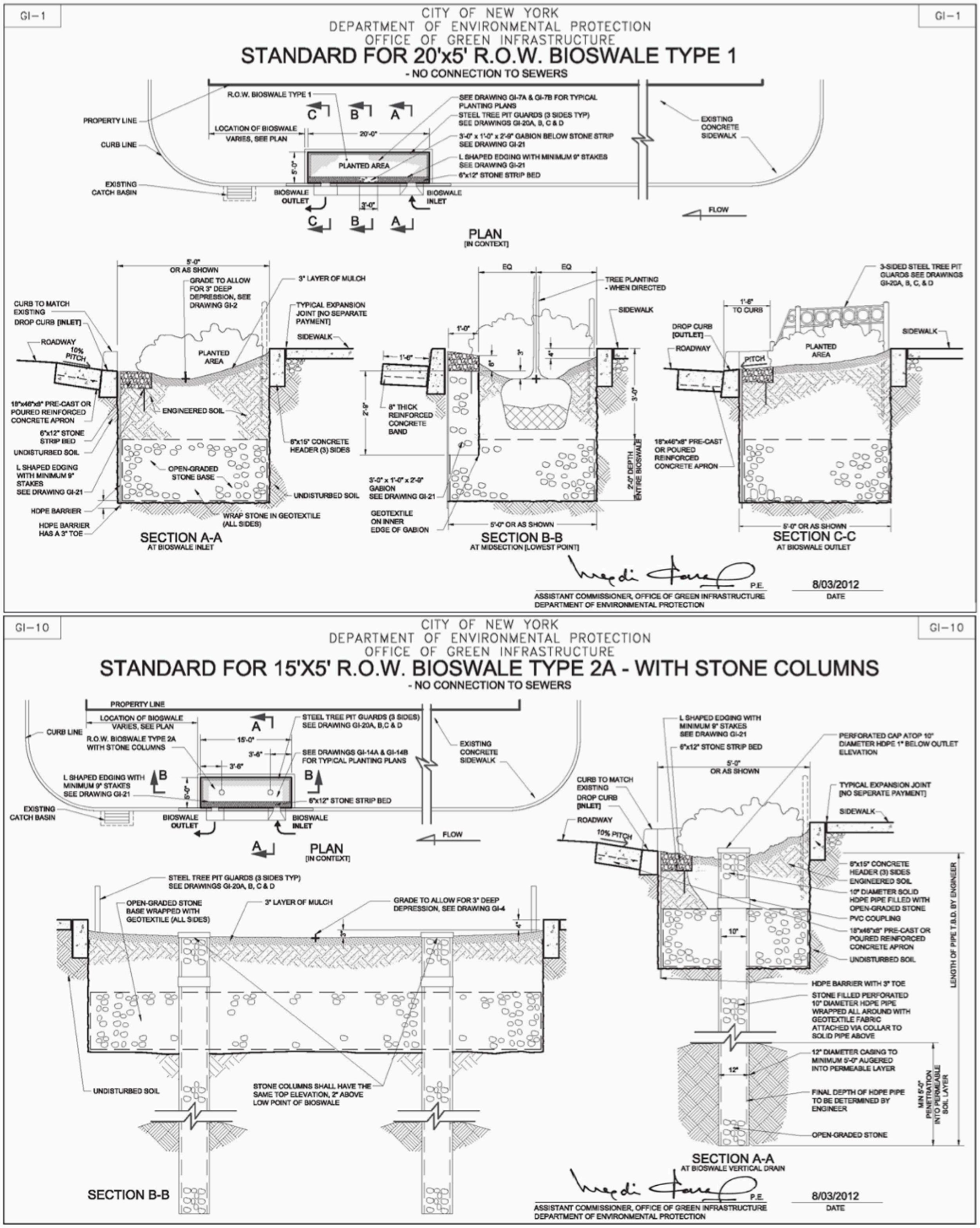

Figure 14: Schematics of two popular types of bioswale used in New York City. Top: a bioswale with a subsurface storage gabion. Bottom: a Bioswale with subsurface pipeline. From "Standards for Green Infrastructure" (NYC DEP 2012, 2012). Source: Archive of NYC Drawings

Green resilience developers list these as the benefits of bioswales:

1) Reduced temperatures and energy use
2) Enhanced habitat
3) Increased property values
4) Improved streetscape aesthetics, and
5) Green jobs (Gowanus Canal Conservancy and Trees of New York 2018, 32).

So, by design, the landscape of green infrastructure is intended and expected to raise property values and improve aesthetics, which is a major contributor to attracting residents (L. L. Colburn and Jepson 2012; Jimenez 2021).

There are two types of attractiveness when we talk about gentrification: land-use potential that is attractive to developers, and in turn, designs by developers that are attractive and accessible to potential new residents. That increased property values are an explicated benefit of bioswales means that increased property values are a tenet of the green infrastructure landscape. Nearly all indexes of gentrification or socioeconomic risk include fluctuation of property values or housing costs, where upward costs are associated with gentrification and depreciation is associated with dilapidation (Klein Rosenthal, Kinney, and Metzger 2014; L. L. Colburn and Jepson 2012; Johnson et al. 2021; Block 2020; Chapple and Thomas 2021).

Bioswales are also the site of an interagency endeavor between NYC DEP and NYC Schools. Inspired by the use of porcelain to line oyster farms in Jamaica Bay, the Department of Environmental Protection is lining some bioswales with upcycled porcelain from NYC Public School toilets in lieu of stone. One effort to reduce sanitary waste was to change NYC School toilets from models that use over 5 gallons of water per flush to models that use about 1 gallon per flush. The expense of this endeavor was too great for NYC Schools, whose budgets are already stretched thin, so the Department of Environmental Protection paid for the new toilets, fronting the endeavor for 80% less sanitary wastewater from schools, and reclaiming materials for bioswales (NYC Water 2017). There's a lot of money in the environment.

Ontologies of Resilience and the Resilience Paradigm of Development

Resilience is now part of the "daily lexicon" of the multitude of actors involved in land stewardship (Branco and Waldman 2016). In an age where climate emergencies are increasing in both frequency and magnitude, the paradigm of development that responds to it appropriates concept of organism resilience and applies it to the built portion of the environment. Resilience was originally used as a bio-ecological concept, and is now "applied to coupled human-environmental systems," and contributes to analyses of human population vulnerability by "avoiding the artificial divide between a physical and social emphasis" (Berkes 2007, 284).

Biological resilience is a property measured by "the persistence of systems and their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables," (Holling 1973, 14). That is not to say that the built human environment is separate from earth systems—in fact, the Anthropocene is a rich field of study.

But while Holling's flagship bio-ecological resilience study described resilience as distinct from stability, the resilience paradigm of planning and development treats the idea of stability as one of its tenets. Holling found that high variability and low stability within a species, coupled with high tolerance for unstable environments in individual organisms, increased their level of resilience (synonymous with survival rates). Highly stable organism communities were found to have low resilience because they were not elastic enough to bounce back without irreparable damage or death. This kind of stability is rigid. In contrast, within resilience planning, stability is idealized as a characteristic of resilience alongside flexibility (Biñas 2018) or a dynamic that incorporates resilience (B. Walker et al. 2004).

Biñas argues unconvincingly that non-profit development work is traditionally centered on poverty reduction, but that climate change and the increase in natural hazards is risky to the extent that it compromises poverty alleviation strategies. To planners, this warrants an urgent and immediate shift to a planning paradigm of resilience against climate disasters, defining "disaster" as a condition in which communities and individuals are unable to cope and bounce back from a hazard event. While the conventional solution to a disaster involves humanitarian aid, this form of emergency management has a high occurrence of malpractice, (Biñas 2018, 5). And the event-based nature of humanitarian aid work fails to solve long-term risk from natural disasters.

However, development under the resilience paradigm may be (re)creating risks to housing stability. The shift to climate resilience intends to put a pin in poverty reduction planning, shift to climate resilience, and then go back to poverty reduction once extreme weather resilience has been implemented (Biñas 2018). But do paradigmatic shifts really rebound in this way? This plan to pause and circle back does not account for the transformations in the economic and social realms that may happen both because of and independently of that green development, including a likely increase in the wealth gap.

Paradigmatic shifts create a new orthodoxy and the transformations during one paradigm theoretically prevent old paradigms from returning to business as usual (Kuhn 1994). Perhaps poverty reduction principles will come back, but the old paradigm will not. Reneging on a paradigmatic shift doesn't work because a paradigm makes its conventions unquestioned. In the resilience paradigm, greening is the convention. A "resilience paradigm requires assessment and monitoring of the social and ecological attributes of the system that confer resilience and the mechanisms by which a system undergoes a regime shift to a new state—parameters such as thresholds, diversity, variability, social capital, modularity, slow variables, adaptability and transformability," (Parsons et al. 2016, 209). According to Mitchell (2003), the landscape makes this unquestionable and that is its purpose.

Vulnerability and resilience are often treated as sliding-scale reciprocals in evaluations of environmental hazard risk (Folke 2006; Gallopín 2006; Clay and Olson 2008; L. Graham, Debucquoy, and Anguelovski 2016). That is, the more resilience a community has, the less vulnerability it is calculated to have, and vice versa. Vulnerabilities can include exposure or sensitivity to risk without ability to recover, while resilience is the capacity to deflect or quickly recover from hazards. Environmental models recognize that (urban coastal) resilience and vulnerability are social-community attributes that both affect and are affected by external forces (B. Walker et al. 2004; L. L. Colburn and Jepson 2012).

Gentrification is a key external force of coastal community vulnerability that leads to restricting of the demographic makeup of a community to an extent that fragments formal and informal community support networks, exacerbating risks to health, wellness, and stability (L. L. Colburn and Jepson 2012; Baez 1996; Johnson et al. 2021; L. Colburn and Clay 2012). Therefore, greening strategies that contribute to gentrification pressure are antithetical to the idea of resilience.

The resilience paradigm of development rests on the ontology that extreme weather events related to climate change drained resources from the momentum of development. This conception indicates a shift from understanding climate change as a force that needs to be stopped to an orthodoxy we have to figure out how to live with. Calls to engineer for multi-hazard resilience focus on adding "man-made" disasters like fires, terrorism/war, and nuclear/power plant explosions to the docket of hazard risk and differentiate building/structure resilience from community or organizational resilience in these events:

> "After each calamity peoples restore their built-up environment. However, required resources (human, material, financial, time) for restoration are permanently increasing. Restoration of the vital functions of the key elements of the built environment (so called critical infrastructure) should be made in first instance in order to provide the right conditions for other elements of the built environment to get restored," (Kirillov, Metcherin, and Klimenko 2013, 127).

However, if the civic built environment is the "ultimate protection layer for peoples… provid[ing] the vital settings for human life and social activities," (Kirillov, Metcherin, and Klimenko 2013, 122) this neglects the need to understand and treat community housing stability as a type of critical infrastructure that gentrification threatens. Rather than reduce risk, the risk is merely diverted to another sector.

The momentum of perpetual development may be unsustainable regardless of ecological scenarios. Social, economic, and city planning restrictions are also hinderances to development. I believe that the momentum of perpetual development is actually sustained by unsustainable development that triggers boom and bust cycles. When it comes to resilience and sustainability, theorists fail to explicate their definitions, and the work begs the question: Resilient against what? Sustaining what? And for whom?

Chapter 4 · Political Ecology of Green Infrastructure

The politics of preservation and restoration short circuit the radical possibilities of producing nature, authorizing instead, a privatized rescripting of nature.
Whose Nature, Whose Culture?
(Katz 2005, 56)

While landscape ecology concerns itself with spatial distribution of flora and fauna species, and cultural ecology concerns itself with human adaptions to environments, political ecology "emphasize[s] the role of political economy as a force of maladaptation and instability" (P. A. Walker 2006). Sited using a combination of financial, social, and ecological logistics, municipal greening initiatives in New York are a political ecology. Through this lens we can unpack the elements of the resilience paradigm wherein places are competing to be the "greenest" and real estate becomes just another greenwashed product for sale (Castree 2020).

In geographic applications of political economy, it is theorized that capitalist investment occurs by means of a two-phase spatio-temporal fix. Rather than sit on an accumulation of money, the people that hold it invest funds, effectively affixing the capital to a certain place at certain times…

> "to build a fixed space (or "landscape") necessary for its own functioning at a certain point in its history only to have to destroy that space (and devalue much of the capital invested therein) at a later point in order to make way for a new 'spatial fix' (openings for fresh accumulation in new spaces and territories) at a later point in its history," (Harvey 2001, 25).

In the first phase—the spatial phase—of the spatial fix in the resilience paradigm, where the city government and developers are tied to greening obligations, and up-and-coming neighborhoods seek green space for both legal compliance and tenant attraction, green infrastructure investments are the place to affix your money (Oza 2011).

In the 1990's, Latour projected that ecologism would become a nonpartisan issue normalized in government with "the creation of specialized administrative bodies, like those for bridges and highways or water and forests, which would be all the more effective, since they would be cast in the mold of the well-established depoliticizing tradition of public sector administration," (Latour 2005, 220–21). In 2014, The Office of Climate Resiliency was founded within the New York City Office of the Mayor. Countless research institutes are dedicated to understanding climate change, from scholarly theory, to biogeochemistry, to clean-up crews. Green work is now an arm of our government and an economic boon.

While environmentalism is still far from politically ubiquitous, gentrification scholars have theorized that the global competition to be the greenest city and the need to comply with government rules like the Clean Water Act, combined with the post-modernist/resilience paradigmatic need for a green aesthetic are central to "boost[ing] political salience and financial feasibility," (Shokry, Connolly, and Anguelovski 2020, 1) for green infrastructure.

The United States Federal Emergency Management Agency (FEMA) suggests to developers that stormwater management solutions can be funded partially through residential utility fees and the leveraging of state-specific grant programs, (FEMA 2021, 202). Green infrastructure development (which includes site selection, geological examination, environmental impact assessment, design, architecture, construction, and ongoing maintenance) is funded in a myriad of ways and at different levels, but private entities that fund infrastructure have their own financial interests to maintain. Says Katz, "for a relatively small price, corporate capitalists buy the good will, averted glance, and forgiveness, as well as patronage, of much of the population, with changes in packaging and tokenistic 'green' gestures" (Katz 2005, 50).

A political ecology lens highlights “the dynamics among actors involved in environmental governance—including the state, civil society, and the public,” and in this case, public-private partnerships for greening. “Municipal urban forestry campaigns can be understood as strategies used by competitive, global cities investing in environmental quality as part of city image-making, within a political-economic context of rescaled, post-industrial, neoliberalism,” (Campbell 2015, 243). In this context, neoliberalism refers to capitalist practices in the United States that encourage government deregulation coupled with strategies to reduce government spending. This is “spatially manifested in the fragmentation of space at multiple scales, from the body to international borders,” (Oza 2011, 256).

Uneven development of green infrastructure across the county is owed to state-sanctioned uneven funding as much as it is owed to uneven underlying geological formations, fragmenting the borough into a northwestern green “modernized” Brooklyn and a forgotten southeastern Brooklyn. When “green” is the contemporary mode of modernization, this leaves southeastern Brooklyn behind as the northern area modernizes.

Paradox of Recovery Narratives

United States historiography often evokes a narrative of recovery or salvation. Historians of the American environment show that what we call “natural” is framed as inert, pristine, or untouched, when in reality, pretty much the entire United States has been acted upon by humans, even prehistorically (Merchant 2005). Even if an area is known as a reserve, it has been delineated, stewarded, and defined to be as such. Natural resources (including amenities and reserves) are manifested by human intervention. “Up close, they replaced existing systems of human access and livelihood and ecological dynamics of replenishment with the cultural apparatus of capitalist expansion,” (Tsing 2005, 53). Urban greening practices and ontologies resilience treat the earth as an inherent autonomous “agent of regeneration” (Merchant 1996, 133).

Urban greening is treated as a strategy of recovery from urbanization. “As a powerful narrative, the idea of recovery functioned as ideology and legitimation for settlement in the New World, while capitalism, science, and technology provided the means of transforming the material world” (Merchant 1996, 137). In particular, environmental engineering and biotechnology serve to transform the terrain and the vegetation so that it can thrive in an otherwise hostile urban environment (Merchant 2013). These strategic ecological boom-and-bust cycles reflect the financial investments in them as well. This is perhaps why the spatial fix is “one of the central contradictions of capital” (Harvey 2001, 25). Centering “the operationalization of resilience—how resilience is ‘practiced,’” (L. Graham, Debucquoy, and Anguelovski 2016, 113) can help open up a discussion of the back-loop of social-ecological system development at the community level and the resilience paradox at the individual level (Bonanno 2021; Folke et al. 2005).

Disasters open opportunities for financial prospecting. Climate disasters open opportunities to make money by incentivizing multiple realms of stakeholders to jump on the climate adaptation bandwagon (Klein 2008). FEMA directs city governments to “leverag[e] nature-based solutions in an era of climate change,” (FEMA 2021, 2). However, FEMA has been heavily criticized for neoliberal policies that produce and then privatize environmental risks, especially related to flooding, across the United States in urban, rural, suburban, and industrial landscapes (Checker 2017; Fink 2016).

Green Futures

Neoliberal practice, which decreases government spending by looking for private enterprise investments for public goods, often results in partnerships between public and private institutions. Many private institutions evaluate what they stand to gain from participation in this partnership by evaluating economic "futures."

Economic "futures" are the (assumed or derived) future prices or rates of an object in a market. Weather derivatives for financial futures (based on future models of weather and climate) are a tool financiers use to protect themselves against expected damages caused by future climate and weather conditions (Oxley 2012). Financial contracts can be made between market investors and operators to exchange items (including land, real estate, and infrastructure) to ensure things are bought and sold at predetermined prices at a certain date or time period, or to determine insurance rates (Benth and Saltyte Benth 2013). With an onslaught of extreme weather coming to New York, as well as ecological resilience mandates from the federal government, this creates an incentive for investors to get into the urban greening arena. The United States has a history of investing in futures to maintain the (self-proclaimed) title of world leader in modernization (Newfield 2005). This necessitates investing in economic futures. Since the new paradigm is the environment, ecological futures are the new thing to invest in (Katz 2005). Green infrastructure has become the future and areas without it, like southern Brooklyn, are left behind.

Public-Private Partnerships for Green Infrastructure

As investors have an incentive to invest in urban greening, the City of New York is incentivized to reach out to investors to fund their green infrastructure solutions. It is not only their money we need, but the resources, labor, and partners these private investors and developers have available to do the actual work. Contractors are also fully liable for property damage due to construction activities (NYC DEP 2021a), so the liability is displaced from the City. Many New York City government agencies have official public-private partnership (P_3) divisions to maintain ongoing relations with private enterprise.

Research from *Water Law and Policy Monitor* (a Bloomberg BNA publication) purports that community-based P_3 models for funding green infrastructure disrupt the status quo (a piecemeal project-based approach), but they still heavily rely on a market-based approach to investment using ecological derivatives to analyze futures. The plan involves employing top-level specialists "who could most efficiently scan the landscape for scenarios providing the lowest-cost opportunity for [green infrastructure] implementation. Some turn-keys could potentially specialize in land use types/scenarios to further increase efficiency" (Lueckenhoff and Brown 2015, 6).

The New York City Department of City Planning expanded requirements for vegetation and permeable surfaces in waterfront developments, front yards, and commercial parking lots, creating an imperative for real estate development to go green (NYC Department of City Planning 2011). There is a mutual imperative encouraged between the public (government) and the private (enterprise) to green[1] an area. The resilience paradigm creates the convention, then city government mandates green infrastructure, then the green infrastructure needs to be funded, private investors need to build green infrastructure, and the city needs to leverage private funding for development.

The combination of public and private investment in green infrastructure complicates the equity of green infrastructure installation (Cherrier et al. 2016). Private financial resources for

[1] Green is a verb now.

urban greening are leveraged by licensing land within or adjacent to parkland and open spaces owned by the city. This can create citywide inequity where parks and forested areas in surrounding neighborhoods are stewarded with private investment funds while others are unmaintained. Private investors in and around parks then have a profit incentive to recoup their investment, which, for them, necessitates things like high rents or tax breaks garnered from green elements or income bracket-based rentals that can block out poorer residents (NYC Department of City Planning 2011). Income-based rentals are based on the median income for residents in the area, so even the people getting supposedly affordable rent in an area are wealthier than average if the area is wealthier than average.

A bioswale can run about $60,000 per unit, which, along with construction disturbances, has led to local protests of their installation (J. Rosenberg 2016). Historically, an aversion to paying taxes for public environmental amenities has also been linked to suburbanization, urban sprawl, "white flight," and related tax breaks for the wealthy to discourage them from leaving their residence or and dropping out of P_3's, so seeing reinvestment in public goods, like parks, can also raise concerns of eventual displacement for longtime working class residents (Checker 2020, 73; Pulido 2000).

One such project funded under the P_3 model was a set of major green roof installations at Admiral's Row[2], which has been rezoned for residential purposes. While there is expulsion of

[2] Formerly a row of 10 houses for U.S. Navy personnel when the Brooklyn Navy Yard was functioning as such

poorer residents from existing residential areas, there are also areas newly zoned for residential use on the waterfront are being newly built up as luxury residential areas.

One 11,736-square-foot green roof project received $351,788 from the New York City Green Infrastructure Grant Program and $537,000 funded from the private company associated with the property. It was designed and constructed by private contractors. The other green roof nearby was paid for in-full by a Green Infrastructure Grant of $344,881 (NYC DEP 2021b).

To qualify for green roof retrofit funding from the New York City Green Infrastructure Grant Program, the following criteria must be met: a private property owner must pre-apply, and projects must have a minimum of 1.5" soil depth, an area of 5,000 ft^2, and cost a minimum of $50,000 (see Table 1). Private rooftop gardens and even full-fledged rooftop parks are amenities used to attract tenants not just to neighborhoods, but also specifically to new blockbuster luxury condominiums like those in the Brooklyn Navy Yard, where a one-bedroom one-bathroom (1b1ba) apartment can now be rented for $4,500 a month.

Table 1: Green Roof Reimbursement Rates from Green Infrastructure Program

Reimbursement Rates ($/$ft^2$) for Green Roof Projects

Soil Depth (Inches)	Price per Square Foot*
1.5-1.99	$10
2.0-2.99	$15
3.0-3.99	$25
4.0+	$30

** In projects between 5,000 and 20,000 ft^2. The reimbursement rate per ft^2 of planted area over 20,000 ft^2 is calculated using 50% of the rate shown above. (NYC DEP 2021b)*

NYC Green Infrastructure Grant Program

DEP's Green Infrastructure Grant Program provides funds for the design and construction of green roof retrofits on private property in NYC

Program Background

The New York City Department of Environmental Protection (DEP) offers green roof retrofit funding for private property owners in New York City. The goal of the Green Infrastructure Grant Program is to incentivize private property owners to retrofit their roofs with green roofs to manage stormwater runoff.

Design Guidelines

Green roofs are vegetated systems built on roof tops, designed to capture and manage stormwater runoff before it enters the sewer system. Funding for green roof retrofits is determined based on green roof area and soil depth following the reimbursement schedule. A retrofit is defined as a project built on an existing building. All projects must contain a root barrier, drainage layer, filter layer, growing media, and vegetation. A structural analysis is required with each application.

Reimbursement Schedule*

Soil Depth (inches)	5,000 - 20,000 (SF)**
1.5 - 1.99	$10
2.0 - 2.99	$15
3.0 - 3.99	$25
4.0 +	$30

*Includes hard and soft costs.
**Any additional square footage over 20,000 is funded at 50% of the listed rate.

Workshops:
DEP hosts quarterly public workshops to explain the eligibility requirements of the program and guide users through the online application. Visit DEP's website for more information.

Website:
https://nyc.gov/dep/gigrantprogram

Email:
gigrantprogram@dep.nyc.gov

NYC Environmental Protection

June 2021

Figure 15: Green Infrastructure Grant Program Flyer (NYC DEP 2021b).

The buildings on Admiral's Row that received this green roof funding are anchored to the adjacent Wegmans Food Market, a high-end supermarket chain, which is another form of P_3 planning. In shopping centers, anchor retail tenants are usually franchises of long-reputed companies renting the largest spaces in an area that are expected to draw shoppers to the surrounding smaller businesses and residences. In some cases, anchor businesses will be so fundamental to the plan for an area that landlords will write stipulations in leases that other tenants can be relieved of contracts if the anchor tenant leaves (Agrawal and Cockburn 2003). These big-box retailers (stores that take up large swaths of physical space and industry space), also called "category killers[3]" (Kroll 1999) in their industry because they crush any competing small businesses, are chosen because they have a built-in customer base and low competition.

Proximity to supermarkets is also a strategic marketing point for real estate agents, where they even use supermarket brands to gauge where the next "hot" market neighborhood might be. Real estate surveys find that the importance of supermarket proximity in looking for a home fall only behind affordability, proximity to schools and workplaces, and neighborhood crime rates (Martin 2017; Rent Editorial Team 2014). Among those surveyed in 2017, Wegmans' markets are the highest rated supermarkets among prospective property owners, preferred by 77% of participants (Martin 2017).

In this case, the supermarket creates a quintessential resource for a large, newly residential area that formerly had no amenities of that type, and in conjunction with urban greening amenities, several perks for attracting new residents to buildings and keeping the real

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[3] For example, stores like home improvement retailer The Home Depot are category killers for multiple small business types within the "home improvement" category—carpentry and plumbing suppliers, greenhouses, hardware stores, furniture stores.

estate market there viable and valuable. In New York City, where most people are walking to the store on foot, walkable proximity is doubly important.

Land Use and Management

In order to keep vegetated roofs viable and valuable, some sort of groundskeeping is needed to maintain them. So, private property owners who receive grants for green roofs must do it themselves, hire a contractor or create a team to do so, or give these extra specialized duties to staff groundskeepers.

In addition to the Green Infrastructure Program, a suite of city plans under the title 'PlaNYC 2030' incorporated a number of greening initiatives and ecosystem services for resilience against climate change, including the MillionTreesNYC (MTNYC) campaign for urban reforestation and afforestation[4]. This project had a goal to plant one million trees in New York City, and surpassed that goal.

However, many trees failed to thrive due to soil properties, disturbance histories, and management regimes (Mejía et al. 2022). Approximately 88% of all trees survived after the first year and, of those, 90% survived through the second year. While this is a generally high and acceptable success rate, a specific pattern of very low survival rate in high-disturbance areas underscored that land-use history and management were underestimated and need to be taken into greater consideration in urban greening projects (Mejía et al. 2022; Simmons and Auyeung 2017). Since these assets are public municipal parkland, "management" refers to undertakings by

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[4] Reforestation is the process of replacing the lost tree population or planting more trees in an area where the number of trees is in decline, while afforestation refers to planting trees in an area where no trees existed in the recent past.

the NYC Parks department, such as addition or removal of trees, mowing, paving, and other municipal land management techniques. "Land-use history" refers to legacy effects from urban land-use change and anthropogenic disturbances: landfill, former farmland, prior residential or industrial areas, etc. (Yang et al. 2017). Additionally, many trees are removed during various construction projects throughout the city, which lowers the net gain of tree coverage (see, *Grey and Green Urbanism* in Chapter 3).

The Luxury Effect and an Ecology of Prestige

In both Los Angeles and New York City, high urban vegetative success rates have been observed to be concomitated with wealthier residential areas despite very different ecological conditions.

A soil legacy effect type known as the "luxury effect" has had a significant impact on urban vegetative success. Luxury effect is a phenomenon in which wealthier residential areas in urban areas have higher quality soils, yielding higher afforestation success and, therefore, higher rates of tree canopy coverage (Yang et al. 2017; Grove, Locke, and O′Neil-Dunne 2014; L. W. Clarke, Jenerette, and Davila 2013). While the luxury effect is largely found in arid cities that do not have ecological disturbances from winter effects like those encountered in the northeast coastal region, an analogous phenomenon known as an "ecology of prestige" is found in New York City.

An ecology of prestige is a "theory of lifestyle behavior which hypothesizes that many locational choices, environmental management decisions, and expenditures on publicly visible environmental relevant goods and services at household and neighborhood levels are motivated by identity and social status associated with different lifestyles and lifestages," (Grove, Locke, and O'Neil-Dunne 2014, 404) in order to uphold visible neighborhood prestige.

Precarity in Stewardship

With Vision 2020, the City vowed 20 years of commitment to green infrastructure, but what happens after that? A chronic issue for new green space budgeting is finding reserve revenue for ongoing maintenance and improvement (NYC Department of City Planning 2011). Some of this is supplemented by large numbers of unpaid court-mandated community service personnel and parks volunteers, and non-profit parks partnerships (like the Prospect Park Alliance, Partnership for Parks, and AmeriCorps), but these can be too precarious to depend on exclusively and rely on morally compromised largely unpaid labor practices.

Are vegetated projects doomed to a brown out? Over 90% of the green infrastructure units in Brooklyn are ROW, easily subject to damage from vehicles and the public. A unique property of vegetated green infrastructure compared to grey or blue infrastructure is its animate, perishable, ecological trajectory. If the infrastructure assets fail to be properly stewarded in perpetuity, they will fail to thrive, and the labor and monetary investments in them will have been wasted (at least from the perspective of people who value the green space as an amenity).

A lapse in stewardship can cause a complete failure of the living components of a green infrastructure unit—they are ephemeral. While native plant cultivars are selected to suit the environment, without stewardship, damages (intentional and accidental) and heavily compacted soils from vehicle wheels, pedestrians, snowbanks, trash staging, and other anthropogenic impacts can stop the vegetative portions of green infrastructure from continuing to thrive.

In special regulations applied to the waterfront area, as seen in

Figure *16*, the maintenance of these amenities is part of a plan “to create a desirable relationship between waterfront development and the water’s edge, public access areas and adjoining upland communities,” and “allow waterfront developments to incorporate [coastal flooding] resiliency measures" (NYC Planning 2009). This is as much about increasing area desirability as it is about flood mitigation.

A system of "sustainable dilapidation" (Lawrence 2015), like the spatial fix, is theorized to produce amenities that only last as long as it takes to draw in investors and tenants and get a return on the investment. In decreasing public spending by pursuing private monies, the government relinquishes certain powers (i.e., regulation) to private stakeholders. A P_3 model for green stormwater infrastructure development funding is a small but powerful part of a political ecology wherein privatization of infrastructure causes uneven funding that enables uneven governance (Appel, Anand, and Gupta 2018).

A sister theory to political economy, the theory of historical materialism posits that the way economics are organized within a community determines the organization of its institutions, such as infrastructure. Dialectical materialism, the method by which historical materialism is enacted, involves looking at contradiction of needs within historical events and material conditions within a landscape and shall be used in this project to display some of the fundamental contradictions of green gentrification.

62-00 GENERAL PURPOSES LAST AMENDED 5/12/2021 HISTORY

The provisions of this Chapter establish special regulations which are designed to guide development along the City's waterfront and in so doing to promote and protect public health, safety and general welfare. These general goals include, among others, the following purposes:

(a) to maintain and reestablish physical and visual public access to and along the waterfront;

(b) to promote a greater mix of uses in waterfront developments in order to attract the public and enliven the waterfront;

(c) to encourage water-dependent (WD) uses along the City's waterfront;

(d) to create a desirable relationship between waterfront development and the water's edge, public access areas and adjoining upland communities;

(e) to preserve historic resources along the City's waterfront;

(f) to protect natural resources in environmentally sensitive areas along the shore; and

(g) to allow waterfront developments to incorporate resiliency measures that help address challenges posed by coastal flooding and sea level rise.

Figure 16: Special Regulations Applying in the Waterfront Area. Source: NYC Dept. of City Planning 2021

Chapter 5 · Gentrification in Brooklyn

I can't take the smell, I can't take the noise, got no money to move out, I guess I got no choice.
The Message
(*The Message* 1982)

Gentrification

The 2020 Brooklyn population was actually smaller than it was in 1940 (2,698,285 vs. 2,576,771 people) (NYC DCP 2022). So with the swaths of new residential development over the last century, why has it become so much harder to find suitable housing?

Gentrification is a complex spatial phenomenon. In general quantitative analysis, gentrification is defined as a measure of demographic shifts coupled with economic transformations (L. L. Colburn and Jepson 2012). The Center for Disease Control (CDC) defines gentrification as a sharp change in land value from low to high (CDC 2017). Gentrification can also be "explained as the result of an alteration of preferences and/or a change in the constraints determining which preferences will or can be implemented" (N. Smith 1979, 539). New residents, new landlords and new landowners, or new businesses tend to thrive in these conditions, while longtime residents (often with lower income than newcomers) are at risk of being displaced or destabilized.

The etymological origins of "gentrification" are quite illuminating. The term was coined in 1964 by Ruth Glass, here:

> "One by one…the working-class quarters…have been invaded by the middle classes…[M]odest mews and cottages…have been taken over, when their leases have expired, and have become elegant, expensive residences. Larger Victorian houses, downgraded in an earlier or recent period—which were used as lodging houses or were otherwise in multiple occupation…are being sub-divided into costly flats or 'houselets'

> (in terms of the new real estate snob jargon). The current social status and value of such dwellings are frequently in inverse relation to their size, and in any case enormously inflated by comparison with previous levels in their neighbourhoods. Once this process of '*gentrification*' starts in a district, it goes on rapidly until all or most of the original working-class occupiers are displaced, and the whole social character of the district is changed," (Glass 1964, 22–23).

Gentrification here seems to refer back to the gentry and genteel shop windows described earlier in the book. The term "gentry" refers generally to a gentle/*gentil*/genteel or "civilized" noble class of (rich, white) landowners in elite social standing who rented out farmland. It evokes colonialism, respectability politics, classism, racism, and even genocide.

And while Glass is describing London prior to the 1960s, Victorian houses and modest row houses all over Brooklyn have been demolished and replaced with modernist modular buildings. The Victorian houses in Ditmas Park, Brooklyn have historical landmark protections, so while they're not being demolished, some have been turned into boarding houses, broken up into expensive rental apartments the way they were in London, or chartered out as vacation lodging through short-term rental accommodation services like the popular AirBnB or Hostelworld.

Jane Jacobs' theories of urban planning make extensive use of gentrification and integrated greening as alternatives to modernist urban renewal processes that involve razing of communities and rebuilding. *The Death and Life of Great American Cities* calls for integration of green space in the landscape as part of the "urban fabric" rather than fully segregating different land use types, partially to avoid severe overcrowding in zones that would otherwise be for discrete residential use (Jacobs 1992, 207). Jacobs believed that a mix of new and old buildings and amenities in the same area contributed to urban vibrancy and increased economic diversity in an area, which is both a tenet of sustainable development and a departure from modernist planning that would prioritize demolition of older buildings and building of uniform, orderly buildings, as promoted for New York City by urban planner Robert Moses (Caro 1975; Jimenez 2021). While this promotion of gentrification is optimistic for social and economic diversity invigorating neighborhoods, gentrification has reached a point where the poorest residents are expelled or excluded from these invigorated areas. And without laws in place to protect longtime residents in an area, they remain vulnerable to housing disruption (Freeman 2015; Jacobs 1992; Stein 2019).

Gentrification is a process where a pattern of neglect or divestment of monies from poor neighborhoods exacerbates vacancies and drives down land value, followed by a period of reinvigoration by private investors encouraged by governmental and private financial incentives that increase the attractiveness of an area (N. Smith 1979; 1987). As opposed to persistent ideas of gentrification that lay the blame with new residents, which may be traced to early theorists of gentrification, more contemporary scholarship on gentrification describes gentrification as a top-down process, naming the top at difference scales: private investors, city government, federal government, financial institutions, and/or capitalism as a whole (Glass 1964; N. Smith 1987; Hammel and Wyly 1996; Stein 2019; Anguelovski et al. 2019; Checker 2020; Johnson et al. 2021).

Sometimes the process of gentrification involves wealthy investors buying property in new development areas and remaining absent from the building. Companies may also buy out clusters of existing homes in a neighborhood and sell them to people in a much different wealth bracket or ethnic background than current residents. Neighborhoods that are filled with families may start seeing apartments and houses shared by young upwardly-mobile urban professionals[1] who are not related, have no dependents, and may not even know each other, but have a higher combined total income than a family with one or two working adults and dependents.

So, hypothetically, if one head-of-household on a single salary, is looking to rent a 3-bedroom apartment for their family, but three individual unrelated adult roommates (often unpartnered and/or without children) on the same salary each, then their budget for the same space is triple the family's. Single-income households also have a more unstable (read: less economically resilient) financial situation than a three-income household. One person losing their job in the family puts the family out on the street. One roommate losing their job obligates the rest of the household to pick up the slack or find a new roommate without having to turn over their entire lease. The competition is stiff. What's a better scenario for landlords?

In particular, poor women of color are the most likely head-of-household demographic to be evicted from their homes, especially if they are raising children in the household. "Today, most poor renting families spend at least half of their income on housing costs, with one in four of those families spending over 70 percent of their income just on rent and utilities." At the same time, "only one in four families who qualifies for affordable housing programs gets any kind of help. Under those conditions, it has become harder for low-income families to keep up with rent and utility costs, and a growing number are living one misstep or emergency away from eviction" (The Eviction Lab 2022). These family displacements disrupt the lives of children in a community—lowering school enrollment, perpetuating poverty, making it more difficult to obtain or maintain a job, making it more difficult to escape or avoid domestic abuse, cause

[1] Or "yuppies."

severe mental and physical distress, and/or (in the case of eviction) make it difficult to ever rent another unit under your name.

From 1999 to 2002, my multi-generational family-of-five leased a 1250-ft^2 3-bedroom 1-bathroom top-floor cooperative housing (co-op) apartment on Bay Parkway near Gravesend Bay for a for $1000.00 a month. The co-op shareholders were looking to sell the unit shares to us for $149,000.00, without consideration of the $36,000.00+ we had already paid them in rent and the maintenance we had done on the unit. Unfortunately, we were unable to make the down payment at that time, despite my aunt working parttime, my grandmother working fulltime, and my mother working overtime, and we had to leave, which was probably one of the most devastating blows to our quality of life. A decade later, environmental remediation and waterfront development related to damages from Superstorm Sandy transformed the economic landscape of the area. In 2020, the same unit was listed online at Zillow.com for over $600,000.00—a 400+% appreciation in value.

Green Gentrification

In the second phase—the temporal phase—of the spatial fix, the capital investments that get displaced into long-term projects take "many years to return their value to circulation through the productive activity they support" (Harvey 2003, 88; cf. Oza 2011). In the era of green climate resilience orthodoxy, investors affix their money to various forms of green infrastructure in up-and-coming neighborhoods where property values are promised to rise, as stated in driving design principles and long-term city plans (NYC Department of City Planning 2011; Fekete and Rosenzweig 2018). The promise of property value rise is what actually manifests the investment that raises the property value.

Public events for resident participation in development facilitated by formal organizations may foster an environment that stifles community members' capacity for input (J. T. Miller 2016). The compromises that occur during these processes leave residents with the fraught paradoxical and "painful choice of either resisting environmental improvements altogether or of being priced out of their neighborhoods," (Checker 2020, 82). These "green locally unwanted land uses (green LULUs)" are often indicators to socially vulnerable groups that they either have to modify their relationship with their neighborhood or risk displacement (Shokry, Connolly, and Anguelovski 2020, 2).

Health, safety, and sustainable development are intimately linked, which is illustrated by the socioeconomic gradient for many health outcomes where the poor are sicker and the wealthy are healthier (Molamohamadi and Ismail 2014; Zhang et al. 2013). Gentrification affects community health and the health of legacy residents in many ways by shifting access to appropriate resources (CDC 2017). The CDC names gentrification as a factor in negative environmental health impacts, where increasing environmental injustice limits access to affordable healthy housing, healthful and culturally appropriate food choices, transportation options, well-funded schools[2], bicycle and walking paths, exercise facilities, and social networks, while also potentially changing stress levels, injuries, violence and crime, mental health, and social and environmental justice (CDC 2017; cf. Comber, Brunsdon, and Radburn 2011; Maguire et al. 2017; Baez 1996).

[2] Public school funding is tied to residents' income levels. Public schools are often funded by local taxes, so areas with people in lower tax brackets have lower funding for public schools than areas with people in higher tax brackets.

Creation and/or restoration of green amenities in conjunction with rapid economic and demographic transformation in an area constitutes environmental or “green” gentrification (K. Gould and Lewis 2016). Green gentrification is a process of ecological clean-up that follows the onset of gentrification in an area, which accelerates community changes or displacement, especially for the most economically and socially vulnerable (Maantay and Maroko 2018; Maantay 2002a; 2002b). However, it has also been theorized that greening sparks gentrification, rather than perpetuating gentrification, or that only certain types of greening, like large parks, are related to gentrification (K. A. Gould and Lewis 2017; Rigolon and Németh 2020). Much green gentrification research has been on parks and restoration projects, but none so far have touched upon the ongoing green stormwater infrastructure efforts in New York City.

In Gowanus, Brooklyn, it was shown that water quality improvement efforts were the result of gentrification already taking place, making the city consider the area “‘worth’ cleaning up” (J. T. Miller 2016). Suddenly making an area or resource more “amenable” may negatively impact longtime residents that suddenly find themselves surrounded by wealthier neighbors, and often is followed by people being slowly displaced by either eviction, being priced out of their homes, or general antagonism towards them from new, more affluent residents (Nir 2017; J. Rosenberg 2016; Martinez 2017).

Community Attractiveness

Federal research on measuring gentrification in United States northeast coastal areas, including Brooklyn, treats attractiveness of coastal towns for new residents as a given (L. L. Colburn et al. 2016; Jepson and Colburn 2013). In addition to the primary ecological benefits, green infrastructure proposals include beautification as part of a suite of neighborhood attractiveness co-benefits (see Chapter 3). The fringe impacts of green infrastructure like UHIE relief are necessary to get projects greenlighted as per mandated design principles.

There are concerted efforts to use urban greening as a strategy to actively reduce the environmental justice issue of thermal inequity, for example (Byrne et al. 2016; Klein Rosenthal, Kinney, and Metzger 2014). However, diminished heat stress in one area does not help people who wind up being displaced from these “cooled” areas—and cooled areas are cool. Lowered risk of heat vulnerability and desire for access to natural amenities are linked to neighborhood attractiveness for yuppies and other wealthy groups, (L. L. Colburn and Jepson 2012). In maddening contrast, numerous studies have shown that areas in cities across the United States communities with largely Asian-American, Black, Hispanic, and/or low-income populations are the hottest and have the least tree canopy by a whopping 92% (Bock et al. 2021; K. M. Hoffman et al. 2016; J. S. Hoffman, Shandas, and Pendleton 2020; McDonald et al. 2021; Klein Rosenthal, Kinney, and Metzger 2014; Nayak et al. 2018).

The framing of green infrastructure deployment’s multiplicity of benefits renders it “decoupled from the political-economic landscape of cities’ historic and ongoing patterns of uneven and unsustainable growth” (Shokry, Connolly, and Anguelovski 2020, 1). However, there is a slippery slope in the discourse of neighborhood attractiveness causing gentrification. That is, certain qualities make areas attractive to *developers*, who then use market research to develop with *the intention of attracting new residents* to a location, and development prospects must appeal to planners who have the say in official development.

Vulnerability is a structural problem, not an individual or interpersonal one (Domi 2021). So, while newcomers’ financial investments in their communities (like which stores they choose to patronize or not patronize) may contribute to social, cultural, or economic changes that fall out of line with immigrant and/or longtime resident communities, the structure that drives these behaviors is much larger than that. For example, chain stores with identical layouts at every franchise selling familiar brand name products may be less intimidating to a new, white population than specialty stores appealing to specific cultural needs or mom-and-pop shops, drawing in more shoppers even if they are pricier.

I explored qualitative data and local ecological knowledge (LEK) from NOAA's Voices: Oral History Archives to expand upon some of the pressing social indicators of gentrification pressure. This archive is a collection of oral histories from people who have a diversity of experiences working in or alongside the marine fisheries industry. One document described the process of sustainable dilapidation as antithetical to the essence of the "cultural view-shed issue" that draws new residents to the area in the first place (Lawrence 2015, 34–35). That is, mainstay small business and community hubs form a distinct and appealing community for tourists and new residents. Larger populations, however, increase demands on businesses that necessitate changes to their business practices that are not as aesthetically appealing as their existing, more artisanal practices (such as a fishmonger needing supply from fish farms rather than local wild fishermen).

The element of culture and authenticity is often hailed as quintessential to attractiveness, but there is a paradox at play. Gentrification and sustainable dilapidation "chang[e] the essential character and flavor of a community" (Yagley et al. 2005, 1), while "the people who produce space through their everyday labor and practice—and not just those with the money to buy a piece of land and property—should control its form and function: the city must belong to those who build it, not those who buy it" (Stein 2019).

Brooklyn Marine Fisheries Community Snapshot

The dwindling marine fisheries economy in Brooklyn was an early catalyst of vast socioeconomic change resulting from an ecology of deteriorating water ecology in New York City. Drawing from methods used to create a story map of gentrification pressure in NOAA's Northeast Fisheries jurisdiction (Jimenez 2021), I conducted a trend analysis based on qualitative data from several resources, including NOAA's community social vulnerability indicators (CSVI) and community snapshot online portals. Supporting LEK was excavated from materials in the Voices Oral History Archives.

Keyword search terms were used to locate relevant oral histories in the online archive collection. The search term *Gentrification* only yielded 12 results, and the archive was not optimized to search for partial terms or modifiers like *gentri-* or *gentr**. Furthermore, orators tended to talk casually about issues related to gentrification, such as having to move due to a career advancement or the political climate, without explicitly using the word "gentrification."

The search term *Brooklyn* yielded 36 interview results. Some results were redundant due to the archive being organized by orator and some oral histories having multiple people in conversation, or others being interviewed in multiple parts. I read through the remaining transcripts, and excluded those where the term was only included in the metadata[3]. Ultimately, I surmised the following from close readings of from 20 transcripts (listed in Appendix I):

Brooklyn's maritime and fisheries industry has been in a slow decline for many decades. As the coastal economy shifted from the 1960s through the 1990s, industry workers (largely based out of Sheepshead Bay in southern Brooklyn) migrated north to New England or south to

[3] Such as the participant's birth place

Virginia and the Carolinas, (Jeffries 2011; *Cordell Expeditions. Oral History Interview with Elaine Dvorak, Sue Estay and Don Dvorak by Dewey Livingston and Jennifer Stock on March 9, 2012.* 2012; Grachek and Hall-Arber 2011; Kvilhaug 2005; Allerdt 2011). Housing cost, fishing regulations and restrictions in New York State, especially related to the Long Island Sound, compared to other states (Ruhle 1987), permanent and seasonal job opportunities (Scavone 2011; Roche 2010; Pederson 2008; Rogers 1997), or desire for more amenable ports with space for bigger or more technologically advanced boats (Dawson 2005; Ulrichsen and Ulrichsen 2017) made these moves attractive. Pollution overload and waste management were also a great contributor to shifting economies related to manufacturing decline and fishery reduction in Brooklyn (Merchant 1996; Bryant 2020; Bernice et al. 2016).

Subsistence fishing became untenable. Being unable to safely eat their own catch from the Long Island sound seems to be a trigger for families living and working near the water and depending on their catch for either home use, business supply, or both, (Tursi 2016). Fisheries work on the southern coast of Brooklyn became less and less sustainable around the same time the garment and manufacturing industries largely housed on the northwest coast also started dwindling.

Community (Re)Branding

Zukin theorizes that the union between culturally dominant newcomers and "profit-oriented place entrepreneurs" (as Logan and Molotch (2007) call them) creates a discourse that "brands" a place, and that branding turns into "shaping new zoning (and other) laws" for development (Zukin 2011, 162). And rezoning and planning are as much about exclusion as they are about inclusion. In many respects, Brooklyn itself has become a brand, but each neighborhood gets branded and rebranded with both official re-delineations and the passage of time. Check out Table 2*,* for a more detailed list of rezoning in the borough from 1992 to 2010.

Table 2: Rezoning in Brooklyn, 1992-2010

Original Zoning	Code | Area Name	Rezoning
Non-Residential	B1 | Greenpoint/Williamsburg	Residential/Mixed Use/Commercial
	B2 | The New Domino	Residential/Commercial
	B3 | Williamsburg Bridge	Non-Residential and Commercial
	B4 | Kedem Winery	Residential/Commercial
	B5 | Schaefer Brewery	Residential/Commercial
	B6 | Rose Plaza on River	Residential and commercial
	B7 | Vinegar Hill	Residential/Mixed Use/Commercial
	B8 | DUMBO	Mixed Use
	B9 | Main Street	Residential/Commercial
	B10 | Dock Street	Mixed Use
	B11 | Red Hook Stores	Mixed Use
	B12 | Ikea	Non-Residential (other)
	B13 | 363-365 Bond Street	Residential/Mixed Use
Low-Density Residential	B14 | The Home Depot	High-Density Residential and Commercial
	B15 | Coney Island	
	B16 | Gateway Estates/Fresh Creek	

For example, in the northern Brooklyn neighborhood Williamsburg, the shutdown of ports and the Brooklyn Navy Yard, and abandonment of factories in the area throughout the fiscal crisis of the 1960s and '70s drew in a population of artists and musicians assuming empty warehouse space in the area for community building, work space, shelter, music performances, and parties that continued through the new millennium (Zukin et al. 2009, 53). But, from the mid-1990's through 2005, loft spaces and apartments were slowly bought up and converted to condominiums, stores, and bars.

In 2005, the East River waterfront was rezoned from industrial to residential. About this, the New York Times said the rezoning…

> "would transform the long-crumbling waterfront into a residential neighborhood complete with 40-story luxury apartment buildings…and manicured recreational areas [including 54

acres of parkland]…to capitalize on one of New York's most ignored assets, its miles of neglected waterfront, while also protecting a neighborhood that has long been a repository for unpopular projects like power plants, waste transfer stations and porn shops," (Cardwell 2005, 1).

And while the article even acknowledges that "young people seeking an alternative to Manhattan" (p. 1) fueled a nightlife boom in that area of Brooklyn that helped propel the housing market there, what these mainstream ideas ignore is that the neglect of the area was on a municipal level, and that longtime Polish and Latino working-class communities, as well as the more informal subcultures and artist communities, were caring for the neighborhood for a long time. But these new developments are the ones eligible for 25-year tax exemptions and public esplanade[4] grants. It is important to note what is said in the humanities and big publications like this because it is consumed by the public and shapes public perceptions and social dynamics.

These diverse street and warehouse community uses (like underground punk rock and hip-hop music venues, art warehouses, or fruit vendors) were largely operating outside legal business parameters (unlicensed collectives not necessarily paying taxes). And so when the investors came in, they had to get out. Perhaps a radical take on these community amenities is that the cultural contributions of these grassroots collectives directly do more for the community than the transformations of their tax contributions would do.

Additionally, rezoning in Brooklyn is related to rezoning in other areas, essentially just displacing certain environmental issues to other places. Fishing moved up and down the coast to other states, and a lot of manufacturing moved overseas. More locally, "expulsive zoning"

[4] Fancy word for "walkways" used in development proposals.

practices show growing pollutive manufacturing zones in low-income and racialized areas, such as the south Bronx, are linked to shrinking pollutive zones in Brooklyn and Manhattan (Maantay 2002a). Environmental "negatives" are not simply eliminated in areas with green infrastructure installation, they are (re)moved elsewhere.

Analysis of Income Disparities in Brooklyn with the Gini Index

The Gini Index is a statistical analysis that expresses the dispersal of wealth within a given area, based on the frequency of certain values (in this case, individuals' income), where a coefficient of 0% would indicate perfectly equal distribution of wealth, and 100% indicates one person holding all of the wealth. Usually, 25% is the projected tipping point of harmful inequality. As higher-earning individuals move into lower-income neighborhoods and lower-income individuals move out of them, these dynamics change income inequality measured in percentage or Gini scores. While areas can have similar coefficients of wealth disparity, they can differ in overall wealth.

In Brooklyn, Gini coefficients for each neighborhood tabulation area (NTA) vary somewhat (38.6% to 53.2%). However, the difference in wealth between NTAs varies greatly, with the top earnings of $195 thousand per year in East New York but top earnings as high as $1 million per year in Brooklyn Heights while they have almost the same Gini score (48.3% vs. 52.6%). In Table 3: Neighborhood-level Gini Scores compared to Top Earnings for Brooklyn (2018), a more detailed breakdown of Gini scores in Brooklyn neighborhoods can be seen. See also Figure 17, where the Gini scores are mapped over time, indicating a growth in the wealth gap across the entire borough at the census tract level.

While neighborhoods are not as socially segregated by strict geometric borders, the approximate borders used for cartographic NTA delineation have revealed that neighborhoods in

Brooklyn have distinct wealth and property value disparity, which greatly impacts rent and mortgage rates, which in turn impacts the demographics (economic, racial, ethnic, age brackets, etc.) of the residents in that neighborhood, and eventually the brand of the neighborhood, too (Jacobs 1992). This enacts something of a "power-geometry," or a space-time condition where some people (in this case, the wealthiest people) can move into any neighborhood they wish, while the poorest people must stay put until they get priced out of their homes (D. Massey 1993). Socially, many neighborhood borders are only permeable in one direction.

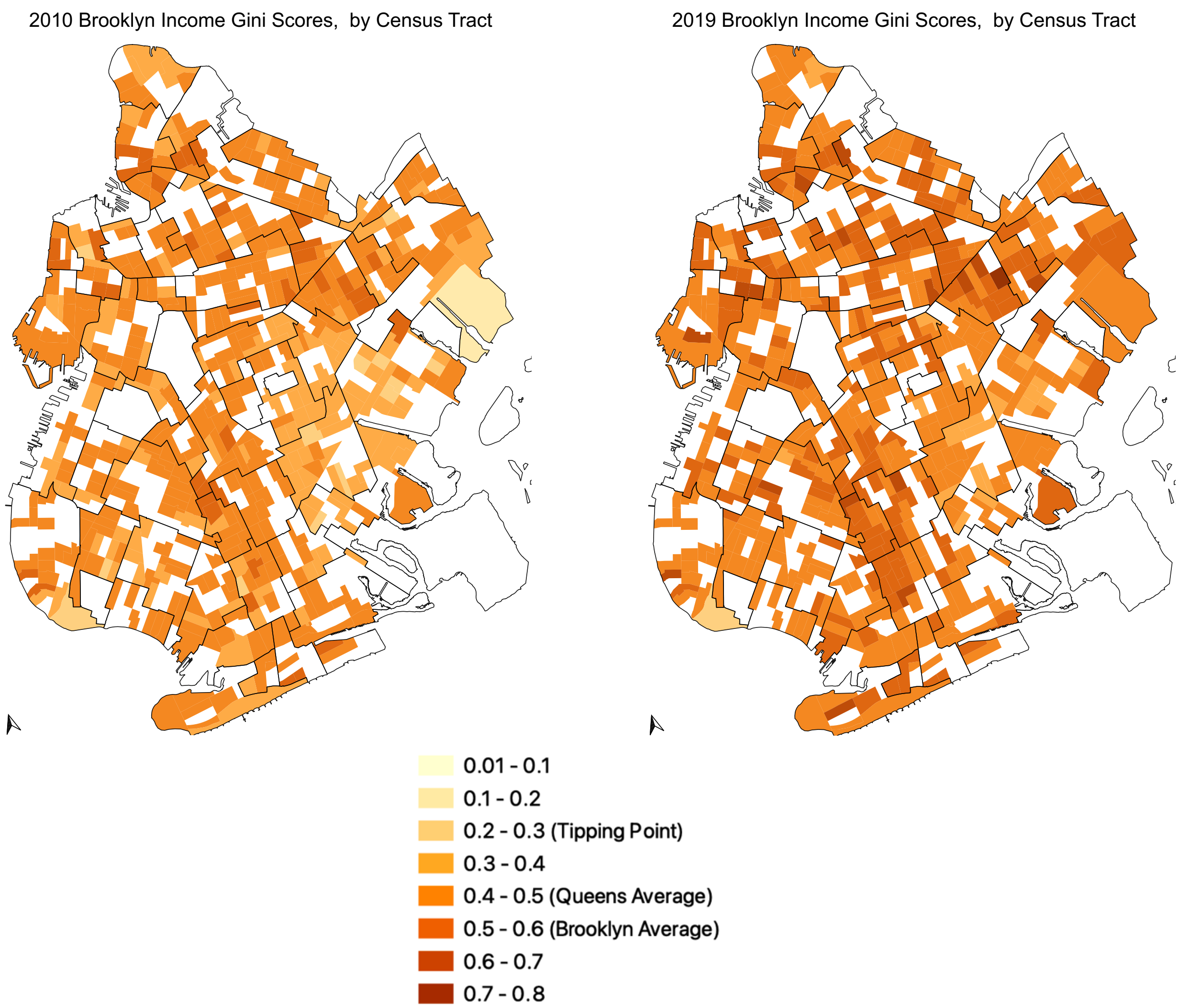

Figure 17: Brooklyn Gini Scores, by Census Tract, 2010 vs. 2019. Data Source: U.S. Census Bureau

Table 3: Neighborhood-level Gini Scores compared to Top earnings, for Brooklyn (2018)

Gini Index of Inequality		Mean Household Income of the Top 5% Earners	
	0% 10% 20% 30% 40% 50%		$0k $500k
New York	54.7%	Brooklyn Hts	$894.0k
New York City	54.7%	Carroll Gdns	$780.9k
Ocean Parkway	53.2%	Park Slope	$732.5k
Brooklyn Hts	52.6%	Boerum Hill	$725.1k
Brighton Bch	52.3%	Cobble Hill	$691.3k
Kings	52.0%	Gowanus	$591.9k
Brooklyn	52.0%	Hunters Point	$532.3k
Brownsville	51.3%	New York Area	$508.9k
New York Area	51.1%	New York	$503.9k
New York	51.0%	New York City	$503.9k
Gravesend	50.5%	Prospect Hts	$503.2k
Coney Island	50.1%	Windsor Ter	$493.9k
Ocean Hill	50.0%	Clinton Hill	$463.4k
Boerum Hill	49.6%	New York	$455.3k
Midwood	49.6%	Ocean Parkway	$441.2k
Bedford Stuyvesant	49.5%	Midwood	$435.8k
Middle Atlantic	49.4%	Fort Greene	$428.4k
Fort Greene	49.3%	Northeast	$421.4k
Northeast	49.1%	Middle Atlantic	$419.9k
Gowanus	48.6%	Marine Park	$391.3k
Williamsburg	48.5%	Howard Beach	$387.2k
East New York	48.3%	Kings	$375.2k
Borough Park	48.1%	**Brooklyn**	$375.2k
Crown Heights	48.0%	Fort Hamilton	$370.5k
United States	48.0%	Gravesend	$363.2k
Prospect Lefferts â€¦	47.9%	United States	$358.3k
Red Hook	47.8%	Bay Ridge	$351.3k
Bushwick	47.7%	Georgetown	$348.7k
Carroll Gdns	47.4%	Mill Basin	$343.9k
Bensonhurst	46.8%	Greenwood	$342.9k
Wingate	46.6%	Prospect Lefferts â€¦	$339.4k
Park Slope	46.5%	New Utrecht	$322.9k
Prospect Hts	46.3%	Coney Island	$322.8k
Bay Ridge	46.2%	Dyker Heights	$321.0k
Kensington	46.0%	Williamsburg	$319.4k
Fort Hamilton	46.0%	Maspeth	$313.4k
Dyker Heights	45.9%	Greenpoint	$311.6k
Clinton Hill	45.7%	Flatlands	$281.8k
Homecrest	45.5%	Brighton Bch	$280.5k
Flatbush	45.4%	Sheepshead Bay	$278.8k
Cobble Hill	45.3%	Glendale	$278.6k
Bath Beach	45.0%	Bensonhurst	$275.6k
Windsor Ter	45.0%	Kensington	$273.4k
Howard Beach	44.8%	Bath Beach	$270.7k
New Utrecht	44.7%	Bedford Stuyvesant	$269.4k
Sheepshead Bay	44.7%	Canarsie	$268.8k
Maspeth	44.2%	Flatbush	$264.7k
Georgetown	44.2%	Borough Park	$264.3k
Sunset Park	44.1%	Crown Heights	$258.7k
Greenwood	43.9%	Ocean Hill	$248.1k
Mill Basin	43.5%	Ridgewood	$246.9k
Hunters Point	43.1%	Red Hook	$239.4k
Greenpoint	43.0%	Bushwick	$236.8k
East Flatbush	42.3%	Homecrest	$232.1k
Ridgewood	41.7%	East Flatbush	$221.8k
Marine Park	41.3%	Sunset Park	$211.0k
Canarsie	41.0%	Brownsville	$200.4k
Flatlands	38.8%	Wingate	$199.2k
Glendale	38.6%	East New York	$194.8k

Data Source: U.S. Census Bureau 2018

Statistical Analysis of Select Racial Demographics in Brooklyn and New York City

The borough of Brooklyn is about 70.82 square miles of land with a population of over 2.7 million people (U.S. Census 2020). And this population is highly racially segregated. Based on application of United States Census (2010) data to indexes of segregation, New York City has a score of 56.9% on the Isolation Index of Segregation and a score of 82.2% on the Index of Dissimilarity.

The isolation index assigns a score from 0-100, indicating the percentage of the population falling into a certain demographic out of the total population of a census tract. In this case, we are indexing self-identified people of non-Hispanic Black or African American descent. As the isolation index approaches 100, it approaches total isolation. Lower scores indicate higher integration/dispersal of that group within the census tract. Of course, since the isolation index only looks at one group compared to one census tract, it is not necessarily indicative of intersectional diversity throughout the tract. It also means that as the population of census tract increases, the isolation index will likely fall, (Wong 2005; Johnston, Poulsen, and Forrest 2009). Of course, social integration and statistical population dispersal are not necessarily intertwined. People can live in very close proximity and not be very socially interactive.

The Index of Dissimilarity compares how dissimilarly two mutually exclusive demographic groups are dispersed across census tracts. Ranging from 0-100, a higher number (60+) indicates a high level of segregation. A score of 40-50 is moderate. Scores of 30 or less are considered low. In this case we are comparing the non-Hispanic Black population to the non-Hispanic white population. Again, this also does not take into account the populations other than the two demographic markers compared in it, (D. S. Massey and Denton 1988). The non-

Hispanic Black population of New York City has a moderate-to-high isolation index and has a high index of dissimilarity with the non-Hispanic white population of New York City.

Brooklyn Neighborhood Studies

Recent GISc-based studies on Brooklyn have shown that greening (defined in this context as "environmental amenity creation and restoration") is not an indicator of incoming gentrification, but an indicator of acceleration of the process, especially in the era of New York City's waterfront development plan and CSO control orders to comply with the Clean Water Act (Cherrier et al. 2016; Waterkeeper Alliance 2019; J. T. Miller 2016; Maantay and Maroko 2018).

Likely owing to this immense size, heavily concentrated population density (38,634 people per square mile), and high rates of racial and economic segregation, many research projects on Brooklyn geography are conducted at the neighborhood level, and are also specific in the conditions related to gentrification there. However, most studies here still bring up the idea of taking aspects of the community built by community grassroots and seized for capital expansion, and most are done with consideration of a specific local waterbody.

Transportation and evaluation of the delivery and accessibility of healthcare service amenities in the **Greenpoint** and **Williamsburg** area, which has extensive waterfront development in recently rezoned areas, speak to an increase in demand for hospital care being related to an increase in residential populations after a change in zoning from industrial to residential, and differences in hospital preference (largely outside the immediate area) spoke to a relative lack of healthcare coverage among ethnic and racial minorities, heterogenous/clustered population density across the area (Naphtali 2006). Some research on Greenpoint shows that the high relative bicycle usage and streetside bike storage by the 18-35-year-old crowd has changed several things in the Greenpoint landscape, some of which has led to police intervention (DeSena

2012). Drivers and bicyclists have conflicting needs on roads. Increased noise complaints have arisen from the both late-night parties by the younger population and early-morning traffic from working-class homeowners going to work, an interesting conflict rising from a phenomenon where two distinct age-group demographics have a temporal, or time-based, differentiation in the ways they use the same physical space.

Other research on Greenpoint posits that green resilient development related to Newtown Creek (including green infrastructure assets) may cause the tipping point in creating a super-gentrification phase in the neighborhood by displacing the rest of the working-class population there, (Curran and Hamilton 2012). The cultural shifts in Williamsburg from World War I to World War II, serialized in the novel *A Tree Grows in Brooklyn* (B. Smith 1943), show a long history of struggling revitalization and dilapidation waves in this area.

The prevalence of community gardens has been found to coincide with low-income areas in The Bronx, Manhattan, and Brooklyn. The confrontation of community gardens with the municipality and real estate entrepreneurs during gentrification waves was examined in **Bedford-Stuyvesant Heights** (AKA Bed-Stuy), Brooklyn, where community gardens were labeled as "vacant" lots on maps that were given over to developers, (Eizenberg 2013). Bed-Stuy has long been a cultural center for Black and African-American communities, especially after many people migrated there and surrounding neighborhoods from Harlem in the 1930s.

Work with Black residents of **Clinton Hill** revealed a nuanced account of longtime residents' attitudes on gentrification. Gentrification signaled opportunities for financial revitalization in the area (for example, sale or rental revenue for homeowners, new commercial retail and food offerings, and other amenities like rejuvenated parks) (Freeman 2015). While these benefitted people on a family and individual level, there are risks to housing stability, unaffordable prices in some new businesses, incidences of racially discriminatory practices at new storefronts, and changes in police presence associated with gentrification that can be risky in the long-term.

Brooklyn Heights is regarded as the first neighborhood in the borough to be revitalized after World War II, drawing in many white-collar professionals that could have very easy access to the financial district in Manhattan, and maintains its old-money status with significantly more wealth than other neighborhoods (Osman 2011). Demographic and economic conditions in Brooklyn Heights, Park Slope, and the surrounding area, colloquially known as "Brownstone Brooklyn," are categorized as undergoing super-gentrification, where people with extreme wealth have even displaced a middle-class (Osman 2011; Lees 2003; Halasz 2018).

Environmental remediation strategies in **Gowanus** have been used as a tool of capitalist accumulation in what Gould and Lewis call "the green growth machine," (K. Gould and Lewis 2016, 146; Checker 2015). The onset of clean-up in the long-dilapidated post-industrial landscape along the Gowanus Canal called into question which parts of the population were included or excluded from considerations. Miller (2016) notes that gentrification took place in the Gowanus area while a long, highly combative process occurred trying to plan the clean-up of one of the most polluted bodies of water in the United States. In particular, as demographics shifted towards a "wealthier, whiter, and more [formally] educated" (J. T. Miller 2016, 286) population, economic transformations include ever-rising rent and housing costs since 2000.

The consequences of installing environmental amenities in and around Prospect Park have been studied for an analysis of green gentrification in **Park Slope**, (K. Gould and Lewis 2016). This study determined that class-based housing segregation functionally creates other forms of segregation within the population: racial segregation, disparities in access to amenities (including green space), and difference in proximity to environmental health hazard risks, all of which impact poorest people the most harshly.

Gravesend and the **Bensonhurst** area have also long-been subjects of popular historical fiction focused on demographic changes in the area, (Badham 1977; A. Miller 1993). A hot spot for recreational fishing, after Superstorm Sandy in 2012, barricades were put up for storm surge protection but also diminished the amount of space for fishing anywhere that was not out in the open, as shown in Figure 18. In my story map and forthcoming research on Gravesend Bay, I trace mitigation strategies following a series of environmental disasters in the area, where development proposals that had been previously rejected (such as a waste transfer station) were eventually approved when proposed under a new umbrella of environmental remediation and ecosystem services (Jimenez 2018; C. Miller 2017).

An entire dissertation could be dedicated to the history of social and ecological disasters and revivals in **Coney Island.** Coney Island itself was physically connected to Brooklyn via a series of compounded bridges starting in the early 1800s to ease access to resorts there (Phalen 2016). A highly diverse area overall, the population is significantly segregated by class and the physical landscape is distinctly organized by use—from the gated community of Seagate on the west end to the adjacent to public housing projects, to the homeless population on the boardwalk that also houses two massive amusement parks, the New York Aquarium, an amphitheater, and a baseball stadium. The segregation can be seen in the skyline, as shown in Figure 19.

Figure 18: Recreational Fishing in Gravesend Bay. The area in the black box is a ledge that was formerly open for crabbing and is now closed for storm surge risk. The large building in the top left corner is part of Ceasar's Bay Bazaar (a shopping complex). The horizon shows housing complexes in Coney Island. The yellow arrows point to large holes in the sea wall from the original damaged, rusted fencing. Photo by Rose Jimenez 2018.

Figure 19: View of Coney Island looking south from Gravesend Bay. A distinct cross section in the skyline shows the border between high-density housing on the left and the gated housing community Seagate on the right (the westernmost tip of Coney Island. Photo by Rose Jimenez 2018.

Innovations in steel, ideologies of a technological utopia popularized in The 1939 New York's World Fair, and trends from the City Beautiful movement[5] at the turn of the century influenced the rapid and grand development of amusement parks in Coney Island in the 1940s (Busá 2012). In 1994, sand began to be pumped under the boardwalk in Coney Island as a means to deter people who are homeless from using the area, diminish violent crimes and drug use reported there, and act as a storm surge barrier. Coney Island still took huge hits after Superstorm Sandy in 2012, and has only just come back in full force, although some of the chain restaurants

[5] The City Beautiful Movement was a revolution in city planning at the turn of the 20th century. A product of the Progressive Era in North America, this development reform touted a philosophy of adding grandiose neoclassical and Mediterranean Revival aesthetics to amenities and infrastructure to encourage civic virtue. The Municipal Arts Society of New York was developed in this era, which supported the passing of The 1956 Bard Act and the 1965 New York City Landmarks Law for the preservation of landmarks.

and new attractions have been criticized for Disneyfication, or "the transformation (as of something real or unsettling) into carefully controlled and safe entertainment or an environment with similar qualities" of the area (Merriam-Webster 2019; cf. Lipton 1959, 143–44). Now, after 100 years, $114.5 million in funding will be invested in reconstruction of the boardwalk, (NYC Parks 2021).

Chapter 6 · Environmental Modeling

In the worthy quest to transform contaminated or otherwise unused urban land into beneficial green space, we must acknowledge and never lose sight of the fact that these greening actions tend to pit the goals of environmental justice against the effects of environmental gentrification.
Brownfields to Greenfields
(Maantay and Maroko 2018, 13)

Environmental Modeling and Spatial Analysis

A "model" is the best possible representation for a person, place, or thing. In cartography, everything on a map is a model for a real-world phenomenon. Dots are a model of locations, polygons drawn to represent statistical rates are models of social conditions. For immaterial things, like the phenomenon of gentrification, scores from indexes can model gentrification developed from complex ontologies of what gentrification is. The index score acts as a stand-in, or proxy for gentrification because gentrification is something that can only really be measured, not simply geolocated. For example, it is hard to just put a pin on map and say "this is gentrification."

Instead, it is more useful to pick out an area, look at the various data for the conditions within the area, and generate some kind of score for that area that we can mark with some color scheme, shape, or label. Since there are many economic and demographic conditions that will be fluctuating in a gentrification process, an index is useful to measure those changes[1] within a specific time period and their coincidence and singularly symbolize them on a map (Cherrier et al. 2016).

[1] Each of the indexes chosen are singular scores of change over a specific period of time, as indicated.

By creating singular scores or types for each spatial unit, the index allows cartographers and geostatisticians to singularly symbolize spatial units on a map in a way that represents multiple factors at once, fit for a cross-sectional analysis looking at one data point that encompasses a dynamic confluence of factors within a temporality, such as with a choropleth (color-block) map. And since the breadth of literature has so many complementary but varying sets of variables to measure gentrification, evaluating green infrastructure against a number of different gentrification measurements will hopefully provide us with a trend or pattern (or lack thereof) to interpret the gentrification landscape. These expected patterns allude not only to the internal spatial relationship of gentrification rates between communities in the borough during the time period, but also the varying spatial relationship between permutations of gentrification and green infrastructure. Because of the different variables with each index and differing scales of analysis, it is expected that each area could receive up to five gentrification statuses dependent on the index applied to it.

Proxy Representations

To place the more tangible elements on a map, like urban greening practices or existing structures, we can simply make points on maps that correspond to actual locations, but proxy representations are still useful. Beyond data being readily available, data existence plays a critical role in any kind of spatial modeling, and the green infrastructure data is readily, reliably, and publicly available (Montello and Sutton 2006; Bowen et al. 2020; National Centers for Environmental Information n.d.; K. C. Clarke, Parks, and Crane 2002). Sociological critique of representations, or proxies, emphasize that the author's choice(s) in representation reveal "conditions for environmental action, communication, politics, democracy, management, and governance" (Boström and Uggla 2016, 356).

The choice to use the Green Infrastructure Program as a proxy for urban greening and CSOs as a proxy for existing grey infrastructure is not a neutral one, even though they are intimately connected (it is almost a dialectical "no-brainer" that you have to discuss one when discussing the other) and the convenience and breadth of data availability are factors in choosing them. There are other options, such as change in vegetation over the time period gathered from satellite data, or growth and loss of parks and open spaces. However, this would not encompass all of the spatial politics at play, especially since so many of the green infrastructure projects are tied to funding and structure. Some data are dynamic and ever-changing, like satellite imagery of vegetation. Dynamic data like this might be more useful in evaluations of afforestation success. For this cross-sectional experiment, it is more appropriate to have static data points from the Green Infrastructure Program and indexes that represent a change in time around them.

The Green Infrastructure Program asset shapefile does two things as a proxy: it gives us actual location data to place elements on a map and it encapsulates elements of urban greening beyond vegetation that this dissertation wishes to interrogate: the resilience paradigm, city planning and development actions, funding differentials, and real estate relationships to urban greening.

Use of Index to Measure Socioeconomic Risk and Gentrification

An index is a useful way for statisticians to represent "multifactorial phenomena like gentrification or deprivation" with a discrete score (Johnson et al. 2021). Comparative visual analysis can be useful between maps with different data sets for the same physical area, for example, one choropleth map showing mean or median rents next to a choropleth map of the same place showing median income. The observer is expected to look at these maps side-by-side with casual visual analysis that, if properly symbolized, will show clear comparisons. Other maps may show a choropleth map with an overlay of dots or symbols. For example. Vector polygons representing neighborhoods may represent mean or median rents with a color gradient, with dots/points overlain with certain densities to represent population numbers. However, these observations are particularly visually subjective. Instead, indexing multiple data factors to create single symbols for regions offers a unified picture, although they are still visually subjective.

Many indexes have been developed at various scales to measure gentrification or other hazards in New York City or areas that include New York City. Among these are rate-based gentrification indexes like NOAA's Gentrification Pressure index for coastal communities, The New York City Heat Vulnerability Index (HVI) developed by the Department of Health, the Housing Risk Chart from the Association for Neighborhood & Housing Development (ANHD), and the Small Area Index of Gentrification from researchers at The City University of New York. There is also a graduated typology-based index like Typologies of Gentrification and Displacement from the Urban Displacement Project. See Table 4 for all indexes and factors included in this study.

Each index incorporates a unique set of varying economic, demographic (and in some cases ecological) factors to grade levels or typologies of gentrification at a certain scale in an area. Among themes in the index data are traditionally accepted factors in evaluating gentrification: whiteness vs. non-whiteness, age group distribution, level of college education, and housing cost burdens, where new residents related to gentrification patterns tend to be some combination of young (aged 18 to 35), non-Hispanic white, wealthy, able-bodied (not receiving disability or social security benefits), and formally educated in 4-year institutions. While most of the indexes use governmental data from the United State Census, American Community Survey (ACS), and American Housing Survey (AHS) data, each of the permutations of gentrification is likely to result in marking hot spots of gentrification risk. Each has its own purposes and its own limitations. The findings of each index also emphasize a particular factor as highly definitive.

To compare gentrification hot spots, each index was applied to a map of Brooklyn using QGIS geographic information systems software Version 3.10 using a shapefile of Kings County from NYC Open Data—a data portal created and provided by the municipal government. Each index was symbolized into approximately 5 categories using the same color ramp for ease of comparative visual analysis, while also remaining loyal to the index author's categorization.

Table 4: Index Factors (continued on next page)

Index	Creator	Data Year(s)	Scale	Score Style	Score Factors
Gentrification Pressure Index	NOAA NMFS (federal)	2010, 2018	County	Risk Level Scale	Retiree Migration ▪ -% Households w/ Residents aged 65+ ▪ % Population receiving SSI ▪ % Population receiving retirement income ▪ $\%^{-1}$ Population in labor force
					Urban Sprawl ▪ Population density ▪ Distance-1 to urban cluster ▪ Cost of living ▪ Median home value
					Housing Disruption ▪ % Change in mortgages ▪ % change in home value ▪ Housing costs compared to income (35%)
NYC Heat Vulnerability Index	NYC DOHMH (municipal)	2018	Community Board	Risk Level Scale	Environmental ▪ Daytime summer surface temperature ▪ Green space
					Social ▪ % households with air conditioning ▪ Poverty (% People using public assistance) ▪ Race (% non-Latino Black population)
Small Area Index of Gentrification	Johnson, et al. (Scholarly)	2010-2016	Census Tracts	Risk Level Gradient	Changes in:
					▪ Median Rent
					▪ % non-Hispanic white population
					▪ % 20-34 year olds
					▪ % Adults with 4-year college degree
Typologies of Gentrification and Displacement	Urban Displacement Project (Activist)	2000, 2016	Census Tracts	Typologies	2000 Population
					2016 Income level
					Market type (‘hot’, ‘at risk’, etc.)
					Past gentrification trends
					Loss/gain of low-income housing (absolute)
					Low-income migration rate

Housing Risk Chart	Association for Neighborhood and Housing Development (Non-profit)	2020	Community Board	Ranking	COVID Case Rate (per 1000)
					COVID Death Rate (per 1000)
					Mortality from underlying conditions (per 1000)
					% uninsured (2018)
					% service workers (2018)
					% with severe crowding (2018)
					% people of color (2018)
					% with rent burden
					% of area median income
					Rate of evictions (per 1000)
					Number of housing litigations (2019)
					Number of foreclosure filings (2019)
					Number of SCRIE/DRIE recipients (2019)
					% change in avg price per ft^2 of residential sales
					Number of rent stabilized apartments
					Number of NYCHA units (2020)
					Serious housing code violations in 6+ Unit buildings (per 1000 units)
					LIHTC Units Eiigible to Expire 2021-2025)
					Share of 1-4 unit non-bank home purchase loans, 2018

Data Management for a Spatial Coincidence Analysis

A spatial coincidence analysis serves as the quantitative portion of this mixed-methods approach to looking at green infrastructure. Extensive data management included phases of data acquisition, geoprocessing for aggregation and assimilation, use of vector analysis tools, and digital cartography. The data will be evaluated at three scales: borough, community district, and census tract (see image below). All data related to results for the HVI, Housing Risk Chart, UDP Typologies, and the SAIG, including results from the vector analysis can be found within Appendix II: Results Data for Spatial Coincidence Analysis.

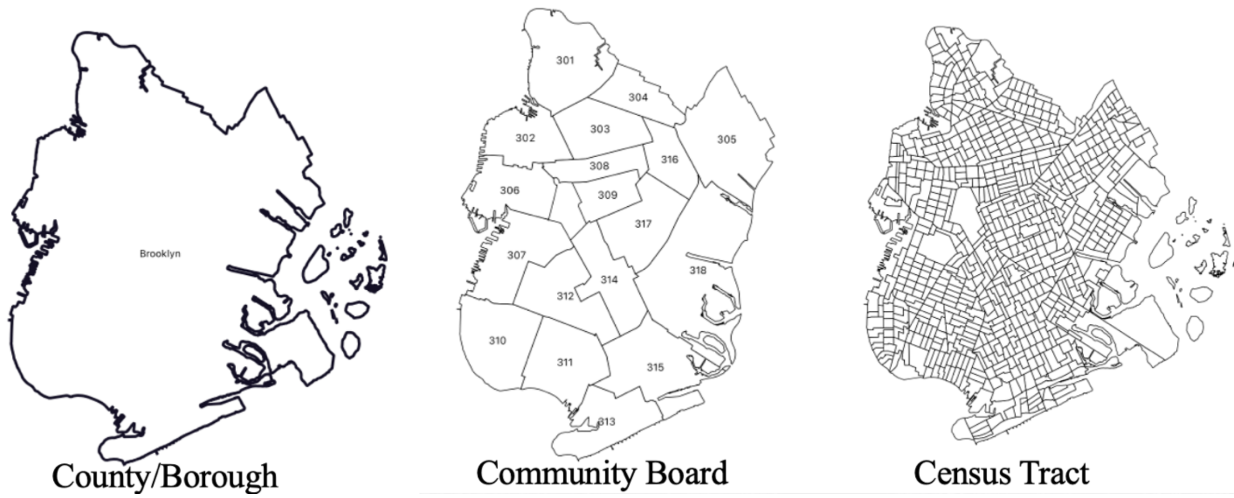

Figure 20: Three Scales of Data Evaluation

Quantitative Data Acquisition

The primary data mode for the quantitative portion was the shapefile format (.shp). A shapefile is a digital method for storing geometric location and attribute/feature data. I used shapefiles that were readily available, however, each index dataset and shapefile could also be replicated using the authors method and data that are readily available through the United States Census Bureau and other publicly available surveys, as applicable. Each shapefile is initially nontopological, or unconnected to other spatial datasets, when they are all uploaded into a GIS project file. However, shapefiles contain coded information (such as community district, county, and census tract codes), that allows each polygon to be located and “know” its relationship with surrounding polygons. Each shapefile’s set of attributes can be used to assimilate, or adjust to conform, to one another, using GIS software tools such as “join” functions matching field names in their attribute tables so that they can be linked and analyzed together inside the GIS software.

All datasets were downloaded from online sources[2], as follows:

A shapefile for the Green Infrastructure Program assets was downloaded from NYC Open Data, New York City's open access data portal. The attributes in this file include the following for each asset:

- Unique asset identification numbers
- The asset's implementation/installation phase and construction stages
- The name of the asset in the contract
- Right-of-Way (built in city streets and sidewalks) projects vs. Onsite (all other, built within the property line of a City-owned site such as parklands and schools) projects
- The green infrastructure class (bioswale, green roof, etc.) and category
- Location Data for the purposes of placing on a map: longitudinal and latitudinal ("X and Y") coordinates, borough, nearest physical address, and cross street,
- Sewer type, tributary, and waterbody whose watershed contains the asset
- Political and Jurisdiction information: ownership class, community district, city council district, assembly district
- Asset length, width, and area
- Tree species cultivar, if applicable

Shapefiles for New York City boroughs and neighborhoods were also downloaded from NYC Open Data. These shapefiles represent the same jurisdictions and extents used by and for

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[2] All data source webpage uniform resource locator (URL) links are active and accurate as of March 3, 2022, but are subject to change, migration, or removal at the discretion of the domain holders and content managers.

the city in their planning, development, and evaluations so they are both accurate to the study and easily assimilated to the green infrastructure datasets.

Data for the NOAA Social Indicators of Gentrification Pressure were downloaded from the CSVI Tool, an interactive online map[3]. The papers associated with the data (L. L. Colburn and Jepson 2012; L. L. Colburn et al. 2016; Jepson and Colburn 2013) are also available online in the NOAA Institutional Repository[4].

Shapefiles and a spreadsheet (.csv) for the New York City Heat Vulnerability Index (NYC Dept. of Health 2017) were downloaded from a now-defunct webpage about the index on the New York City government website, but is currently available from the online Environment & Health Data Portal[5].

The Association for Neighborhood and Housing Development makes shapefile and data chart for the Housing Risk Chart readily available for download from the annual report (Block 2020) webpage[6] for 2020.

The Urban Displacement Project has its papers (Chapple and Thomas 2021) and shapefiles available for download from its interactive map tool webpage[7].

Datasets and shapefiles for the Small Area Index of Gentrification are accompanied by data disclosure attachments from the peer reviewed article (Johnson et al. 2021) at Taylor &

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[3] https://www.st.nmfs.noaa.gov/data-and-tools/social-indicators/
[4] https://repository.library.noaa.gov/
[5] https://a816-dohbesp.nyc.gov/IndicatorPublic/VisualizationData.aspx?id=2191,4466a0,100,Map,Score,2018
[6] https://anhd.org/report/how-affordable-housing-threatened-your-neighborhood-2020
[7] https://www.urbandisplacement.org/maps/new-york-gentrification-and-displacement/

Francis Online[8], which I was able to retrieve through institutional library access privileges from my enrollment at the City University of New York Graduate School and University Center.

Quantitative Data Aggregation, Assimilation, and Geoprocessing

First, shapefiles of New York City boroughs, New York City census tracts, and New York City community districts were acquired from New York City's Open Data web portal. Then, the shapefiles were imported to QGIS geographic information system software and clipped to contain only Brooklyn.

Shapefiles for each of the indexes were imported and applied to the map and clipped down to the Brooklyn extent. The census tract-level indexes have some spaces without symbolization due to them having missing data, being designated as official city parks or open spaces, or airport designations. These are accounted for in the map keys, if applicable. The county data layer will be used to contextualize the county boundaries and create maps of consistent shape and size for each index. Then, each hierarchical map was symbolized using the same color ramp to symbolize the 5 classes the same way for consistency as well. The typological map is symbolized similarly, as appropriate using aggregation class modes from the original authors' results.

A shapefile for green infrastructure assets was then applied and clipped to the extent of Brooklyn from the borough column (labeled "Boro") of its asset table (the spreadsheet of data that comprises the shapefile).

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[8] https://www.tandfonline.com/doi/figure/10.1080/13658816.2021.1931873?scroll=top&needAccess=true

Vector Analysis

A vector model is a geometric graphic made out of lines, points, and resultant polygons[9]. The points are "XY" or latitude/longitude coordinates, and vector lines connect each point/vertex with paths, or more complicated topologically connected networks. Each of the aforementioned shapefiles are in vector format.

In QGIS, the "Count Points in Polygon" vector analysis tool[10] was used to count the number of green infrastructure points inside the index polygons (which are shaped by clusters of census tract vectors). This point-in-polygon algorithm counts the number of attributes in a points layer that fall within the boundaries of polygons in a vector layer on the same map. This tool generates a new layer containing all the data from both original layers but containing a new attribute table field with the count corresponding to each polygon ("QGIS" 2021)[11]. See Figure 21 for a breakdown of layers.

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[9] This is distinct from raster images, which are made from grids of pixels, as you would commonly see in satellite imagery or a digital photograph.

[10] Also called "Point-in-Polygon" tool on other platforms, such as in ESRI-brand products

[11] An optional weight field can be used to assign weights to each point. If set, the count generated will be the sum of the weight field for each point contained by the polygon. Unique class fields could also be used to differentiate types of points, but as every green infrastructure unit is being treated equally, this feature was not utilized ("QGIS" 2021).

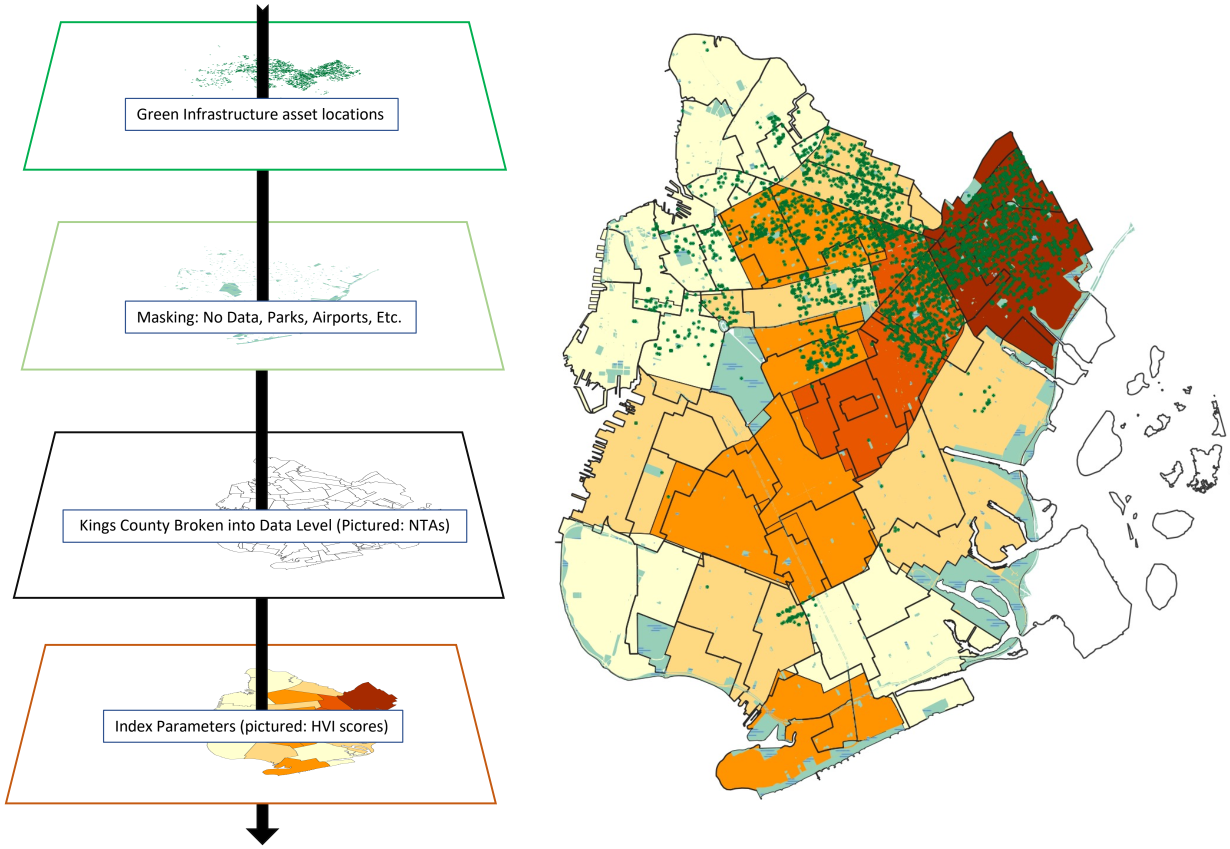

Figure 21: This graphic shows a conceptual breakdown of the layers needed for the cartographic work in GIS software. In the maps below, the data level is hidden underneath the index parameters but is shown for illustrative purposes.

Quantitative Data Processing

The count results from the automated vector process tool yielded results for individual polygons. The attribute tables were exported to spreadsheet files. Then the data were sorted by the gentrification score result and the number of assets was tallied for each gentrification score for each index.

Data Limitations

These indexes were not developed for green forms of gentrification and may not be optimized for such. Additionally, United States Census Data used for these indexes is limited, as only about

60% of the New York City population responds to the U.S. Census, answers are subjective or surveys are incomplete, and definitions of households refer to tax-levy household status rather than residents per home unit. Census statistics for younger adults (18-24) are also likely highly underrepresented while that group is also highly associated with the gentrification process[12] (US Census Bureau 1998). Some groups also remain reticent in the census due to discomfort with surveillance.

The visual nature of choropleth mapping has limits including visual subjectivity and difficulty in accessibility for people with blindness, colorblindness, or low visual acuity.

[12] Many students and young professionals who dorm or live in shared and/or precarious or temporary housing situations maintain their permanent address in different neighborhoods, cities, states, or countries than where they reside on a daily basis, and may not be accounted for at the de facto address on the census although they are participating in the local economy.

Results Atlas 1 • Index Applications to Brooklyn

Table 5: Number of Polygons Marked for Each Score in Each of the Five Indexes

Index	Category (Raw Score, if applicable)		# of Polygons	Unit of Aggregation
1. Social Vulnerability Index		Gentrification Pressure	1	County
2. Heat Vulnerability Index		1	1	Community District
		2	4	
		3	3	
		4	6	
		5	4	
3. Housing Risk Chart 2020		1 (1-4)	5	
		2 (4-8)	5	
		3 (8-13)	5	
		4 (13-20)	1	
		5 (20-23)	2	
4. Small Area Index of Gentrification		1 (–1.68 - –0.58)	149	Census Tract (excludes parks, airports, etc.)
		2 (–0.58 - –0.21)	149	
		3 (–0.21 – 0.40)	148	
		4 (0.4-1.83)	150	
		5 (1.83-4.5)	149	
5. Typologies of Gentrification and Displacement	Low Income	Not Losing Low-Income Housing	208	
		At Risk of Gentrification	53	
		Ongoing Displacement of Low-Income Housing	100	
		Ongoing Gentrification	80	
	Moderate to High Income	Advanced Gentrification	44	
		Stable Exclusion	187	
		Ongoing Exclusion	67	
	Very High Income	Super Gentrification or Exclusion	4	

1. **Social Vulnerability Indicators (SVI) of Gentrification Pressure**

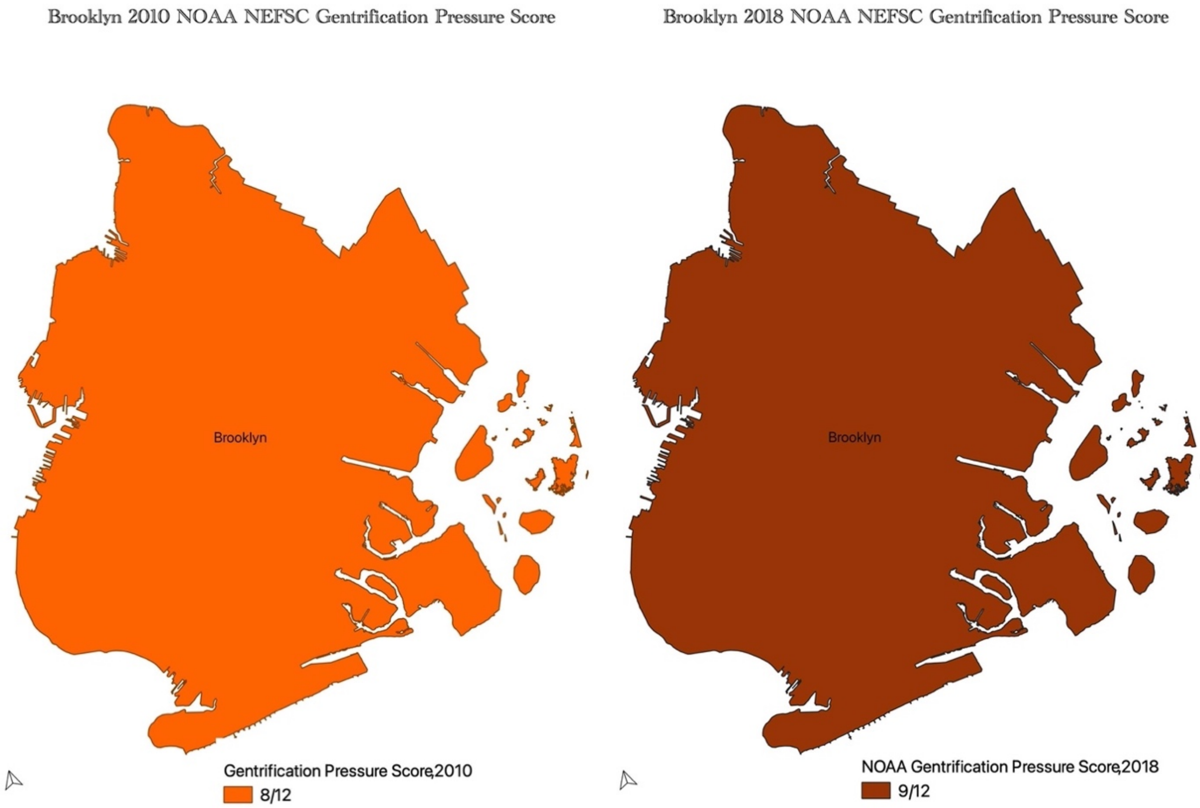

Figure 22: Gentrification Pressure Index Score Applied to Brooklyn, 2009 vs. 2018

NOAA is an agency of the U.S. Department of Commerce that monitors and manages economic vitality related to weather, climate, marine commerce, and coastal conditions. NOAA Fisheries developed the Community Social Vulnerability Indicators (CSVI) of fishing community vulnerability and resilience in U.S. Coastal regions at the county level. The social indicators of Gentrification Pressure—Housing Disruption, Retiree Migration, and Urban Sprawl—were a subindex of this index developed using statistical analysis of pressing concomitant demographic and economic statistics determined from qualitative surveys.

- Housing Disruption scores factor home value changes, mortgage rate changes, and housing cost burdens.

- The Urban Sprawl index measures the impacts of migration from cities into the peripheral populations, factoring population density, dynamics with nearby urban centers, cost of living, and median home value.
- Retiree Migration indicators are measured by the percentages of households with persons over 65 years of age, receiving retirement income, receiving social security income (SSI), and the inverse percent of the adult population in the workforce.

The raw scores are calculated from 5-Year-Average American Community Survey (ACS) data from the U.S. Bureau of the Census. Raw scores are then used to categorize areas from level 1 ("low"), level 2 ("medium"), level 3 ("med-high"), and level 4 ("high"). Applied at the county scale, but centered around activity in Sheepshead Bay and the southern Brooklyn coast, NOAA's gentrification pressure index shows Housing Disruption as the factor most significantly contributing to an increasing gentrification pressure in Brooklyn during the time period 2009-2018. Retiree Migration has remained consistently low categorically, and the raw score is falling. Urban sprawl has remained categorically high, although its raw score has fluctuated within that range. Urban sprawl rates in the United States have historical fluctuated greatly (Lopez 2014). Housing Disruption has been steadily increasing and in 2011 crossed the threshold from med-high to high (from a score of 3 out of 4 to score of 4 out of 4), bringing the overall Gentrification Pressure index categorical score from med-high to high (from 8-out-of-12 to 9-out-of-12).

Drawing from methods in *Social Indicators of Gentrification Pressure in Fishing Communities: A Context for Social Impact Assessment* (L. L. Colburn and Jepson 2012) and guidance from the NOAA Social Indicators Team, I summed the scores for each of the three elements to arrive at the overall gentrification pressure score for each year. With urban sprawl in flux and the retiree migration raw score slowly declining, this points toward an influx of people in the 24-35-year age range in the population. See Table 6 for a breakdown of raw and categorical scores across the timeframe.

Table 6: Social Indicator Scores for Gentrification Pressure in Brooklyn, 2009-2018. Raw Scores and Categorical Rankings. Data Source: NOAA Social Indicators Tool (National Marine Fisheries Service 2019)

Social Indicators of Gentrification

Raw Score										
Indicator	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Housing Disruption	0.945	0.896	1.105	1.233	1.3	1.603	1.621	1.851	1.839	2.179
Retiree Migration	-0.449	-0.528	-0.546	-0.575	-0.628	-0.674	-0.72	-0.738	-0.72	-0.741
Urban Sprawl	3.707	1.597	3.827	3.846	1.812	4.086	1.174	4.08	4.104	4.13
Categorical Ranking 1-Low, 2-Medium, 3-Med-High, 4-High										
Indicator	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Housing Disruption	3	3	4	4	4	4	4	4	4	4
Retiree Migration	1	1	1	1	1	1	1	1	1	1
Urban Sprawl	4	4	4	4	4	4	4	4	4	4
Additive Score (out of 12)	8	8	9	9	9	9	9	9	9	9

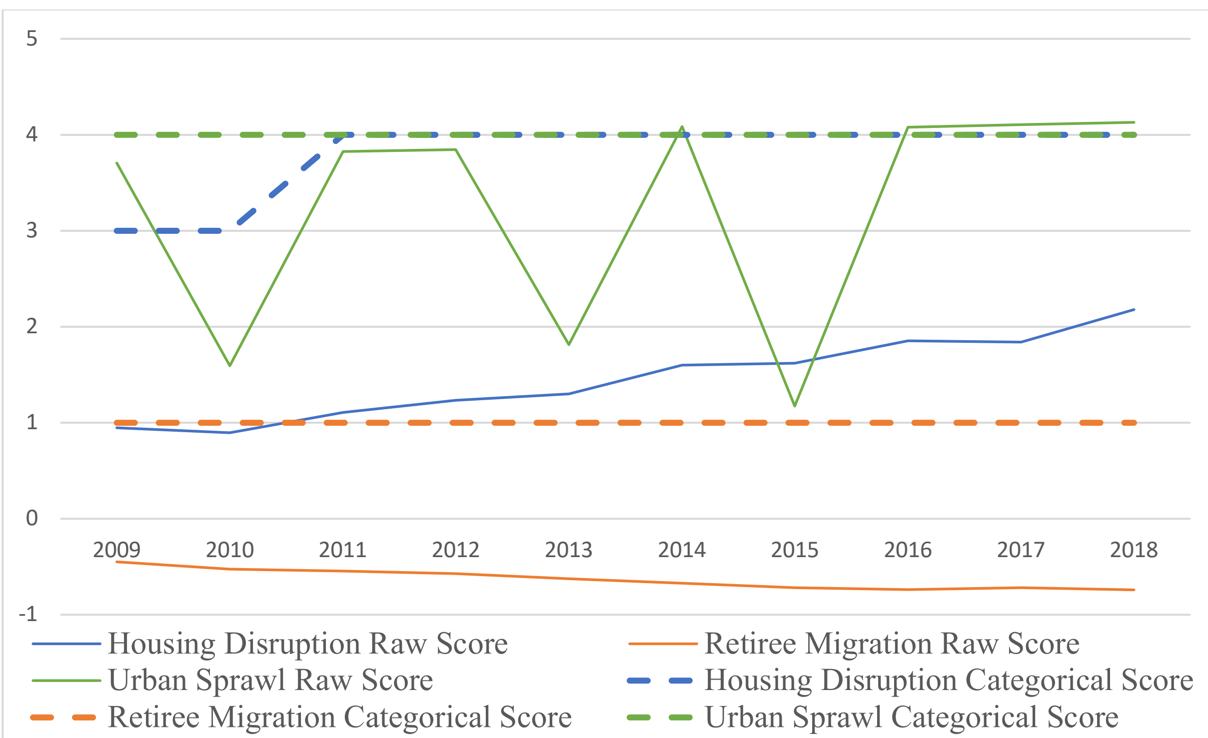

Figure 23: SVI Gentrification Pressure Raw and Categorical Scores 2009-2018. Categorical scores are based on 5-Year averages. Data Source: NOAA Social Indicators Tool

Although this might seem like a minor change, these scores are critical when it comes to federal governmental management strategies (Rouleau, Adkins, and Were 2016). That raw scores can rise infinitely without a change in categorical ranking once they hit level 4 is also an issue that is being discussed currently amongst the Social Indicators Team. Categories could be either left as they are or recalibrated, or additional categories or outlier notations could be useful to add. In order to fortify the gentrification studies, NOAA creates community snapshots and story maps to narrativize the unique permutations of gentrification in each of their jurisdiction counties.

2. The New York City Heat Vulnerability Index

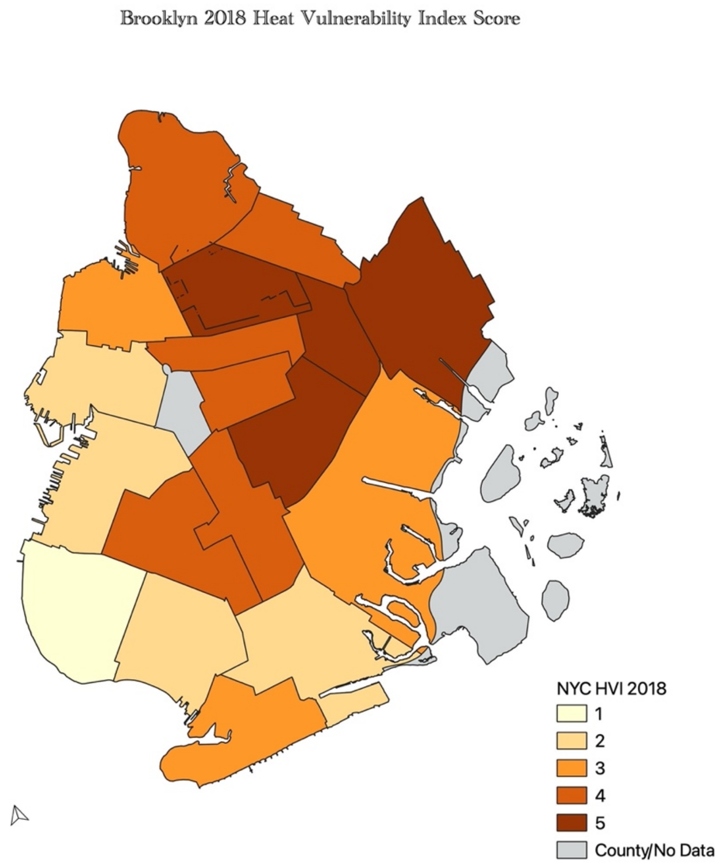

Figure 24: New York City Heat Vulnerability Index applied to Brooklyn

The purpose of the HVI is to identify neighborhoods with a higher risk of heat-related deaths and direct resources to those neighborhoods, including community outreach, and street tree planting (Knowlton et al. 2007; Klein Rosenthal, Kinney, and Metzger 2014). While the HVI is not intended to be an index of gentrification, several factors of heat vulnerability make this index very useful for understanding green gentrification in New York City[1].

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[1] A separate index of Heat Vulnerability was subsequently developed for New York State (Nayak et al. 2018), and excluded New York City data.

The HVI works with a confluence of economic and demographic factors to score its areas of interest common in most gentrification studies, but also has ecological condition factors. These include racial disparities in deaths related to heat stress, percentage of households with air conditioning, poverty rates, surface temperature, and green space (in the form of tree, grass, or shrub cover).

Reducing UHIE, including human heat vulnerability, is one of the fringe goals of the New York City Green Infrastructure Program. Additionally, UHIE reduction strategy proposals in New York City include success rates of the Green Infrastructure Program and synergy with the ongoing Green Infrastructure Program practices for stormwater management in their justification documentation and their scenario modeling, (NYC Mayor's Office of Climate Resiliency 2017). With reduction of UHIE being one of the multiple benefits used to justify urban greening projects and the emergent EH crisis, the HVI is an invaluable measure of socioeconomic risk to compare against green infrastructure installation. Data sources for the index include American Community Survey (2013-2017 5-year estimates, New York City Department of Parks and Recreation (2017), U.S. Geological Survey LandSat (2018), and the United States Census Housing and Vacancy Survey.

Across the United States, more people die from heat-related illness than all other natural disasters combined (NYC Dept. of Health 2017; Madrigano et al. 2015; De Mel 2019). Heat-related illnesses, such as respiratory and cardiovascular distress, heat stroke, are more likely to occur during EH events, which in New York City, is defined as 2 or more days with a heat index over 95ºF or 1 day reaching 100ºF or more (Klein Rosenthal, Kinney, and Metzger 2014). Social isolation also increases risk of heat-related mortality for vulnerable populations due to mobility issues that are caused or exacerbated by EH. Low socioeconomic status indicators (poverty, unemployment, age, and disability) are highly correlated with a need for heat-adaptation and relief amenities like home air conditioning, air-conditioned cooling centers, shaded recreation areas, and/or places like cafes that require purchase for entry.

While evaluating this map, the reader should note that the polygons represent community boards. Scores fall into five numbered categories. Areas with no data (namely Prospect Park in the center, and the small islands in Jamaica Bay on the southwest coast) are nonresidential parkland so they are masked.

When applied to Brooklyn, the HVI shows that the northern half of Brooklyn bordering Queens falls within the two highest risk categories (4 and 5) and becomes gradually lower risk toward the southern Brooklyn coast.

3. ANHD Housing Risk Chart

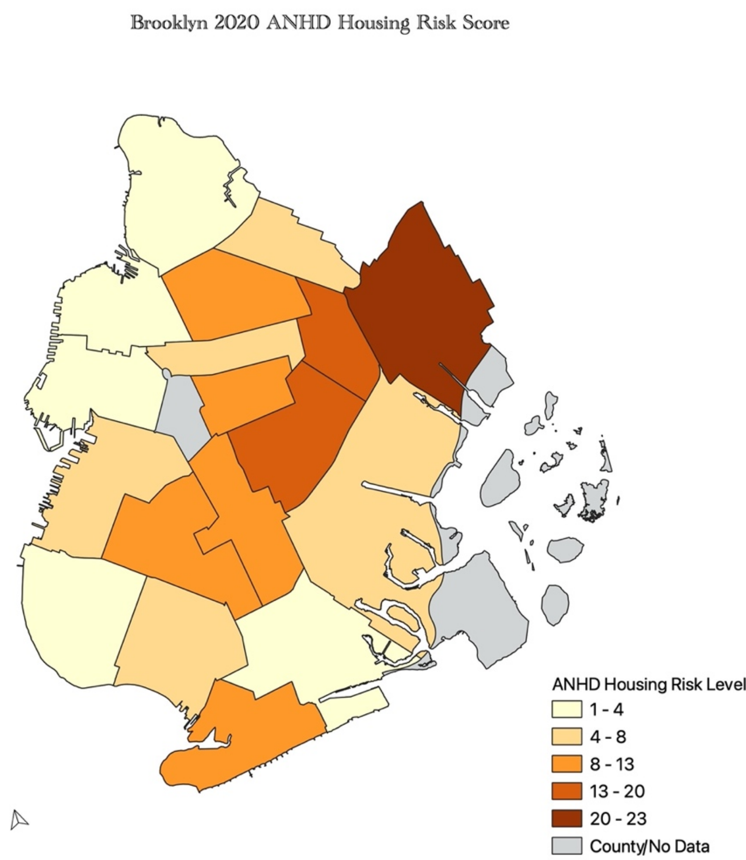

Figure 25: ANHD Housing Risk Chart Index applied to Brooklyn

The Association for Neighborhood and Housing Development (ANHD) is a consortium of neighborhood organizations doing data analysis for housing justice organizations that focus on economic and racial justice frameworks. They publish an annual Housing Risk Chart entitled *How is Affordable Housing Threatened in Your Neighborhood?*[2] to show how vulnerable housing security is in New York City's community districts. ANHD's purpose of conducting this analysis is to help community-based groups, government officials, and other stakeholders

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[2] Original research and analysis by the Association for Neighborhood & Housing Development (ANHD).

"determine where to direct resources to promote community stability and vitality," (Block 2020). In 2020, the index was updated to account for the hit on the economy caused in-part by extreme drop in population related to the COVID-19 pandemic from out-migration and, unfortunately, premature deaths.

The factors of this index are the 2020 COVID-19 case rate[†][3] and death rate[†], mortality from conditions causing higher risk of severe illness with COVID-19[†] 2015, percent uninsured, percent service workers, percent with severe crowding, percent non-white 2018, percent with rent burden over 30% 2018, percent of area median income (based on household size), the residential eviction rate[†] 2019, number of housing litigations and foreclosure filings 2019, number of SCRIE/DRIE[4] recipients 2019, number of rent stabilized apartments and New York City Housing Authority (NYCHA) housing project units, percent change in the average price per square-foot for residential scales 2017-2019, units with housing code violations[†], units receiving Low Income Housing Tax Credits (LIHTC) that are eligible to expire between 2021 and 2015, and the share of 1-4-unit home purchase loans from independent lenders 2019. These loans are from lenders that are not supervised under regulations from the Community Reinvestment Act (CRA) of 1977, such as banks or even credit unions, and are particularly risky for recipients. Many people may be using these kinds of loans because they were not approved for better-regulated bank loans.

Overall, this study found that "communities of color are the ones facing monumental housing insecurity, economic precarity, and public health disasters," (Block 2020), which has

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[3] †=Per 1000

[4] Senior Citizen Rent Increase Exemption (SCRIE) and Disability Rent Increase Exemption (DRIE) benefits are for qualifying tenants in rent-stabilized apartments.

been the outcome of most environmental justice studies, (Bullard 1994). Key findings in Brooklyn were that communities with the greatest housing in risk contain a high percentage of non-white population. Among the highest risk areas for housing instability, East Flatbush[5] was approximately 96% non-white, had high rates of non-bank lenders, and some of the highest rates of COVID-19 deaths in Brooklyn.

The wide breadth of factors in this index, and index factors that are contemporary to this study may be a smoking gun that shows unprecedented mass casualty events are harshest on those already in the most vulnerable situations. Crowding, for example, becomes an even bigger household stressor when 1) a new respiratory illness has become prevalent and life-threatening, and 2) many more people begin working or schooling from home.

[5] Defined by Brooklyn Community District (CD) 17

4. Small Area Index of Gentrification

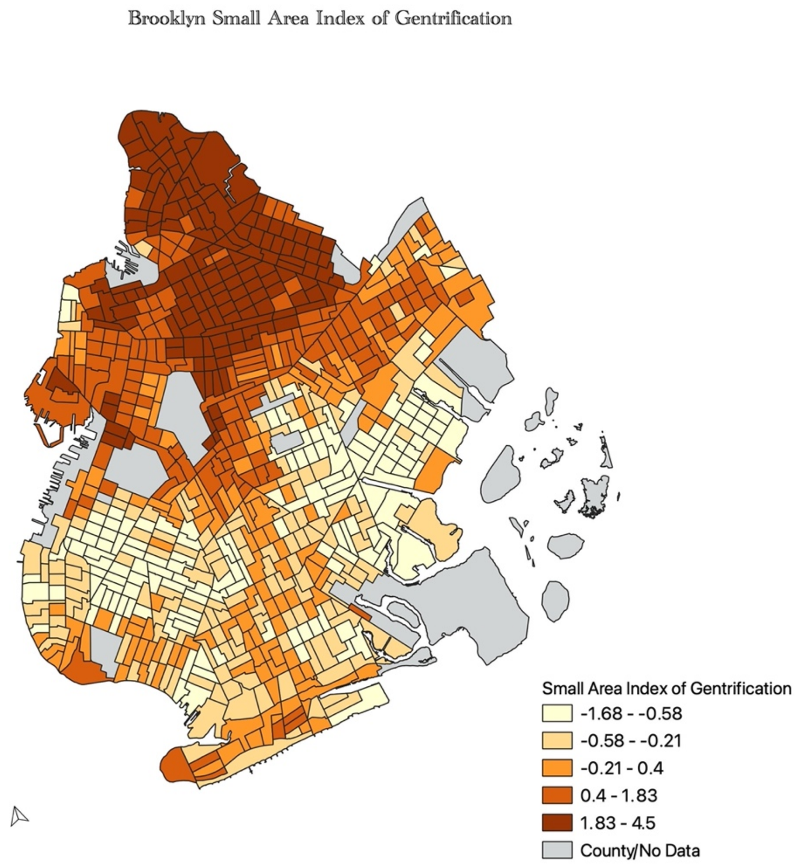

Figure 26: Small Area Index of Gentrification applied to Brooklyn

Examined at the census tract level for the period 2000-2016, the Small Area Index of Gentrification (SAIG) (Johnson et al. 2021) uses changes in the following as key input variables: 1) median family income, 2) median rent of occupied housing units, 3) proportions of non-Hispanic white in the population, 4) adults > age 24 with at least a 4-year college degree, and 5) 20- to 34-year-olds in the population. Data was sourced from the GeoLytics Neighborhood Change Database, the NYC Geodatabase from the City University of New York—Baruch college geoportal, and the U.S. Census and American Community Survey through 2016.

For the purposes of cartography in GIS software, the index developers used a Bayesian conditional autoregressive model to smooth the somewhat arbitrary lines between census tracts.

This method is traditionally used to blur lines to better visually represent fluid health hazard risks like air pollution exposure, or disease risk transmission like those from mosquitos or viruses (Brown, McLafferty, and Moon 2010; M. Gould 2010).

Using this methodology for gentrification does two things. First, it helps deemphasize the arbitrary, but "official" polygons like census tracts or official neighborhood tabulation areas (NTA) made from census tract clusters that are used to define regions because neighborhood boundaries may be better described as gradients or networks with a functional identity, lacking complete "economic or social self-containment" (Jacobs 1992, 117). People walk freely and interact across these boundaries or limit their actual time within them. However, base polygons from census tract data or other empirical datasets are perhaps the only way to effectively geolocate the qualitative attribute data that is available. The Bayesian model emphasizes both of these conflicting aspects of defining an area.

Findings of this index emphasize the relationship of housing cost and gentrification, even when normalized for inflation. The authors found that populations in northern Brooklyn stood out for gentrification owing largely to high population density and extreme demographic transitions over the time period.

Compared to an analysis of just the categorized housing cost changes (low to low, low to high, high to low, and high to high), their interpretation of gentrification is unbalanced, implying a high correlation with gentrification and other factors, especially an increase in the non-Hispanic white and/or college-educated[6] population.

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[6] Based on completion at 4-year institutions/Bachelor's degree

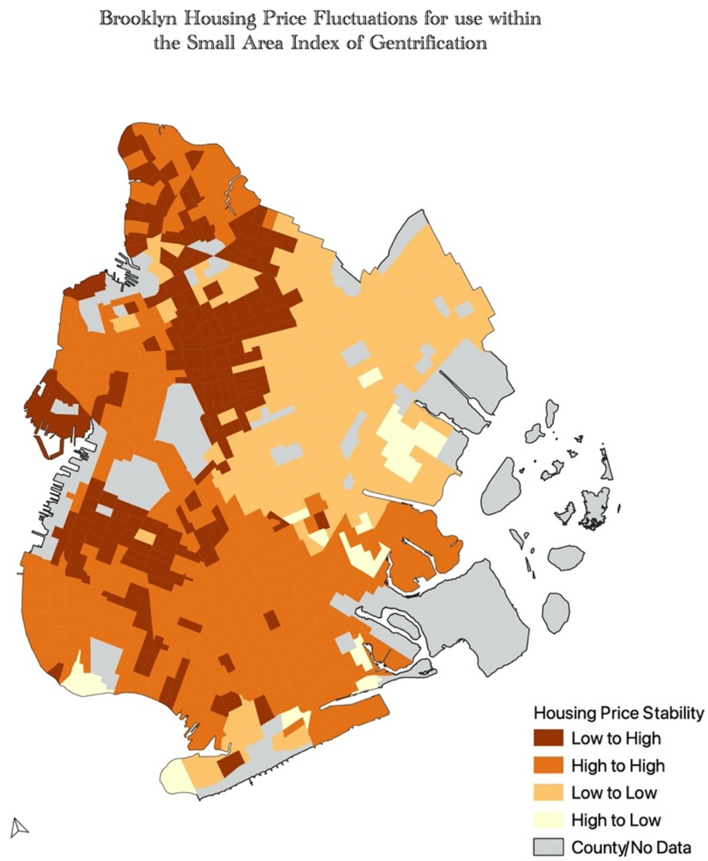

Figure 27: Housing price fluctuations associated with SAIG scores, applied to Brooklyn. Housing Scores are an important factor for the index but clearly highly differential from the gentrification score due to a lack of relevant demographic information.

5. Urban Displacement Project Typologies of Gentrification and Displacement

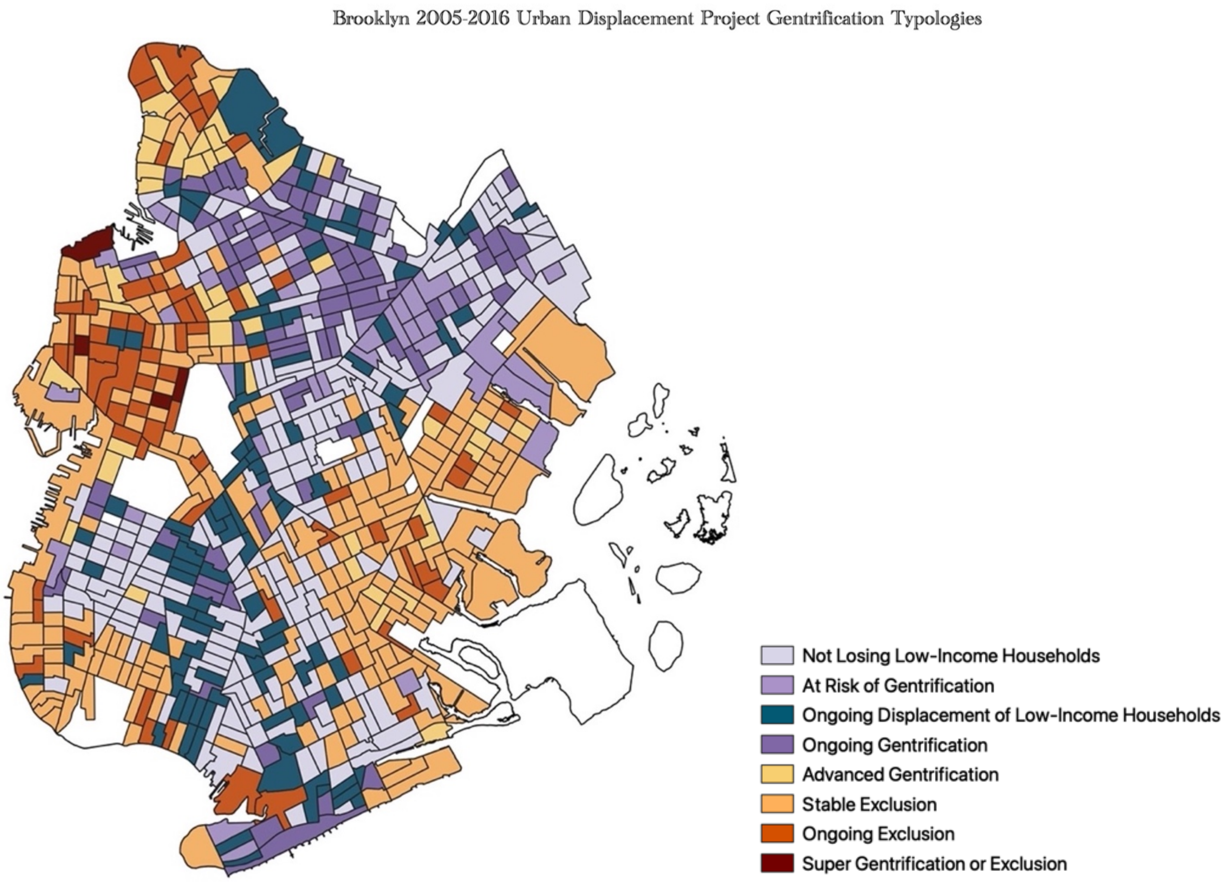

Figure 28: UDP Typologies of Gentrification and Displacement Index applied to Brooklyn

A huge gap in the analysis of gentrification is measurement of the "displacement" or exclusion. In an attempt to characterize permutations of gentrification in census tracts across the New York City region, the Urban Displacement Project developed Typologies of Gentrification and Displacement (Bianco et al. 2018; Chapple and Thomas 2021). Factors included in this index are population in 2000 and 2016, housing units in pre-1950 buildings, employment density, change in median rent price from 2000 to 2016, change in low income households§[7], change in

[7] §=change from 1990-2000 and 2000-2016

low-income population migration 2009-2016, percentage of low-income households‡[8], adults aged 25+ with a college degree‡, non-white population percentage‡, change in college-educated adult population§, median household income 2016, median rent price‡, change in median home value percentage§, and low-income in-migration percentage in 2009 and 2016.

After a data results validation process that involved meetings with local communities, typology names originally used in a study of Los Angeles were updated to fit the New York. Typologies were arranged by a combination of income-level and confluence of the other conditions. The low-income typologies are:

1) Not Losing Low-Income Households
2) At Risk of Gentrification
3) Ongoing Displacement of Low-Income Households
4) Ongoing Gentrification

The moderate-to-high income typologies are:

5) Advanced Gentrification
6) Stable Exclusion
7) Ongoing Exclusion

And the very high income-level typology is:

8) Super Gentrification or Exclusion.

In particular, the first type indicates no gentrification or gentrification risk. The next three types indicate the early phases of gentrification, and the last four types indicate advanced stages of gentrification.

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[8] ‡= data for years 1990, 2000, and 2016

This index shows the aforementioned “Super Gentrification” (a late-stage form of gentrification where even upper middle class households are being priced out by the super wealthy) in the northwest Brooklyn Heights/DUMBO[9]/Park Slope area as shown in Chapter 5’s Brooklyn Neighborhood Studies (Lees 2003; Halasz 2018).

Analysts found that the very lowest income areas were not losing low-income housing over the time period, but many of those areas had NYCHA public housing facilities located within their boundaries, which are highly regulated for low-income households. Otherwise, their findings suggest that those with the lowest income are at highest risk of ongoing displacement patterns across the borough.

[9] DUMBO is an acronym for “Down Under the Manhattan Bridge Overpass.”

Results Atlas 2 · Spatial Coincidence of Green Infrastructure and Gentrification

Table 7: Number of Green Infrastructure Units within Each Scored Category for Each of Five Indexes

Index	Category (Raw Score, if applicable)		# of polygons	GI Unit Count[1]
1. Social Vulnerability Index		Gentrification Pressure	1	4035
2. Heat Vulnerability Index		1	1	0
		2	4	118
		3	3	128
		4	6	946
		5	4	2857
3. Housing Risk Chart 2020		1 (1-4)	5	292
		2 (4-8)	5	705
		3 (8-13)	5	754
		4 (13-20)	1	681
		5 (20-23)	2	1617
4. Small Area Index of Gentrification[2]		1 (–1.68 - –0.58)	149	89
		2 (–0.58 - –0.21)	149	276
		3 (–0.21 – 0.40)	148	917
		4 (0.4-1.83)	150	1513
		5 (1.83-4.5)	149	1212
5. Typologies of Gentrification and Displacement[3]	Low Income	Not Losing Low-Income Housing	208	1259
		At Risk of Gentrification	53	836
		Ongoing Displacement of Low-Income Housing	100	424
		Ongoing Gentrification	80	1094
	Moderate to High Income	Advanced Gentrification	44	73
		Stable Exclusion	187	206
		Ongoing Exclusion	67	108
	Very High Income	Super Gentrification or Exclusion	4	4

[1] Count of Green infrastructure units within residential areas. Units on borders of polygons may be counted twice if they pose equal representation for both units, and impact street flooding and storm flow for both areas.

[2] 44 green infrastructure units fell outside of the active study area for this index (I.e. in parks rather than residential areas, areas with insufficient census/ACS data)

[3] 44 green infrastructure units fell outside of the active study area for this index because of missing data and non-residential placement

1. **Social Vulnerability Indicators (SVI) of Gentrification Pressure**

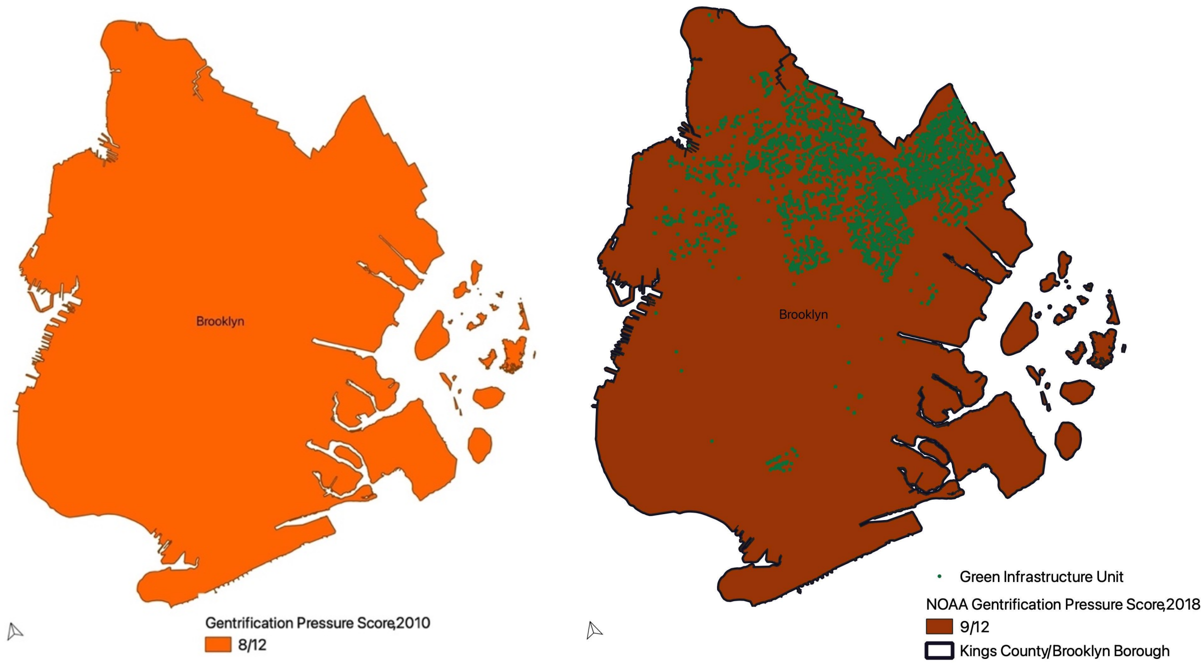

Figure 29: Application of NOAA's Social Vulnerability Indicators of Gentrification Pressure to Kings County in 2010, and in 2018 with an overlay of green infrastructure units.

Since the Gentrification Pressure Index from NOAA's SVI is a county-level score, all 4,052 units of green infrastructure that fall within residential areas, but it is notable that aspects related to housing disruption passed the threshold into "high" level housing disruption in 2011 (based on 5-year ACS averages), the same year that Vision 2020 was released announcing the forthcoming landscape of green infrastructure.

2. New York City Heat Vulnerability Index

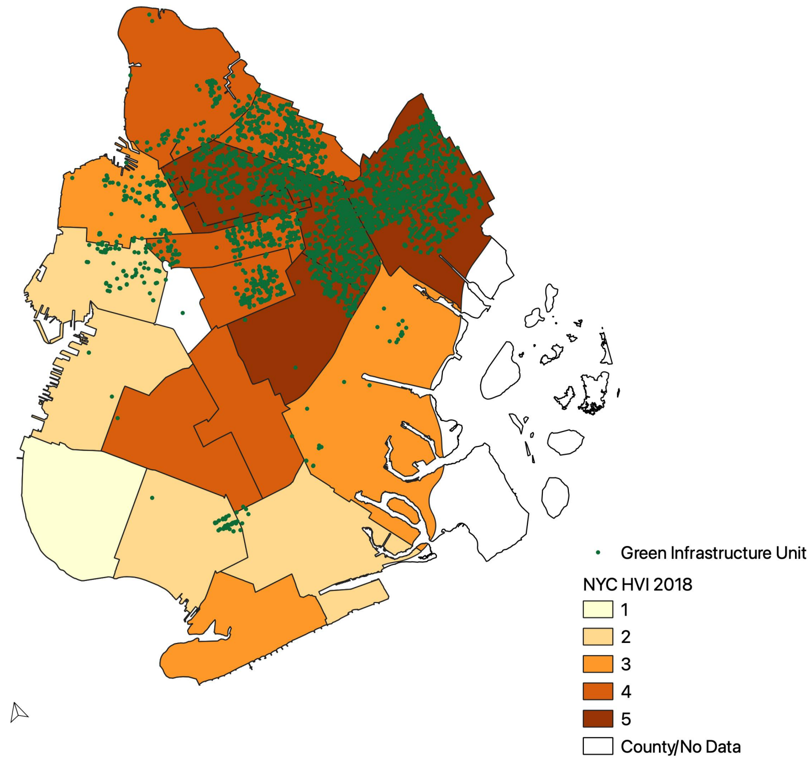

Figure 30: Application of the Heat Vulnerability Index to Community districts in Brooklyn, with green infrastructure units

NYC HVI scores are marked at community district-level polygons. Of 18 community districts (CDs) in Brooklyn, 10 fell into the two highest categories of heat vulnerability and have 3803 units of green stormwater infrastructure within them. Within the 4 CDs that scored the highest alone (CD-3, CD-5, CD-16, and CD-17), 2857 units of green infrastructure are sited—70% of all Green Infrastructure Program assets in Brooklyn. In contrast, there are 118 units in the 4 community districts that scored at level 2, and zero units of Green Infrastructure Program assets were installed in CD-10, which falls in the lowest heat vulnerability category.

3. Housing Risk Chart

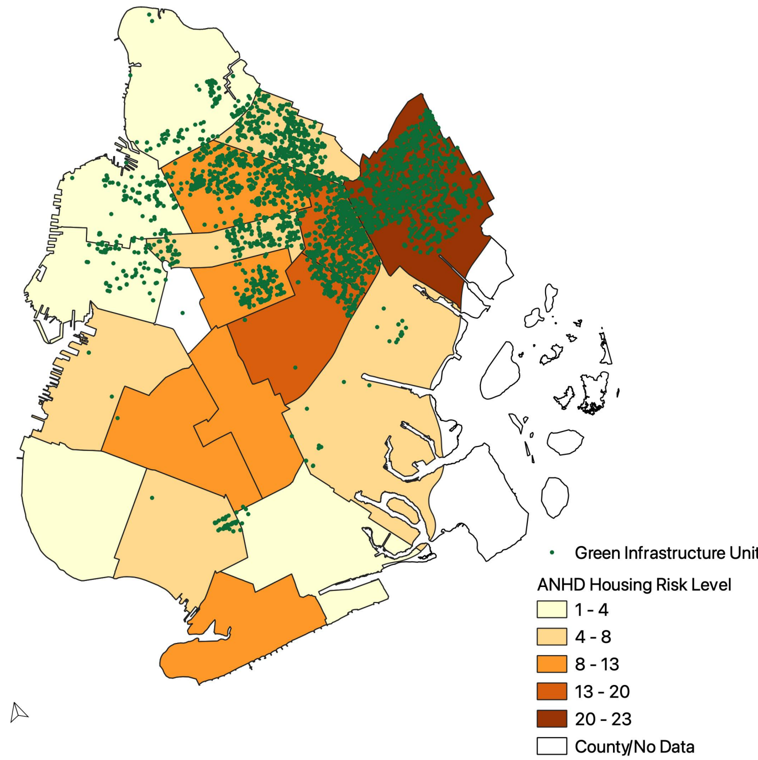

Figure 31: Application of the 2020 Housing Risk Chart to Community districts in Brooklyn, with green infrastructure units

The Housing Risk Chart, also entitled *How is Affordable Housing Threatened in Your Neighborhood?,* is applied at the community district level. Out of 18 Brooklyn CDs, 3 of them (CD-5, CD-16, and CD-17) fell into the two highest categories of housing risk and contain 2298 units of Green Infrastructure Program assets. In the highest category alone, 1463, or 40%, of the Green Infrastructure Program assets are sited. In contrast, 292 units were sited within the lowest housing risk categories, accounting for less than 1% of assets.

4. Small Area Index of Gentrification

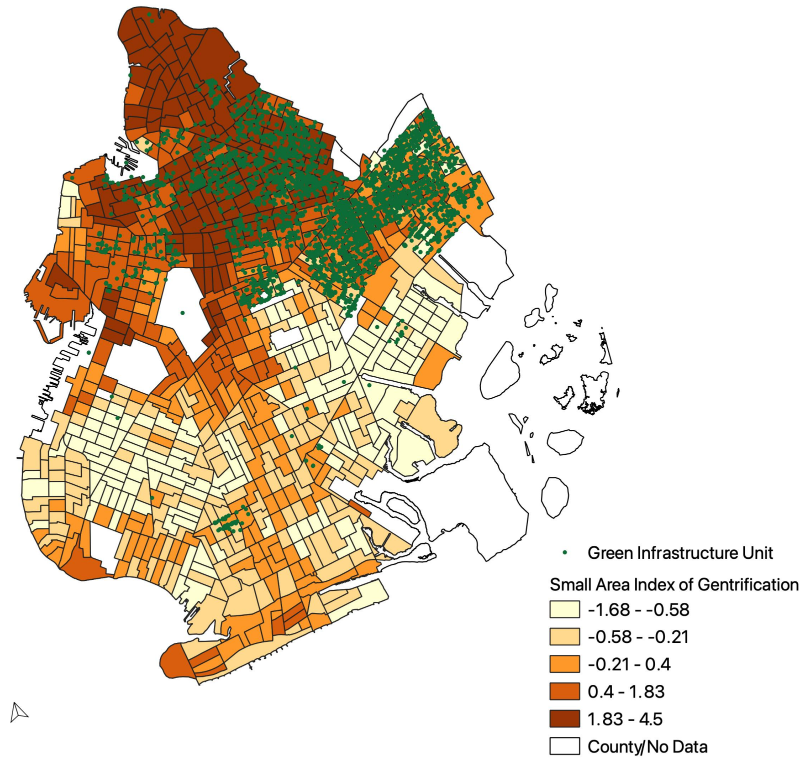

Figure 32: Application of the Small Area Index of Gentrification to census tracts in Brooklyn, with green infrastructure units

The SAIG is applied at the census tract level. The way that risk is distributed, however, is different than other indexes—there are a near-equal number of tracts (149±1) distributed with each of five scores in resultant "quintiles" as per the index authors' methods. This shows scores in relation to each other in ranking, rather than categorizing by graduated scores. After excluding units in areas with missing data and units that fall outside of census tracts, 4004 units of green infrastructure are found to spatially coincide with areas measured by the SAIG. However, 2725 units, or about 67%, of the green infrastructure assets lie within the top two quintiles (1513 units in level 4 and 1212 units in level 5). In comparison, 365 units, or less than 1% of the included green infrastructure assets lie in the census tracts that fall in the first two quintiles.

5. Typologies of Gentrification and Displacement

The Urban Displacement Project's gentrification and displacement index offers a typology-based, rather than hierarchical ranking, representation of gentrification permutations. The index indicates eight types of gentrification, categorized into three income levels: "very high income" (VHI), "moderate to high income" (MHI) and "low income" (LI).

Excluding census tracts with missing information, 4004 units of green infrastructure fall into census tracts measured by the urban displacement project. Four units (less than 0.01%) of the green infrastructure were installed in VHI census tracts marked as in a completed phase of "super gentrification." As also described in the aforementioned geographic literature, these super-gentrified census tracts lie west of Prospect Park, spanning from Park Slope to Brooklyn Heights. About 9% of the units fall within the MHI bracket, which include types of late-stage gentrification (stable or advanced exclusion phases).

Finally, 3613 units amounting to over 90% of green infrastructure are located in areas in the "low income" category. There are four types of gentrification status under the LI category. Three are types in earlier-stage gentrification and the fourth is "not losing low-income housing." About 59% of green infrastructure units that land in areas covered by this index fall within the three earlier-stage gentrification types: "ongoing displacement of low-income housing," "at risk of gentrification," and "ongoing gentrification."

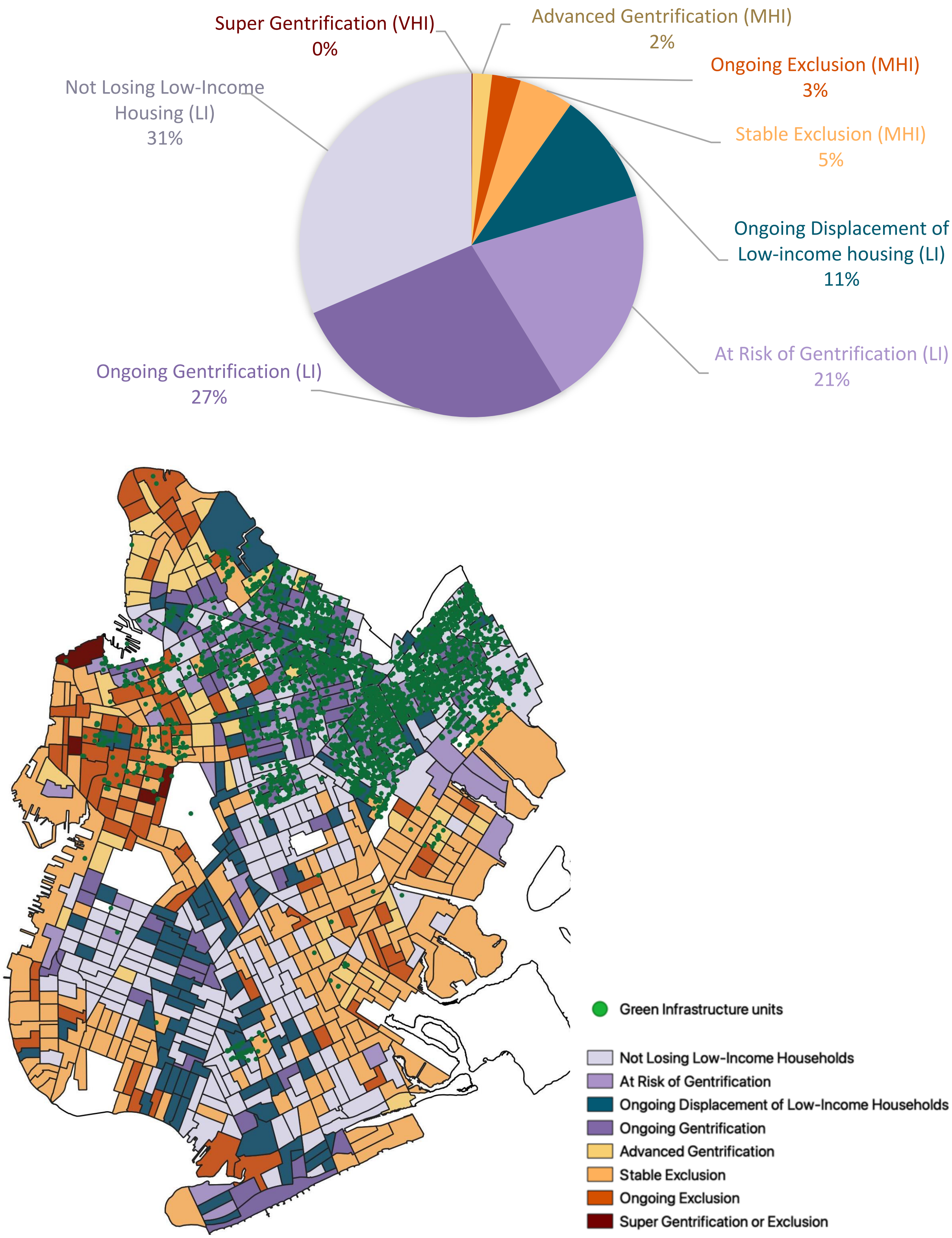

Figure 33: Percent of Green Infrastructure unit locations within each gentrification type and map of Green Infrastructure overlaid on UDP Gentrification Typologies.

Chapter 7 · Interpretation of Results

Brooklyn Heights is the most expensive neighborhood.
Then you got Park Slopes, Fort Greene, Cobble Hill, Clinton Hill and then, you know, it works like this… the rents get cheaper the further away you go from [Manhattan]. And the reality is, after the sand on Coney Island, it's the motherfucking Atlantic Ocean. So, where you gonna go? Where you gonna go?
Spike Lee on Gentrification
(Live at Black History Month Event at Pratt Institute in Brooklyn 2014)

Key Findings

In the annual county-wide index, we see that gentrification crossed a threshold into a new category rating for housing disruption in Kings County around the same time that green infrastructure was proposed across the city in 2011. The scores are categorical and based on raw scores that are derived from five-year averages of census data.

In the three indexes that provide hierarchical scores at the community district and census tract level—The Housing Risk Chart, Small Area Index of Gentrification, and Heat Vulnerability Index—there is a positive spatial relationship between the two highest gentrification score categories out of five and the vast majority of Green Infrastructure Program assets. In contrast, less than 7% of this new green infrastructure falls into areas in the lowest risk categories for both the Housing Risk Chart and Small Area Index of Gentrification. Zero units fall into the lowest heat vulnerability category. See Figure 34.

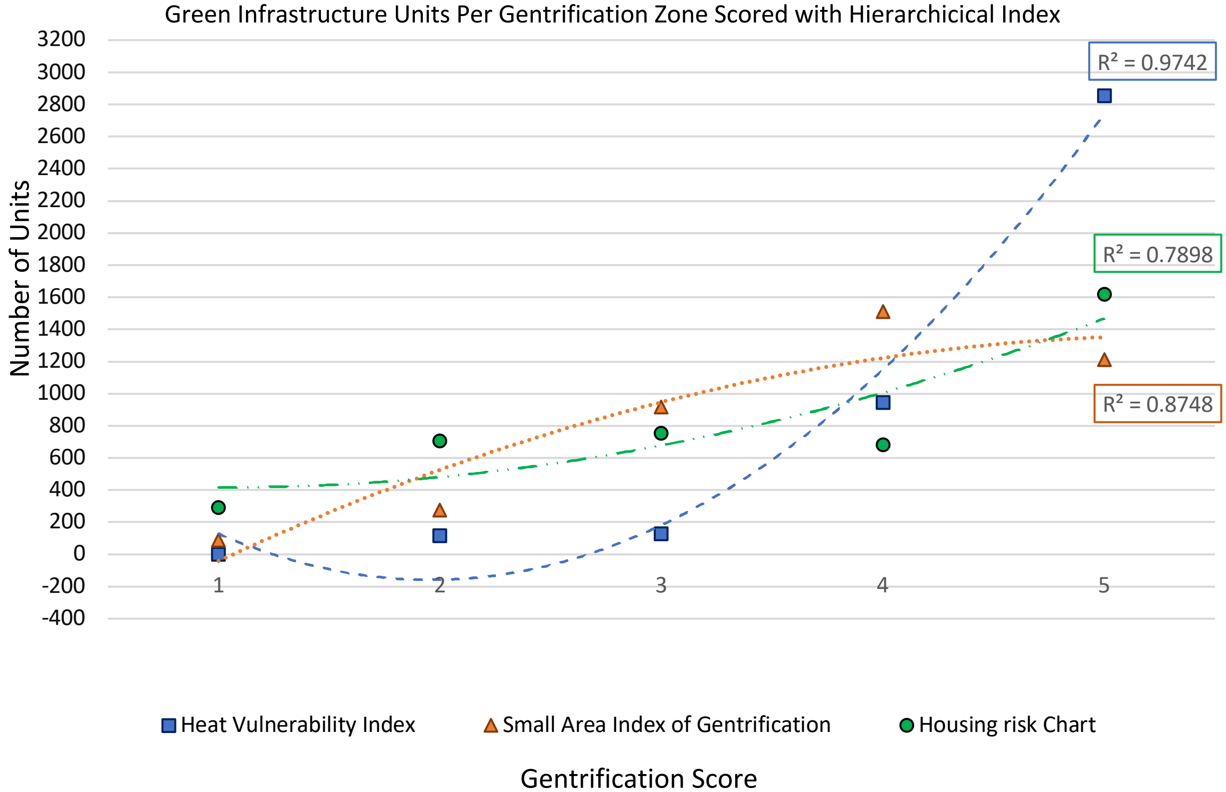

Figure 34: Green Infrastructure Units Per Gentrification Zone Scored with Hierarchical Index showing trends of high correlation between green infrastructure installation and presence of gentrification. Note: trend lines (r^2) are polynomial.

The correlation is highest (r^2=97%) in the Heat Vulnerability Index. This high correlation is not unexpected owing to the tight links to UHIE co-benefits in green stormwater infrastructure development.

The SAIG was the only hierarchical index where the very highest score (5 out of 5) did not have the most units of green stormwater infrastructure, although it is still largely gathered within the top two categories. Though this was unanticipated, the smaller polygon size (census tract rather than the large community district) leads to much higher variability within the total area, and more entropy is to be expected.

Yet this variation might still be better explained by findings in the census-tract based trend analysis for the gentrification and displacement typologies in UDP's index application, where the highest category in the SAIG coincides somewhat with the "super-gentrification" typology.

There are several categories of gentrification type (including "not gentrifying" and super-gentrification, a late-stage gentrification status) in the UDP index. Very few units of green infrastructure fall into late-stage gentrification brackets or high-income gentrifying areas. About 90% of the units fall into low-income categories in this index, which is a pattern also observed in the HVI results. However, 59% of all the infrastructure falls into areas that have both of the following two characteristics: low-income populations and early-stage gentrification.

Due to social, financial, and geological factors, the green infrastructure installed in Brooklyn is concentrated in the northern half of the borough. Drawing from literature linking urban greening practices to gentrification, it was predicted that this green infrastructure would spatially coincide with gentrification across the borough.

"Gentrification" is phenomenon that is not easy to define in absolute terms. In each study, gentrification is defined by a varying set of factors, although most tend to point to a population that is becoming wealthier and whiter. Despite the differentiation, and while all community districts in Brooklyn are gentrifying to some extent, all indexes in this study show far greater rates of gentrification in the northern half of Brooklyn.

So, green infrastructure is highly associated with both displacement risk and phases of gentrification that are related to more recent economic changes in the area, such as financialization of urban greening initiatives. High correlation between green stormwater infrastructure and gentrification constitutes a green gentrification condition.

Overall, I found that the Typologies of Gentrification and Displacement from the Urban Displacement Project was the most illuminating measure for the purposes of identifying the relationship between green infrastructure and gentrification during this time period.

While all the indexes and all the scales were extremely useful (the Housing Risk Chart and HVI both have significant health indicators, for example), the UDP index was most helpful for interpreting the results of the other indexes and drawing conclusions. There is extremely high spatial coincidence between acute[1] forms of gentrification and urban greening within this set of green infrastructure units. In particular, I understand greening as a means to refuel ongoing gentrification processes that had stagnated amongst the climate crisis, and gentrification as a means to fund climate solutions rather than determining a cause-and-effect relationship between the two processes[2].

Health, Safety, and Sustainable Development

Conventional wisdom in the resilience paradigm says green infrastructure is the future. Design principles of this green New Economy promises that urban greening will create a new and better environment and increase property values for the entire community. However, in a place like Brooklyn where over 70% of housing is renter-occupied (U.S. Census Bureau 2019), increased property values and outside investment in their neighborhoods do not mean higher returns on equity and higher quality of life—they mean higher rent rates and demographic transformations in their area that largely favor wealthier individuals.

Combining these ideas, what I am calling the "green gentrification landscape" is a dialectic in which targeted investment in municipally owned/managed/sponsored urban greening

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[1] In the three indexes that use hierarchy, "acute" refers to the two highest gentrification scores, and in the typology-based index, "acute" refers to the early phases of gentrification.
[2] see The Causality Dilemma, below.

practices as part of the resilience paradigm has fortified gentrification pressure and risk throughout the borough of Brooklyn. Green infrastructure is an attempt at solving ecological crises and increasing quality of life in neighborhoods. However, it is not separable from demographic shifts and economic transformations that create housing security risks for existing residents. The Green Infrastructure Program was a revelatory case to use as a proxy representation in this cross-sectional analysis because of its time frame, components, integration with long-term city plans and authoritative position, the availability of data, and its material spatial practices overall.

Modeled CSO measurements showing improvements in sewer overflows should not be the only base for measuring the outcomes of the Green Infrastructure Program. By looking at social and economic conditions in the areas with different green infrastructure presence as intimately connected to the physical structural improvements, we can approach a more holistic approach to understanding the landscape—a vision connecting the people and the land rather than compartmentalizing them (Hernandez 2022, 121). A paradigm of resilience is not a successful one if people's lives are harmed.

In an optimistic sense, applying a resilience framework to coupled human-environment system emphasizes the dynamic relationship between humans and environments as that dynamic operates in response to various hazards. But this is also an opportunity to rethink what we view as a hazard. Yes, a superstorm is a hazard to our environment, but precarious environmental funding and stewardship is also an environmental hazard.

Part of what is occurring in New York City green infrastructure practices is a direct pathway from working within the natural confines to inequitable green infrastructure impacts. The natural topography (water table height, bedrock composition, waterbody flushing time, etc.)

has been used to determine where the grey landscape is greened, which in turn likely exacerbates gentrification and environmental injustice. Water pollution and flooding are hazards to human health and safety, but so is the uneven distribution of health-promoting amenities like those associated with green development.

So, while all this environmental remediation is supposed to be protecting people from a huge influx of water, those who are displaced by gentrification might instead just find themselves “wiped out by the green wave” (Checker 2020, 82).

When The Data Doesn’t Exist…

I sought to create one additional map for an analysis of sites for omission vs. commission for green infrastructure grant public program-funded green roof projects such as those in Brooklyn Navy Yard. Noting that existing green roof contracts were highly concentrated in the northwest part of Brooklyn, I was interested in creating a map that showed sites with granted green roof funding and sites of rejected applications. In theory, I would have created a map showing granted applications with green symbols and rejected/ungranted applications with black symbols, hypothesizing that rejected applications would fill out some of the otherwise “empty” space in the southern portions of the map. This was interesting to me because since so many areas in southern Brooklyn were determined to be unsuitable for bioswale or other street-level green infrastructure installation, green and blue roofs or other strategies might have been a viable option for the area, especially owing to the many large, high-density buildings.

However, in my attempts to request data through the NYC FOIA portal and further research, I found that the data I was looking for on rejected grant applications did not exist. One reason was that most older paper applications (prior to 2013) were not readily available through the DEP or were perhaps past the time frame of document disposal limitations[3].

The other reason is that more recent rejected applications simply do not exist. Potential green roof grant applicants have "pre-application" group meetings to see if they should actually apply for grants, eliminating this data point from existing. The pre-application application is extremely straight-forward, as you can see in the image below (Figure 35).

NYC GREEN INFRASTRUCTURE
GRANT PROGRAM

Form Submission: Please download and send completed form to gigrantprogram@dep.nyc.gov

APPLICANT CONTACT INFORMATION

Name:

Legal Name of Business/Organization (if applicable):

Address:

City: State: Zip Code:

Email: Confirm Email:

Phone Number:

Applicant Role:

Check if Applicant Contact Information is the same as Property Owner

PROPERTY OWNER INFORMATION

Name:

Legal Name of Business/Organization (if applicable):

Address:

City: State: Zip Code:

Email: Confirm Email:

Phone Number:

PROJECT INFORMATION

Project Name:

Project Address:

Project City: Project State: Project Zip Code:

Borough/Block/Lot:

The property is served by: Property Type:

Total Impervious Area of Roof (SF):

Figure 35: Green Infrastructure Grant Pre-Application Form Sample. Source: nyc.gov

[3] Usually 7 years.

I hoped I could take the neighborhood residence data from the meetings and compare it to existing accepted applications but a request for anonymized data for individuals who had pre-application meetings was denied. Additionally, potential applicants can now attend application group workshops to learn about the application process and if they should apply (NYC DEP 2022; Euton, n.d.).

This research attempt would have enabled me to create a map of green roof *desire* vs. green roof *reality*. Data obfuscation such as this is a major limitation of secondary data, public data, and public participation. I still hope to pursue this research.

Policy Prescription

How can we ensure communities are resilient against both ecological hazards *and* environmental gentrification? The objective of environmental justice is to remedy a landscape where poor and racialized communities have historically lived and worked in places with environmental conditions that negatively impact their physical and mental health and wellness. Urban greening in these areas has the potential to mitigate urban environmental burdens, such as flood risk, high heat, and exposure to dereliction. But results here indicate that areas with city-sponsored greening also have high-risk of displacement for those who are made vulnerable in the first place.

A diversity of land use in a small area seems to be a trend in environmental justice proposals against green gentrification. Similar to integrated city planning goals, the "just green enough" strategy of Brooklyn environmental mitigation proposes a mixture of environmental goods, such as community gardening and other "ordinary environmentalisms" (Milbourne 2012) without eschewing industrial uses. This would entail having small but not absent manufacturing presence that would seemingly deter the inevitability of green gentrification because such land uses are not usually found linked to such a phenomenon (Jacobs 1992; Curran and Hamilton 2012). However much grassroots greening and network building strengthens communities, we see time and again that private investors only quash any semblance of community stability we build.

Urban greening should be government funded without corporate property-value increase incentives. I believe that the federal encouragement for cities to engage in partnerships with private enterprise leads directly to uneven, and thus unjust, funding for greening across the city. Though it would likely still be heavily bureaucratic, robust government sponsorship of greening rather than privatized greening may curtail the conflicts of interest.

There needs to be a change in social relations around housing ownership. Cooperative housing and other forms of solidarity economy around housing may be the solution. Absent landlords, especially in the form of residential building ownership by limited liability corporations (LLCs) that has removed some of the intimacy from apartment buildings, should be broken up in the name of antitrust principles. Currently, housing is hoarded and is thus able to be rented out at inflated rates. Corporations that build or buy buildings divert monies from community members because they are better able to develop or enhance green space on these properties that qualify for related government grants and tax breaks.

Additionally, other policy tools, including rent control and incentives for limited-equity apartment purchasing for first-time home buyers may help residents maintain housing stability. Other issues in New York City that reduce the amount of affordable or low-income Brooklyn housing might need to be cracked down on include people renting apartments only to rent them out through services like AirBnB, landlords holding apartments empty for tax incentives and refusing renters with vouchers, reducing luxury condominium approvals, and matching our homeless with empty units to give them a new lease on life.

Future Work

Several other analyses and projects could also contribute to ongoing questions from this research:

- Borough replications: This experiment could be replicated for each borough, borough pairs, or citywide. Although the proxy representation for urban greening could be adjusted, either by green infrastructure type, using another urban greening practice, or a future time period.
- Green gentrification index: Drawing from the index development methodologies for each of the five indexes, an index of green gentrification could be developed by integrating a green infrastructure presence factor within a certain time period.
- Green infrastructure longevity: Time series analysis of LANDSAT data for afforestation success in vegetated green infrastructure units.
- Resident protections: I intend on moving forward with this research with grassroots organizers and tenants' rights organizations in Brooklyn and Queens.
- Type-specific analysis: Analysis of green gentrification or other property value data related to different types of green infrastructure (bioswales vs. green roofs, or ROW vs. on-site, for example).
- Network Analysis: Network analysis of walkways with right-of-way green infrastructure and accessibility.
- Risk displacement: Further analysis of risk of displacement per green infrastructure typology

Chapter 8 · Conclusions

It was the last time she'd see the river from that window… This that I see now, she thought, to see no more this way.
A Tree Grows in Brooklyn
(B. Smith 1943, 415)

Understanding Human Geography as an Environmental Science

In the 18th century, after a boom in population and industry (and several cholera outbreaks), New York City began installing underground sewers to confront its deadly serious sanitation issues. Sewers lining the entirety of the underlying geological formations were outfitted with CSOs to act as a sump system that would protect the sewers by relieving them of anticipated occasional surges in water influx. Now as we start the 21st century, that aging grey infrastructure has become more and more insufficient as there are more and more demands on it. The system must be supplemented by a potentially precarious suite of green infrastructure that needs to tide us over at least until the longer, more expensive "permanent" upgrades and retrofits to existing grey infrastructure can be implemented.

At the same time, green infrastructure is marketed as an environmental boon—a health-promoting amenity that heals the landscape and the people in it. But when the government both mandates greening for any new development in a city where development is constant, and necessitates private investment as a means to fund those projects, property values rise as part of a return on that investment.

When siting for green infrastructure is dependent on both where investors want to invest and site suitability is determined in a way that prioritizes the topology and funding opportunities rather than community health, the development across the county is uneven. Uneven funding equals uneven governance.

In the same space, gentrification—a convergence of demographic shifts and economic transformations—is highly concentrated in certain areas of the borough. The political ecology of green infrastructure theoretically exacerbates economic and demographic conditions in an area, and the confluence of these phenomena beg a natural experiment evaluating whether a case of green gentrification is afflicting Brooklyn, New York—and it is.

So, CSOs have been mitigated by green infrastructure. Great. Green infrastructure is touted as a tool for environmental betterment, but we must think of the environment beyond geophysical processes.

The environment is made of several spheres existing in the same place at the same time, and they are not easily separable—the physical environment, the social environment, the economic environment, the political environment—the list goes on. This dissertation comes from a Department of Earth and Environmental Sciences, which has two official specializations: "Geography," which centers on human geography, and "Environmental and Geological Sciences," that can be mutually supportive areas if we make a conscientious effort to do so. I want to make a call to critical geographers and physical environmental scientists to think about the way we use "the environment" in our daily lexicon. Think about the environment as multifaceted beyond and within the ecological realm. Geography is one of the earth and environmental sciences for a reason. Environmental Sciences—plural.

Responsible applications of political ecology should string these layers together. Greening does not relieve all aspects of the environment. And social problems cannot be solved without considering the ecological terrain on which they occur. Green infrastructure remedies an ecological problem that is highly political, but it exacerbates gentrification and all its associated risks in the socioeconomic environment. An environment is "the surroundings or conditions in which a person, animal, or plant lives or operates" ("Oxford Languages" n.d.) and that is highly social.

The Causality Dilemma

So, which came first, the greening or the gentrification? This has been a question through every iteration of this project. This cross-sectional analysis structure is used to show that this question could only yield a paradoxical response. The inquiry looks at one cross section of time (2010-2020) for an analysis of correlation rather than causation.

Using evidence from literature, this study operates under the assumption that gentrification is ongoing and constant, and reaches many junctures (ecological and social) that affect its trajectory. In this particular moment in space-time (the resilience paradigm), urban greening practices are one of those many moments that fuel and accelerate gentrification.

Development and urban rejuvenation processes hit a wall when climate emergencies became too ubiquitous for their existing development practices to be viable. Influenced both politically and financially by principles of the resilience paradigm, green development was launched at the climate emergency obstacle to clear the path for gentrification to continue. Further evidentiary support for this is given by results from the CSVI of Gentrification Pressure showing a sharp increase in gentrification correlating to the release of the Vision 2020 plan and UDP Gentrification and Displacement Typology Index showing a high spatial coincidence between green infrastructure and areas specifically in the nascent stages of gentrification.

Urban greening in the form of green infrastructure relies heavily on the processes of gentrification for its funding and usage. Moreover, to say that green infrastructure installation sparked gentrification in the area would be a slight to the countless people negatively impacted by their rent burden and the swaths of scholarly and activist work dedicated to it. Gentrification is cyclic and has its own paradigmatic eras—in this moment we are in a green gentrification era.

There can be a fine line between sounding pedantic and sounding conscientious. This may not be a perfect response, but an assumption of one or the other in a chicken-and-egg[1] question is somewhat antithetical to the purposes of this dissertation.

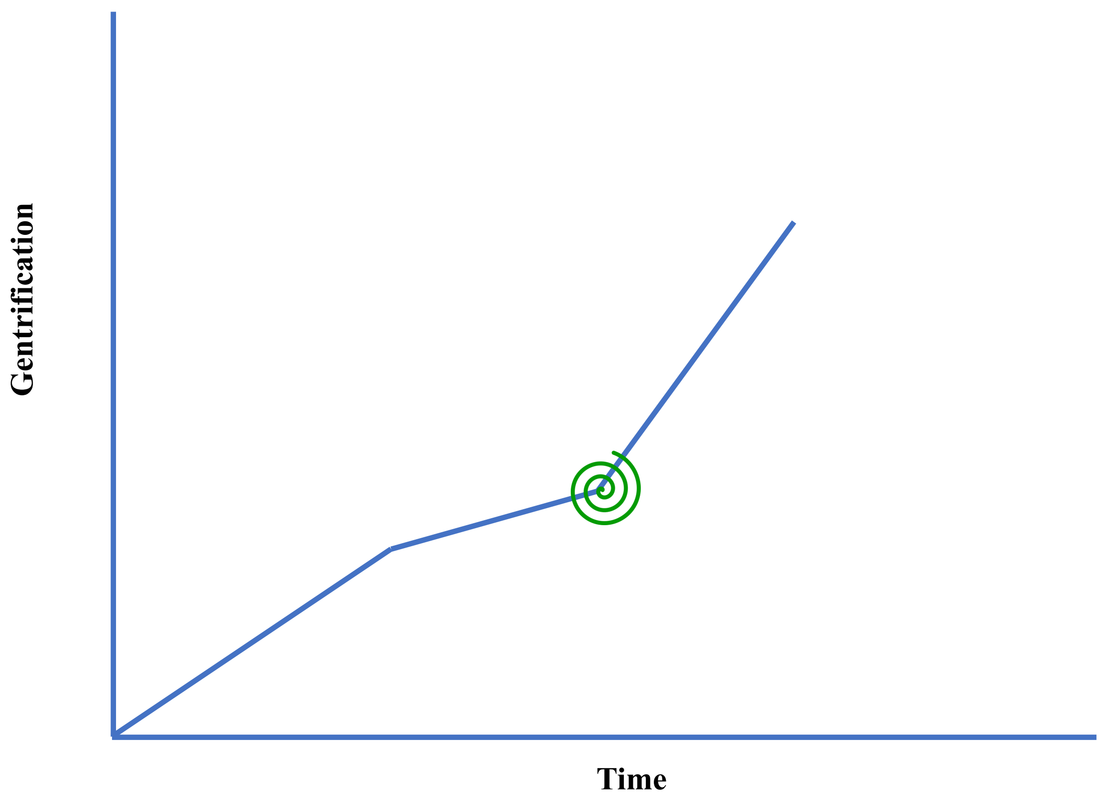

Figure 36: Green Gentrification Concept Map

[1] Even the classic question "which came first, the chicken or the egg" has become a scientifically and socially flawed question whose answer is only a paradox. "Eggs" themselves existed prior to a chicken ever did, and as for what we know as a chicken, the egg the first chicken hatched from would therefore not be an egg from a chicken, but it might be called a "chicken egg" because of what it produced, while others say the first egg begat from a chicken was the first chicken egg (Zushi 2017).

Synthesis of Theoretical and Material Research

I'm drowning here, and you're describing the water!
As Good as It Gets
(Brooks 1997)

A landscape is a site of two types of transformation. One: the terrain itself is landscaped by actions and actors, including financialization, ecological events, and law. Two: materials enter the landscape and become transformed—for examples, people live and work within a landscape and their health is impacted (for better or worse) by it, or a sum of money that is invested in that landscape will yield either losses or returns and grow or shrink, depending on the market.

In Brooklyn, two major factors are creating an uneven landscape of green infrastructure development. First, the different types of underlying geological formations necessitate a high diversity of green infrastructure types of units in order to accommodate all areas. Then, a privatized model for funding leads to uneven support because of the private enterprise's own investment site analyses. This green scheme, in turn and by design, leads to increases in property values which draws in cultural investments in the area like new luxury residential buildings and stores.

In the case of a health-promoting amenity, like the green infrastructure, there is big distinction between sites of commission and sites of omission:

In sites of green stormwater infrastructure commission, people in the landscape reap health benefits and monetary investments appreciate in the processes of gentrification. However, poorer residents are likely expelled from these areas, perhaps even into the areas of omission, and new wealthy residents enter into this part of the landscape, which would mean that only the people with stable or growing high monetary wealth and status reap the health benefits.

The sites of green stormwater infrastructure omission—the forgotten places—are left out of the progressive land transformations, and likely experience dilapidated environments. Expulsive greening practices do not just remove poverty and other environmental "negatives" from the greened area—they remove *the people experiencing poverty*. These landscapes are not healing for the people who live there now nor the people who have already gone.

Uneven investment in the terrain is equivalent to uneven investment in its people.

Resilience is not sustainable.

Appendix I: Archival Documents

Table 8: Gentrification and Brooklyn Fisheries Archival Documents

Author	Investigator	Date	Description	Collection
Frank Tursi	Barbara Garrity-Blake	5/24/16	Retired journalist describes his upbringing in Brooklyn, New York and how he moved to North Carolina with the industry	1997 North Carolina Fisheries Reform Act
Don Dvorak	Dewey Livingston & Jennifer Stock	3/9/12	The personal experiences of the pioneer divers of Cordell Expeditions, who collected specimens, video footage, photographs, and engaged the media to bring awareness to this poorly known marine habitat off the Marin/Sonoma coast, many of whom are now approaching advanced age, are unique and irreplaceable elements of the historic expedition that have not been recorded.	Cordell Expeditions
Elaine Dvovak				
Sue Estey				
Joe Scavone	Nancy Solomon	6/8/11	Interview with Scavone, whose family were fishermen in Brooklyn for multiple generations	Long Island Traditions
Tom Jefferies		10/19/11	Interview with Jefferies. Marketable fish species have diversified as the country as diversified.	
Bill Marinaccio		6/18/15	Retired charter boat captain Marinaccio of Freeport shares some stories of working alongside his father on board the Dutchess	Long Island Traditions - Climate Change and Sandy
Laurel Bryant	Molly Graham	11/13/20	Laurel Bryant was born in Mount Vernon, Washington, and raised in Seattle.	NOAA 50th Anniversary Oral History Project
Doug Rogers	Nancy Solomon	7/17/97	Rogers has worked the Peconic bays for 35 years.	Peconic Estuary Interviews
Philip Ruhle	Jennifer Murray	9/29/87	Born in Brooklyn, Ruhle began his work in the fishing industry during the 1940's.	The Fishing Industry in Newport, RI 1930-1987
Paul Swain	Janice Gadaire Fleuriel	9/25/04	Work schedule changes related to advanced boating and fishing technology	The Working Waterfront Festival Community Documentation Project
Kevin Dawson		9/24/05	Location changes with advanced freezer technology.	
Malvin Kvilhaug			Houses used as collateral for boats.	
Theodore "Ted" Pederson		9/27/08	Pederson discusses his experiences in the fishing industry. His wife, Ethel, joins him in the interview.	
Leonard Roche	Madeleine Hall-Arber	9/25/10	Dr. Roche is a retired fisherman who had a simultaneous career as an educator and school principal.	

Henry Allerdt	Mike Petillo	9/24/11	Allerdt recalls some of the worst weather he has been through, along with the various boats he has fished.	The Working Waterfront Festival Community Documentation Project
Dick Grachek	Madeleine Hall-Arber	9/25/11	Grachek has fished for just about every species of fish. Leaving the ocean to pursue a degree the lure was strong and he returned.	
Hans Davidson	Markham Starr	9/30/02	Although now retired, Davidson recalls the struggle against what he refers to as “draconian” regulations.	
Lewis Lawrence	David Caruso	2/20/15	Sustainable dilapidation and community attractiveness for the investors and new residents and tourists	Voices from the Working Waterfront Oral History Project
Petter & Sharon Ulrichsen	Fred Calabretta	7/12/17	Owners of the family business Harbor Hydraulics in Fairhaven, CT.	Workers on the New Bedford Waterfront

Table 9: Municipal Government Reports and Data

Document, Year (Purpose)	Department	URL	Format
SPDES Report 2014 (CSO output volumes)	NYC Dept. of Environmental Protection	http://www.nyc.gov/html/dep/pdf/harbor/spdes_bmp_report_2014.pdf	.pdf
SPDES Report 2015		http://www.nyc.gov/html/dep/pdf/harbor/spdes_bmp_report_2015.pdf	.pdf
SPDES Report 2016		http://www.nyc.gov/html/dep/pdf/harbor/spdes_bmp_report_2016.pdf	.pdf
SPDES Report 2018		https://www1.nyc.gov/assets/dep/downloads/pdf/water/stormwater/spdes-bmp-cso-annual-report-2018.pdf	.pdf
DEP Green Infrastructure, 2018		No Longer available. Originally accessed via nyc open data, 2018.	.shp
Vision 2020: New York City Comprehensive Waterfront Plan, 2010	NYC Dept. of City Planning	https://www1.nyc.gov/site/planning/plans/vision-2020-cwp/vision-2020-cwp.page	.pdf
NYC Urban Tree Canopy Assessment Metrics 2010 (CSO Drainage Zones)	NYC Dept. of Parks and Recreation	https://data.cityofnewyork.us/Environment/NYC-Urban-Tree-Canopy-Assessment-Metrics-2010/hnxz-kkn5	.shp
Neighborhood Tabulation Areas, 2010	City Of New York	https://data.cityofnewyork.us/City-Government/2010-Neighborhood-Tabulation-Areas-NTAs-/cpf4-rkhq	.shp
NYC Heat Vulnerability Index	NYC Dept. of Health	https://a816-dohbesp.nyc.gov/IndicatorPublic/HeatHub/hvi.html	.csv, .shp

Appendix II: Results Data for Spatial Coincidence Analysis

Table 10: Green Infrastructure Point Counts in Community district Polygons and ANHD and HVI Scores

Community Board District	CB Code	shape_area	shape_leng	Neighborhood	ANHD Number of Housing Threats	Heat Vulnerability Index Score	NUMPOINTS
BK 1	301	131742345.9	68957.4477	Greenpoint/Williamsburg	3	4	112
BK 2	302	79329421.36	74179.91486	Brooklyn Hts/Ft. Greene	3	3	104
BK 3	303	79461502.55	36213.67136	Bedford Stuyvesant	13	5	559
BK 4	304	56662612.93	37007.80652	Bushwick	8	4	437
BK 5	305	155482383.7	65113.74904	E. New York/Starrett City	23	5	1463
BK 6	306	85497428.15	82129.62118	Park Slope/Carroll Gdns/Gowanus/Red Hook	3	2	72
BK 7	307	104130714.1	87416.96312	Sunset Park	6	2	3
BK 8	308	45592714.72	38229.57701	Crown Heights	6	4	202
BK 9	309	45326334.17	29944.47419	S. Crown Hts/Prospect Hts	11	4	192
BK 10	310	111328282.6	44788.15626	Bay Ridge	1	1	0
BK 11	311	103177785.4	51549.55763	Bensonhurst	8	2	39
BK 12	312	99525500.13	52245.83132	Borough Park	11	4	2
BK 13	313	88195685.8	65821.87903	Coney Island	10	3	0
BK 14	314	82167088.19	49292.35139	Flatbush/Midwood	9	4	1
BK 15	315	131644187.9	115292.8116	Sheepshead Bay	4	2	4
BK 16	316	51768906.81	32997.57469	Brownsville	19	5	681
BK 17	317	93818790.08	43327.41058	East Flatbush	20	5	154
BK 18	318	235456955	189415.511	Flatlands/Canarsie	7	3	24

Table 11: Green Infrastructure Point Counts in Census Tract Polygons against Gini Scores, SAIG Scores, and UDP Gentrification Typologies (10 pages, continuous)

CT2010	NTA	NTA Name	PUMA	shape_area	shape_leng	FIPS	Boro	Census Tract ID	CT Geographic Area Name	UDP Typology	Gini—2010	Gini—2019	SAIG Score	SAIG HOUSING Status	NUMPOINTS
100	BK09	Brooklyn Heights-Cobble Hill	4004	2236510.471	6527.768875	47	3	1400000US36047000100	Census Tract 1, Kings County, New York	MHI - Stable Exclusion	0.433	0.5316	-0.6012966	High to High	0
200	BK32	Sunset Park West	4012	2952085.216	9075.284871	47	3	1400000US36047000200	Census Tract 2, Kings County, New York	LI - Not Losing Low-Income Households	0.456	0.4769	0.37642593	High to High	0
301	BK09	Brooklyn Heights-Cobble Hill	4004	2152333.307	6441.358747	47	3	1400000US36047000301	Census Tract 3.01, Kings County, New York	MHI - Stable Exclusion	0.534	0.5714	-0.9082592	High to High	0
501	BK09	Brooklyn Heights-Cobble Hill	4004	901506.9925	4828.170042	47	3	1400000US36047000501	Census Tract 5.01, Kings County, New York	MHI - Stable Exclusion			-0.407753	High to High	0
502	BK09	Brooklyn Heights-Cobble Hill	4004	1038510.38	4866.823298	47	3	1400000US36047000502	Census Tract 5.02, Kings County, New York	MHI - Stable Exclusion	0.458	0.4621	0.36388546	High to High	0
700	BK09	Brooklyn Heights-Cobble Hill	4004	1916981.899	6287.856003	47	3	1400000US36047000700	Census Tract 7, Kings County, New York	MHI - Ongoing Exclusion	0.546	0.55	-0.3070674	High to High	0
900	BK09	Brooklyn Heights-Cobble Hill	4004	1737777.424	5883.375467	47	3	1400000US36047000900	Census Tract 9, Kings County, New York	MHI - Ongoing Exclusion			1.33999799	High to High	0
1100	BK38	DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill	4004	1814052.379	5760.471688	47	3	1400000US36047001100	Census Tract 11, Kings County, New York	MHI - Stable Exclusion	0.212	0.392	4.46778351		0
1300	BK38	DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill	4004	3139245.362	7513.460228	47	3	1400000US36047001300	Census Tract 13, Kings County, New York	MHI - Stable Exclusion	0.326	0.4137	1.14392616		0
1500	BK38	DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill	4004	3310830.172	9618.66407	47	3	1400000US36047001500	Census Tract 15, Kings County, New York	MHI - Advanced Gentrification	0.519	0.5466	4.03908273	High to High	1
1800	BK32	Sunset Park West	4012	22063006.15	75322.49841	47	3	1400000US36047001800	Census Tract 18, Kings County, New York	MHI - Stable Exclusion			0	0	2
2000	BK32	Sunset Park West	4012	1620781.213	5426.039389	47	3	1400000US36047002000	Census Tract 20, Kings County, New York	MHI - Advanced Gentrification	0.384	0.4458	0.64336168	Low to High	0
2100	BK38	DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill	4004	5707257.194	12735.72322	47	3	1400000US36047002100	Census Tract 21, Kings County, New York	VHI - Super Gentrification or Exclusion			0.88318631	Low to High	1
2200	BK32	Sunset Park West	4012	3690691.661	10226.61065	47	3	1400000US36047002200	Census Tract 22, Kings County, New York	LI - At Risk of Gentrification	0.379	0.5367	-0.2264847	Low to High	0
2300	BK38	DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill	4004	1961451.522	6287.882008	47	3	1400000US36047002300	Census Tract 23, Kings County, New York	LI - At Risk of Gentrification			2.07141367		10
2901	BK68	Fort Greene	4004	1167631.229	4334.055638	47	3	1400000US36047002901	Census Tract 29.01, Kings County, New York	LI - At Risk of Gentrification			1.84712388		8
3000	BK31	Bay Ridge	4013	1174204.909	4715.150945	47	3	1400000US36047003000	Census Tract 30, Kings County, New York	MHI - Ongoing Exclusion	0.417	0.4763	-0.4136598	High to High	0
3100	BK68	Fort Greene	4004	3102639.144	7674.199337	47	3	1400000US36047003100	Census Tract 31, Kings County, New York	MHI - Ongoing Exclusion			1.95415303	Low to Low	0
3300	BK68	Fort Greene	4004	1773979.493	6435.6038	47	3	1400000US36047003300	Census Tract 33, Kings County, New York	MHI - Stable Exclusion	0.485	0.5146	2.22261894	High to High	0
3400	BK31	Bay Ridge	4013	5160782.09	11210.6992	47	3	1400000US36047003400	Census Tract 34, Kings County, New York	MHI - Stable Exclusion			-0.5658967	High to High	0
3500	BK68	Fort Greene	4004	1433175.153	5043.325465	47	3	1400000US36047003500	Census Tract 35, Kings County, New York	MHI - Stable Exclusion	0.441	0.5513	0.56141409	High to High	0
3600	BK31	Bay Ridge	4013	1348886.859	5022.630623	47	3	1400000US36047003600	Census Tract 36, Kings County, New York	MHI - Ongoing Exclusion	0.426	0.4944	-0.260856	High to High	0
3700	BK38	DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill	4004	1805697.772	7325.293256	47	3	1400000US36047003700	Census Tract 37, Kings County, New York	MHI - Advanced Gentrification	0.357	0.4096	2.99192566	High to High	0
3800	BK31	Bay Ridge	4013	1367702.861	5026.866778	47	3	1400000US36047003800	Census Tract 38, Kings County, New York	MHI - Stable Exclusion	0.478	0.4951	-0.9214404	High to High	0
3900	BK38	DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill	4004	1681241.449	5101.749748	47	3	1400000US36047003900	Census Tract 39, Kings County, New York	MHI - Ongoing Exclusion			1.58913684	High to High	1
4100	BK38	DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill	4004	1744094.411	5283.85666	47	3	1400000US36047004100	Census Tract 41, Kings County, New York	MHI - Ongoing Exclusion	0.467	0.5007	0.95027654	High to High	0
4300	BK38	DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill	4004	1786641.701	5713.77523	47	3	1400000US36047004300	Census Tract 43, Kings County, New York	MHI - Stable Exclusion	0.498	0.5248	1.12526031	High to High	6
4400	BK31	Bay Ridge	4013	4482159.645	9054.058608	47	3	1400000US36047004400	Census Tract 44, Kings County, New York	MHI - Stable Exclusion			-0.91124	High to High	0
4500	BK33	Carroll Gardens-Columbia Street-Red Hook	4005	1835597.061	5503.683707	47	3	1400000US36047004500	Census Tract 45, Kings County, New York	MHI - Stable Exclusion			0.35303487	High to High	0
4600	BK31	Bay Ridge	4013	3118067.604	10799.26532	47	3	1400000US36047004600	Census Tract 46, Kings County, New York	MHI - Stable Exclusion			-0.4209095	High to High	0
4700	BK33	Carroll Gardens-Columbia Street-Red Hook	4005	2892504.925	9926.016269	47	3	1400000US36047004700	Census Tract 47, Kings County, New York	MHI - Stable Exclusion	0.41	0.4895	0.10629403	High to High	0
4900	BK33	Carroll Gardens-Columbia Street-Red Hook	4005	1051003.111	5528.991799	47	3	1400000US36047004900	Census Tract 49, Kings County, New York	MHI - Ongoing Exclusion			0.09951631	High to High	0
5000	BK31	Bay Ridge	4013	2388874.17	7824.751434	47	3	1400000US36047005000	Census Tract 50, Kings County, New York	MHI - Ongoing Exclusion	0.427	0.4566	-0.2189206	High to High	0
5100	BK33	Carroll Gardens-Columbia Street-Red Hook	4005	1959926.96	6036.165379	47	3	1400000US36047005100	Census Tract 51, Kings County, New York	MHI - Ongoing Exclusion	0.331	0.4348	0.4095601	High to High	0
5201	BK31	Bay Ridge	4013	1451018.291	5503.969541	47	3	1400000US36047005201	Census Tract 52.01, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.567	0.6565	-0.7290702	High to High	0
5202	BK31	Bay Ridge	4013	1398134.512	5190.713705	47	3	1400000US36047005202	Census Tract 52.02, Kings County, New York	MHI - Stable Exclusion			0.05702321	High to High	0
5300	BK33	Carroll Gardens-Columbia Street-Red Hook	4005	17696689.81	55185.36966	47	3	1400000US36047005300	Census Tract 53, Kings County, New York	MHI - Stable Exclusion	0.439	0.4741	1.53058937	Low to High	0
5400	BK31	Bay Ridge	4013	1740560.579	7538.724289	47	3	1400000US36047005400	Census Tract 54, Kings County, New York	MHI - Stable Exclusion	0.512	0.5129	-0.2182597	High to High	0
5601	BK31	Bay Ridge	4013	1818781.264	6884.636443	47	3	1400000US36047005601	Census Tract 56.01, Kings County, New York	MHI - Stable Exclusion	0.387	0.423	-0.1898891	High to High	0
5602	BK31	Bay Ridge	4013	1456957.476	5792.079366	47	3	1400000US36047005602	Census Tract 56.02, Kings County, New York	MHI - Stable Exclusion			0.4013338	Low to High	0
5800	BK31	Bay Ridge	4013	2080303.311	6098.1678	47	3	1400000US36047005800	Census Tract 58, Kings County, New York	LI - Not Losing Low-Income Households	0.468	0.4973	-0.3505832	High to High	0
5900	BK33	Carroll Gardens-Columbia Street-Red Hook	4005	3852115.635	10119.00778	47	3	1400000US36047005900	Census Tract 59, Kings County, New York	MHI - Advanced Gentrification			2.58128678	Low to High	0
6000	BK31	Bay Ridge	4013	1639074.042	5498.334387	47	3	1400000US36047006000	Census Tract 60, Kings County, New York	MHI - Stable Exclusion	0.446	0.4637	-0.2147916	High to High	0
6200	BK31	Bay Ridge	4013	1746843.264	5368.681405	47	3	1400000US36047006200	Census Tract 62, Kings County, New York	MHI - Stable Exclusion	0.485	0.4861	-0.1819966	High to High	0
6300	BK33	Carroll Gardens-Columbia Street-Red Hook	4005	1082019.872	5681.219768	47	3	1400000US36047006300	Census Tract 63, Kings County, New York	MHI - Ongoing Exclusion	0.323	0.4094	0.48071868	High to High	0
6400	BK31	Bay Ridge	4013	2186814.718	5927.578458	47	3	1400000US36047006400	Census Tract 64, Kings County, New York	MHI - Stable Exclusion			-0.9541796	High to High	0
6500	BK33	Carroll Gardens-Columbia Street-Red Hook	4005	2685488.227	7866.465519	47	3	1400000US36047006500	Census Tract 65, Kings County, New York	MHI - Stable Exclusion	0.436	0.4441	0.7366393	High to High	0
6600	BK31	Bay Ridge	4013	1653273.36	5243.925346	47	3	1400000US36047006600	Census Tract 66, Kings County, New York	MHI - Stable Exclusion	0.461	0.4914	-0.4368165	High to High	0
6700	BK33	Carroll Gardens-Columbia Street-Red Hook	4005	1680804.341	5236.047912	47	3	1400000US36047006700	Census Tract 67, Kings County, New York	VHI - Super Gentrification or Exclusion	0.484	0.4963	0.1736212	High to High	0
6800	BK31	Bay Ridge	4013	1996655.736	5840.803227	47	3	1400000US36047006800	Census Tract 68, Kings County, New York	LI - Not Losing Low-Income Households			-0.5723281	High to High	0
6900	BK38	DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill	4004	1927677.572	5563.971321	47	3	1400000US36047006900	Census Tract 69, Kings County, New York	MHI - Ongoing Exclusion			1.01163038	High to High	5
7000	BK31	Bay Ridge	4013	1609198.158	7191.23892	47	3	1400000US36047007000	Census Tract 70, Kings County, New York	LI - Ongoing Gentrification	0.411	0.4644	-0.7910819	High to High	0
7100	BK38	DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill	4004	1840258.51	5816.04662	47	3	1400000US36047007100	Census Tract 71, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.547	0.6166	0.83343288	High to High	12
7200	BK32	Sunset Park West	4012	630314.8276	3386.979685	47	3	1400000US36047007200	Census Tract 72, Kings County, New York	LI - Ongoing Gentrification	0.356	0.4195	-1.0926062	Low to High	0
7400	BK32	Sunset Park West	4012	1516612.999	4994.563857	47	3	1400000US36047007400	Census Tract 74, Kings County, New York	LI - Not Losing Low-Income Households	0.454	0.4944	-0.643001	Low to High	0
7500	BK33	Carroll Gardens-Columbia Street-Red Hook	4005	3052946.627	7513.485203	47	3	1400000US36047007500	Census Tract 75, Kings County, New York	MHI - Ongoing Exclusion	0.467	0.5274	0.68786916	High to High	2
7600	BK32	Sunset Park West	4012	1510401.691	4980.047514	47	3	1400000US36047007600	Census Tract 76, Kings County, New York	LI - Not Losing Low-Income Households	0.481	0.5313	-0.3163278	Low to High	0
7700	BK33	Carroll Gardens-Columbia Street-Red Hook	4005	4187368.545	10144.2156	47	3	1400000US36047007700	Census Tract 77, Kings County, New York	MHI - Ongoing Exclusion	0.413	0.5111	1.15355449	High to High	0
7800	BK32	Sunset Park West	4012	1509791.99	4986.671595	47	3	1400000US36047007800	Census Tract 78, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			0.21782728	Low to High	0
8000	BK32	Sunset Park West	4012	1506326.485	4989.723103	47	3	1400000US36047008000	Census Tract 80, Kings County, New York	MHI - Stable Exclusion			0.80795387	Low to High	0
8200	BK32	Sunset Park West	4012	1517026.099	4989.68675	47	3	1400000US36047008200	Census Tract 82, Kings County, New York	LI - Ongoing Gentrification	0.452	0.5736	0.25153803	Low to High	0
8400	BK32	Sunset Park West	4012	2650333.443	6552.055506	47	3	1400000US36047008400	Census Tract 84, Kings County, New York	LI - Ongoing Gentrification			0.05254946	Low to High	0
8500	BK33	Carroll Gardens-Columbia Street-Red Hook	4005	2624913.751	7950.931704	47	3	1400000US36047008500	Census Tract 85, Kings County, New York	LI - At Risk of Gentrification	0.462	0.6019	1.1922084		0
8600	BK34	Sunset Park East	4012	1221916.798	4685.244935	47	3	1400000US36047008600	Census Tract 86, Kings County, New York	Missing Data			0	0	1
8800	BK34	Sunset Park East	4012	2019986.254	5710.979014	47	3	1400000US36047008800	Census Tract 88, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			0.6239358	Low to High	0
9000	BK34	Sunset Park East	4012	1631111.772	5208.353467	47	3	1400000US36047009000	Census Tract 90, Kings County, New York	LI - At Risk of Gentrification			-0.2390125	Low to High	0
9200	BK34	Sunset Park East	4012	1218874.037	4679.945411	47	3	1400000US36047009200	Census Tract 92, Kings County, New York	LI - Not Losing Low-Income Households	0.492	0.5058	-0.4527142	Low to High	0
9400	BK34	Sunset Park East	4012	1625600.911	5203.583962	47	3	1400000US36047009400	Census Tract 94, Kings County, New York	LI - Not Losing Low-Income Households	0.43	0.4463	-0.6657723	Low to High	0
9600	BK34	Sunset Park East	4012	1622766.586	5203.073715	47	3	1400000US36047009600	Census Tract 96, Kings County, New York	LI - Not Losing Low-Income Households	0.455	0.4793	-0.4341059	Low to High	0
9800	BK34	Sunset Park East	4012	1625498.652	5203.979585	47	3	1400000US36047009800	Census Tract 98, Kings County, New York	LI - Not Losing Low-Income Households	0.466	0.501	-0.5941688	Low to High	0
10000	BK34	Sunset Park East	4012	1625060.713	5203.434379	47	3	1400000US36047010000	Census Tract 100, Kings County, New York	LI - Not Losing Low-Income Households			-0.9282291	Low to High	0
10100	BK32	Sunset Park West	4012	3393635.784	7585.529133	47	3	1400000US36047010100	Census Tract 101, Kings County, New York	MHI - Advanced Gentrification	0.375	0.4408	0.69108201	High to High	0
10200	BK34	Sunset Park East	4012	1640687.839	5223.378481	47	3	1400000US36047010200	Census Tract 102, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			-0.7835525	High to High	0
10400	BK34	Sunset Park East	4012	1639390.921	5221.791692	47	3	1400000US36047010400	Census Tract 104, Kings County, New York	LI - Not Losing Low-Income Households	0.434	0.4484	-1.0644108	Low to High	0
10600	BK34	Sunset Park East	4012	1624784.393	5203.318579	47	3	1400000US36047010600	Census Tract 106, Kings County, New York	LI - Not Losing Low-Income Households	0.429	0.4531	-0.8029791	Low to High	0
10800	BK34	Sunset Park East	4012	1624849.988	5203.5166	47	3	1400000US36047010800	Census Tract 108, Kings County, New York	LI - At Risk of Gentrification			-1.272198	Low to High	1
11000	BK34	Sunset Park East	4012	1699091.864	5365.03648	47	3	1400000US36047011000	Census Tract 110, Kings County, New York	LI - Not Losing Low-Income Households	0.393	0.4411	0.03236778	Low to High	0
11200	BK34	Sunset Park East	4012	1843970.961	5459.472146	47	3	1400000US36047011200	Census Tract 112, Kings County, New York	LI - Not Losing Low-Income Households	0.455	0.4668	-0.3015707	Low to High	0
11400	BK88	Borough Park	4014	1806159.314	5462.281937	47	3	1400000US36047011400	Census Tract 114, Kings County, New York	LI - Not Losing Low-Income Households	0.4	0.4033	-0.7406587	Low to High	0
11600	BK88	Borough Park	4014	1724997.732	5869.317339	47	3	1400000US36047011600	Census Tract 116, Kings County, New York	LI - Not Losing Low-Income Households	0.491	0.5605	-0.8789567	High to High	0
11700	BK37	Park Slope-Gowanus	4005	2160662.478	5822.992359	47	3	1400000US36047011700	Census Tract 117, Kings County, New York	MHI - Ongoing Exclusion	0.463	0.4649	2.2418126	High to High	0
11800	BK34	Sunset Park East	4012	2359854.017	7958.054618	47	3	1400000US36047011800	Census Tract 118, Kings County, New York	LI - Not Losing Low-Income Households	0.378	0.5019	-1.4196889	High to High	0
11900	BK37	Park Slope-Gowanus	4005	7727266.997	15289.95994	47	3	1400000US36047011900	Census Tract 119, Kings County, New York	MHI - Ongoing Exclusion	0.356	0.4259	1.66328905	Low to High	16
12000	BK34	Sunset Park East	4012	2086620.621	7623.153867	47	3	1400000US36047012000	Census Tract 120, Kings County, New York	LI - Not Losing Low-Income Households			-0.8429156	High to High	0

CT2010	NTA	NTA Name	PUMA	shape_area	shape_leng	FIPS	Boro	Census Tract ID	CT Geographic Area Name	UDP Typology	Gini—2010	Gini—2019	SAIG Score	SAIG HOUSING Status	NUMPOINTS
12100	BK37	Park Slope-Gowanus	4005	1593259.515	5142.255125	47	3	1400000US36047012100	Census Tract 121, Kings County, New York	MHI - Stable Exclusion			2.47799134	High to High	2
12200	BK32	Sunset Park West	4012	1969291.806	5636.600929	47	3	1400000US36047012200	Census Tract 122, Kings County, New York	LI - Not Losing Low-Income Households	0.394	0.4387	-1.0967122	Low to High	0
12600	BK31	Bay Ridge	4013	2524209.546	7464.543023	47	3	1400000US36047012600	Census Tract 126, Kings County, New York	LI - Not Losing Low-Income Households			-0.5476895	Low to High	0
12700	BK38	DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill	4004	1759470.563	5308.967591	47	3	1400000US36047012700	Census Tract 127, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.555	0.6564	1.77316568	High to High	3
12801	BK30	Dyker Heights	4013	1238338.665	4828.983712	47	3	1400000US36047012801	Census Tract 128.01, Kings County, New York	LI - Not Losing Low-Income Households	0.414	0.5094	-0.7871909	High to High	0
12901	BK37	Park Slope-Gowanus	4005	1479914.457	5410.692642	47	3	1400000US36047012901	Census Tract 129.01, Kings County, New York	MHI - Ongoing Exclusion	0.374	0.4566	1.25920155	High to High	6
12902	BK37	Park Slope-Gowanus	4005	1372593.935	5163.444992	47	3	1400000US36047012902	Census Tract 129.02, Kings County, New York	MHI - Stable Exclusion	0.433	0.5122	0.70938635	High to High	3
13000	BK31	Bay Ridge	4013	1899181.527	5648.236507	47	3	1400000US36047013000	Census Tract 130, Kings County, New York	LI - Not Losing Low-Income Households			-0.4660493	High to High	0
13100	BK37	Park Slope-Gowanus	4005	1684555.916	5288.633314	47	3	1400000US36047013100	Census Tract 131, Kings County, New York	MHI - Ongoing Exclusion	0.432	0.5171	1.15330953	High to High	1
13200	BK30	Dyker Heights	4013	1676563.65	6427.929609	47	3	1400000US36047013200	Census Tract 132, Kings County, New York	LI - Not Losing Low-Income Households	0.415	0.4431	-0.8038037	High to High	0
13300	BK37	Park Slope-Gowanus	4005	1596011.22	5175.703258	47	3	1400000US36047013300	Census Tract 133, Kings County, New York	MHI - Stable Exclusion	0.44	0.4418	0.56336394	High to High	5
13400	BK31	Bay Ridge	4013	2887190	8713.651722	47	3	1400000US36047013400	Census Tract 134, Kings County, New York	MHI - Stable Exclusion			-0.5291249	High to High	0
13500	BK37	Park Slope-Gowanus	4005	1635300.973	5224.710118	47	3	1400000US36047013500	Census Tract 135, Kings County, New York	MHI - Ongoing Exclusion			0.70965834	High to High	5
13600	BK31	Bay Ridge	4013	2312743.088	8226.98004	47	3	1400000US36047013600	Census Tract 136, Kings County, New York	MHI - Ongoing Exclusion			-0.2975065	High to High	0
13700	BK37	Park Slope-Gowanus	4005	1638366.058	5226.631566	47	3	1400000US36047013700	Census Tract 137, Kings County, New York	MHI - Stable Exclusion			0.71978218	High to High	0
13800	BK31	Bay Ridge	4013	1749765.079	6620.928677	47	3	1400000US36047013800	Census Tract 138, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.445	0.4595	-0.3688087	High to High	0
13900	BK37	Park Slope-Gowanus	4005	1631336.466	5219.68018	47	3	1400000US36047013900	Census Tract 139, Kings County, New York	MHI - Ongoing Exclusion			1.54790466	High to High	0
14000	BK30	Dyker Heights	4013	1579390.236	5656.665555	47	3	1400000US36047014000	Census Tract 140, Kings County, New York	MHI - Stable Exclusion	0.42	0.4738	-0.6742776	High to High	0
14100	BK37	Park Slope-Gowanus	4005	1787081.443	5436.863712	47	3	1400000US36047014100	Census Tract 141, Kings County, New York	MHI - Stable Exclusion	0.464	0.5064	1.69255931	High to High	0
14200	BK31	Bay Ridge	4013	2167285.315	7827.083173	47	3	1400000US36047014200	Census Tract 142, Kings County, New York	MHI - Stable Exclusion	0.426	0.4472	-0.4612141	High to High	0
14300	BK37	Park Slope-Gowanus	4005	2350772.884	6686.580823	47	3	1400000US36047014300	Census Tract 143, Kings County, New York	MHI - Ongoing Exclusion	0.388	0.4114	2.22791261	High to High	0
14500	BK32	Sunset Park West	4012	2317301.553	6539.280972	47	3	1400000US36047014500	Census Tract 145, Kings County, New York	MHI - Advanced Gentrification	0.406	0.4801	2.42352024	High to High	0
14700	BK32	Sunset Park West	4012	1142414.934	4546.553241	47	3	1400000US36047014700	Census Tract 147, Kings County, New York	MHI - Ongoing Exclusion	0.334	0.4035	2.43282925	High to High	0
14800	BK30	Dyker Heights	4013	1437563.891	5247.73083	47	3	1400000US36047014800	Census Tract 148, Kings County, New York	MHI - Stable Exclusion	0.283	0.4358	-0.6112169	High to High	0
14900	BK37	Park Slope-Gowanus	4005	2684799.709	6519.161416	47	3	1400000US36047014900	Census Tract 149, Kings County, New York	MHI - Ongoing Exclusion	0.455	0.4642	1.20512657	High to High	0
15000	BK30	Dyker Heights	4013	1436079.909	5237.641008	47	3	1400000US36047015000	Census Tract 150, Kings County, New York	MHI - Stable Exclusion	0.4	0.4746	-0.0787388	High to High	0
15100	BK37	Park Slope-Gowanus	4005	1607114.126	5175.221646	47	3	1400000US36047015100	Census Tract 151, Kings County, New York	MHI - Stable Exclusion	0.458	0.4588	0.35263274	High to High	0
15200	BK30	Dyker Heights	4013	2884401.782	8539.144107	47	3	1400000US36047015200	Census Tract 152, Kings County, New York	MHI - Stable Exclusion	0.433	0.4415	0.00093357	High to High	0
15300	BK37	Park Slope-Gowanus	4005	1619490.318	5188.381441	47	3	1400000US36047015300	Census Tract 153, Kings County, New York	VHI - Super Gentrification or Exclusion	0.451	0.5038	0.40567516	High to High	0
15400	BK99	park-cemetery-etc-Brooklyn	4013	9969049.056	14530.43698	47	3	1400000US36047015400	Census Tract 154, Kings County, New York	Missing Data			0	0	0
15500	BK37	Park Slope-Gowanus	4005	1610814.53	5181.351516	47	3	1400000US36047015500	Census Tract 155, Kings County, New York	MHI - Stable Exclusion	0.436	0.4602	0.28624626	High to High	2
15700	BK37	Park Slope-Gowanus	4005	1802056.047	5427.704575	47	3	1400000US36047015700	Census Tract 157, Kings County, New York	MHI - Ongoing Exclusion			0.29448475	High to High	5
15900	BK37	Park Slope-Gowanus	4005	2699302.548	7060.357051	47	3	1400000US36047015900	Census Tract 159, Kings County, New York	MHI - Stable Exclusion			0.64053854	High to High	5
16000	BK31	Bay Ridge	4013	2785264.084	7935.130184	47	3	1400000US36047016000	Census Tract 160, Kings County, New York	MHI - Stable Exclusion			-0.1360012	High to High	0
16100	BK64	Prospect Heights	4006	1964230.13	6481.072221	47	3	1400000US36047016100	Census Tract 161, Kings County, New York	MHI - Stable Exclusion	0.413	0.4682	0.64023475	High to High	5
16200	BK31	Bay Ridge	4013	2622222.868	8492.491002	47	3	1400000US36047016200	Census Tract 162, Kings County, New York	MHI - Stable Exclusion	0.357	0.4675	0.15809874	High to High	0
16300	BK64	Prospect Heights	4006	1980070.659	6111.664367	47	3	1400000US36047016300	Census Tract 163, Kings County, New York	MHI - Ongoing Exclusion	0.45	0.4704	0.7770511	High to High	5
16400	BK31	Bay Ridge	4013	8407201.498	16774.8453	47	3	1400000US36047016400	Census Tract 164, Kings County, New York	Missing Data	0.217	0.2825	0.80698977	High to Low	0
16500	BK37	Park Slope-Gowanus	4005	2010390.992	6739.865095	47	3	1400000US36047016500	Census Tract 165, Kings County, New York	VHI - Super Gentrification or Exclusion			0.3697214	High to High	3
16600	BK30	Dyker Heights	4013	2873519.77	6807.468496	47	3	1400000US36047016600	Census Tract 166, Kings County, New York	MHI - Stable Exclusion	0.434	0.4584	-0.1899024	High to High	0
16700	BK37	Park Slope-Gowanus	4005	1818135.607	6192.570231	47	3	1400000US36047016700	Census Tract 167, Kings County, New York	MHI - Ongoing Exclusion	0.396	0.4114	0.06543568	High to High	2
16800	BK27	Bath Beach	4017	1767486.757	5646.961834	47	3	1400000US36047016800	Census Tract 168, Kings County, New York	MHI - Stable Exclusion			0.02991954	High to High	0
16900	BK40	Windsor Terrace	4012	2257354.468	6152.549694	47	3	1400000US36047016900	Census Tract 169, Kings County, New York	MHI - Stable Exclusion	0.446	0.5285	1.07398168	High to High	0
17000	BK27	Bath Beach	4017	2249706.471	7327.427132	47	3	1400000US36047017000	Census Tract 170, Kings County, New York	MHI - Stable Exclusion	0.401	0.454	-0.2185182	High to High	0
17100	BK40	Windsor Terrace	4012	2247115.358	6141.88802	47	3	1400000US36047017100	Census Tract 171, Kings County, New York	MHI - Stable Exclusion	0.397	0.5035	0.38725007	High to High	0
17200	BK27	Bath Beach	4017	2216345.863	7259.599925	47	3	1400000US36047017200	Census Tract 172, Kings County, New York	MHI - Ongoing Exclusion			0.3627134	High to High	0
17400	BK27	Bath Beach	4017	1798223.919	5995.85312	47	3	1400000US36047017400	Census Tract 174, Kings County, New York	MHI - Ongoing Exclusion			-0.4143184	High to High	0
17500	BK99	park-cemetery-etc-Brooklyn	4012	21101598.56	18789.02252	47	3	1400000US36047017500	Census Tract 175, Kings County, New York	Missing Data			0	0	0
17600	BK27	Bath Beach	4017	1436666.988	5460.466914	47	3	1400000US36047017600	Census Tract 176, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.435	0.4714	0.01327529	High to High	0
17700	BK99	park-cemetery-etc-Brooklyn	4005	27403867.41	24251.24851	47	3	1400000US36047017700	Census Tract 177, Kings County, New York	Missing Data			0	0	1
17800	BK27	Bath Beach	4017	1765217.211	6092.042689	47	3	1400000US36047017800	Census Tract 178, Kings County, New York	LI - Not Losing Low-Income Households			0.09835855	Low to High	0
17900	BK68	Fort Greene	4004	1705006.946	5330.115187	47	3	1400000US36047017900	Census Tract 179, Kings County, New York	LI - At Risk of Gentrification	0.482	0.5437	0.72877518	Low to High	2
18000	BK27	Bath Beach	4017	1896108.783	6100.980497	47	3	1400000US36047018000	Census Tract 180, Kings County, New York	MHI - Stable Exclusion	0.438	0.4988	-0.0760831	Low to High	0
18100	BK68	Fort Greene	4004	1823380.083	5495.107397	47	3	1400000US36047018100	Census Tract 181, Kings County, New York	MHI - Stable Exclusion	0.473	0.4886	0.76107587	High to High	2
18200	BK28	Bensonhurst West	4017	1781148.593	5730.247466	47	3	1400000US36047018200	Census Tract 182, Kings County, New York	MHI - Stable Exclusion	0.368	0.45	-0.1477376	Low to High	0
18300	BK68	Fort Greene	4004	1477789.721	4935.748035	47	3	1400000US36047018300	Census Tract 183, Kings County, New York	MHI - Ongoing Exclusion			1.5486265	High to High	4
18400	BK28	Bensonhurst West	4017	1609239.553	5158.192096	47	3	1400000US36047018400	Census Tract 184, Kings County, New York	MHI - Stable Exclusion			0.1824627	High to High	0
18501	BK68	Fort Greene	4004	1189362.288	4405.288999	47	3	1400000US36047018501	Census Tract 185.01, Kings County, New York	LI - At Risk of Gentrification	0.462	0.5101	1.86427076	Low to High	5
18600	BK28	Bensonhurst West	4017	1216850.356	4679.729722	47	3	1400000US36047018600	Census Tract 186, Kings County, New York	MHI - Stable Exclusion			-0.1446878	High to High	0
18700	BK68	Fort Greene	4004	917703.1174	3902.052654	47	3	1400000US36047018700	Census Tract 187, Kings County, New York	MHI - Stable Exclusion	0.435	0.5288	2.27114347	High to High	2
18800	BK28	Bensonhurst West	4017	1885932.632	5864.289707	47	3	1400000US36047018800	Census Tract 188, Kings County, New York	MHI - Stable Exclusion	0.345	0.4237	-0.5846361	Low to High	0
19000	BK28	Bensonhurst West	4017	2291793.605	6614.318963	47	3	1400000US36047019000	Census Tract 190, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.388	0.4803	-0.5259263	Low to High	0
19100	BK69	Clinton Hill	4004	2721477.665	7816.215875	47	3	1400000US36047019100	Census Tract 191, Kings County, New York	MHI - Ongoing Exclusion			2.50740905	Low to High	18
19200	BK88	Borough Park	4014	2042946.474	5880.317176	47	3	1400000US36047019200	Census Tract 192, Kings County, New York	LI - Not Losing Low-Income Households	0.44	0.5372	-0.9962778	High to High	0
19300	BK69	Clinton Hill	4004	2903179	6981.649815	47	3	1400000US36047019300	Census Tract 193, Kings County, New York	LI - Not Losing Low-Income Households	0.466	0.4667	1.50428047	Low to Low	7
19400	BK30	Dyker Heights	4013	1920211.755	6220.292663	47	3	1400000US36047019400	Census Tract 194, Kings County, New York	LI - Ongoing Gentrification			-0.6107016	Low to High	0
19500	BK69	Clinton Hill	4004	1475082.708	4887.717107	47	3	1400000US36047019500	Census Tract 195, Kings County, New York	MHI - Stable Exclusion			1.75360713	High to High	6
19600	BK30	Dyker Heights	4013	2027285.922	5718.167634	47	3	1400000US36047019600	Census Tract 196, Kings County, New York	LI - Not Losing Low-Income Households	0.378	0.461	-1.0306796	Low to High	0
19700	BK69	Clinton Hill	4004	1828072.206	6148.341529	47	3	1400000US36047019700	Census Tract 197, Kings County, New York	MHI - Ongoing Exclusion			1.3288364	High to High	5
19800	BK30	Dyker Heights	4013	1450201.497	5279.397046	47	3	1400000US36047019800	Census Tract 198, Kings County, New York	MHI - Stable Exclusion	0.432	0.4547	-0.9322759	High to High	0
19900	BK69	Clinton Hill	4004	2037876.603	5989.624771	47	3	1400000US36047019900	Census Tract 199, Kings County, New York	MHI - Ongoing Exclusion	0.468	0.486	1.55731356	High to High	9
20000	BK30	Dyker Heights	4013	1451580.193	5280.941799	47	3	1400000US36047020000	Census Tract 200, Kings County, New York	LI - Not Losing Low-Income Households	0.391	0.4247	-1.1289771	High to High	0
20100	BK69	Clinton Hill	4004	1884866.892	6244.380536	47	3	1400000US36047020100	Census Tract 201, Kings County, New York	MHI - Ongoing Exclusion	0.357	0.4438	2.27367296	Low to High	0
20200	BK30	Dyker Heights	4013	1451352.466	5281.122969	47	3	1400000US36047020200	Census Tract 202, Kings County, New York	MHI - Stable Exclusion			-0.90175	High to High	0
20300	BK64	Prospect Heights	4006	1512110.998	5265.168565	47	3	1400000US36047020300	Census Tract 203, Kings County, New York	MHI - Ongoing Exclusion			2.90316763	Low to High	4
20400	BK30	Dyker Heights	4013	1450945.825	5280.338351	47	3	1400000US36047020400	Census Tract 204, Kings County, New York	MHI - Stable Exclusion	0.369	0.4989	-0.7185704	High to High	0
20500	BK64	Prospect Heights	4006	1718969.898	5441.543496	47	3	1400000US36047020500	Census Tract 205, Kings County, New York	MHI - Stable Exclusion	0.388	0.4346	1.88393179	Low to High	9
20600	BK30	Dyker Heights	4013	1829747.986	5902.064484	47	3	1400000US36047020600	Census Tract 206, Kings County, New York	MHI - Stable Exclusion	0.421	0.4501	-0.7045066	High to High	0
20700	BK64	Prospect Heights	4006	1464651.022	6082.977223	47	3	1400000US36047020700	Census Tract 207, Kings County, New York	MHI - Stable Exclusion	0.438	0.484	0.68429897	High to High	9
20800	BK30	Dyker Heights	4013	1542688.965	5945.305485	47	3	1400000US36047020800	Census Tract 208, Kings County, New York	LI - Not Losing Low-Income Households	0.434	0.46	-1.3980618	Low to High	0
21000	BK30	Dyker Heights	4013	1614539.932	5710.82802	47	3	1400000US36047021000	Census Tract 210, Kings County, New York	LI - Not Losing Low-Income Households	0.417	0.4632	-1.0483608	High to High	0
21100	BK68	Fort Greene	4004	1892154.329	7314.259955	47	3	1400000US36047021100	Census Tract 211, Kings County, New York	LI - Ongoing Gentrification	0.337	0.5229	2.25810582	High to High	3
21200	BK30	Dyker Heights	4013	2054324.467	5986.105228	47	3	1400000US36047021200	Census Tract 212, Kings County, New York	LI - Not Losing Low-Income Households	0.417	0.4695	-1.1725867	High to High	0
21300	BK63	Crown Heights South	4011	1989394.768	7277.70784	47	3	1400000US36047021300	Census Tract 213, Kings County, New York	LI - At Risk of Gentrification	0.434	0.4587	2.24245941	Low to High	0

CT2010	NTA	NTA Name	PUMA	shape_area	shape_leng	FIPS	Boro	Census Tract ID	CT Geographic Area Name	UDP Typology	Gini—2010	Gini—2019	SAIG Score	SAIG HOUSING Status	NUMPOINTS
21400	BK88	Borough Park	4014	1808036.312	5551.994241	47	3	1400000US36047021400	Census Tract 214, Kings County, New York	MHI - Advanced Gentrification			-0.5583296	High to High	0
21500	BK64	Prospect Heights	4006	1588668.465	6474.466924	47	3	1400000US36047021500	Census Tract 215, Kings County, New York	MHI - Stable Exclusion	0.417	0.526	1.32364962	Low to High	2
21600	BK88	Borough Park	4014	1810243.926	6210.278881	47	3	1400000US36047021600	Census Tract 216, Kings County, New York	LI - Not Losing Low-Income Households	0.407	0.522	-0.6882235	Low to High	0
21700	BK61	Crown Heights North	4006	1279622.354	4570.039602	47	3	1400000US36047021700	Census Tract 217, Kings County, New York	MHI - Stable Exclusion	0.431	0.509	2.1308653	Low to High	0
21800	BK88	Borough Park	4014	1698856.968	5927.279419	47	3	1400000US36047021800	Census Tract 218, Kings County, New York	LI - Not Losing Low-Income Households	0.408	0.6089	-0.8433228	Low to High	0
21900	BK61	Crown Heights North	4006	1582742.223	5031.288126	47	3	1400000US36047021900	Census Tract 219, Kings County, New York	MHI - Stable Exclusion			2.88206654	Low to High	0
22000	BK88	Borough Park	4014	2091173.161	6117.0823	47	3	1400000US36047022000	Census Tract 220, Kings County, New York	LI - Not Losing Low-Income Households			-0.4827539	Low to High	0
22100	BK61	Crown Heights North	4006	1617936.881	5511.964693	47	3	1400000US36047022100	Census Tract 221, Kings County, New York	LI - Ongoing Gentrification	0.472	0.5941	3.25049502	Low to High	0
22200	BK88	Borough Park	4014	1896474.051	5742.179476	47	3	1400000US36047022200	Census Tract 222, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			-0.6939423	Low to Low	0
22400	BK88	Borough Park	4014	1890190.845	5835.731986	47	3	1400000US36047022400	Census Tract 224, Kings County, New York	LI - Ongoing Gentrification	0.393	0.396	-0.4238846	Low to High	0
22600	BK88	Borough Park	4014	1680920.141	5954.07399	47	3	1400000US36047022600	Census Tract 226, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.412	0.4186	-0.0222479	High to High	0
22700	BK69	Clinton Hill	4004	2588318.216	6861.719709	47	3	1400000US36047022700	Census Tract 227, Kings County, New York	MHI - Advanced Gentrification			3.11918974	Low to High	0
22800	BK88	Borough Park	4014	1801521.316	6040.548185	47	3	1400000US36047022800	Census Tract 228, Kings County, New York	LI - Not Losing Low-Income Households	0.422	0.5127	-0.0325205	High to High	0
22900	BK69	Clinton Hill	4004	1849568.448	5440.76449	47	3	1400000US36047022900	Census Tract 229, Kings County, New York	MHI - Advanced Gentrification	0.453	0.4674	3.23103679	Low to High	0
23000	BK88	Borough Park	4014	1624924.583	8320.931146	47	3	1400000US36047023000	Census Tract 230, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.435	0.444	-0.1104461	Low to High	0
23100	BK69	Clinton Hill	4004	1716029.853	5908.873251	47	3	1400000US36047023100	Census Tract 231, Kings County, New York	MHI - Advanced Gentrification	0.429	0.4684	2.45536521	Low to High	4
23200	BK88	Borough Park	4014	2436821.503	7284.636123	47	3	1400000US36047023200	Census Tract 232, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.43	0.5413	-0.701615	Low to High	0
23300	BK75	Bedford	4003	1849442.026	5438.790291	47	3	1400000US36047023300	Census Tract 233, Kings County, New York	LI - At Risk of Gentrification	0.491	0.5825	2.78569582	Low to High	1
23400	BK88	Borough Park	4014	1827230.585	6241.897363	47	3	1400000US36047023400	Census Tract 234, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			-0.49228	Low to High	0
23500	BK69	Clinton Hill	4004	1523725.767	4958.034954	47	3	1400000US36047023500	Census Tract 235, Kings County, New York	LI - Not Losing Low-Income Households	0.491	0.5324	3.16797701	Low to High	6
23600	BK88	Borough Park	4014	1828207.777	6242.981077	47	3	1400000US36047023600	Census Tract 236, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			-0.1971584	Low to High	0
23800	BK88	Borough Park	4014	1828765.822	6244.556731	47	3	1400000US36047023800	Census Tract 238, Kings County, New York	LI - Not Losing Low-Income Households			-0.4863683	Low to High	0
24000	BK88	Borough Park	4014	1827206.393	6240.45935	47	3	1400000US36047024000	Census Tract 240, Kings County, New York	LI - Not Losing Low-Income Households			-0.923891	Low to High	0
24100	BK75	Bedford	4003	1939949.84	5837.005323	47	3	1400000US36047024100	Census Tract 241, Kings County, New York	MHI - Stable Exclusion			4.07282113	Low to High	18
24200	BK88	Borough Park	4014	2061125.047	6964.549393	47	3	1400000US36047024200	Census Tract 242, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			-0.5823719	Low to High	0
24300	BK75	Bedford	4003	1661539.559	5291.716499	47	3	1400000US36047024300	Census Tract 243, Kings County, New York	LI - Ongoing Gentrification	0.506	0.5485	3.61088066	Low to High	3
24400	BK88	Borough Park	4014	1670948.349	6280.447046	47	3	1400000US36047024400	Census Tract 244, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			-0.6993719	High to High	0
24500	BK75	Bedford	4003	1795931.543	5582.222563	47	3	1400000US36047024500	Census Tract 245, Kings County, New York	MHI - Ongoing Exclusion	0.404	0.437	3.10152198	Low to High	2
24600	BK88	Borough Park	4014	1845582.935	6796.313336	47	3	1400000US36047024600	Census Tract 246, Kings County, New York	LI - Not Losing Low-Income Households			-0.8058276	High to High	0
24700	BK61	Crown Heights North	4006	2028330.425	7488.70173	47	3	1400000US36047024700	Census Tract 247, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			3.31134715	Low to High	3
24800	BK28	Bensonhurst West	4017	1895137.519	6417.483306	47	3	1400000US36047024800	Census Tract 248, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			-0.6461198	High to High	0
24900	BK75	Bedford	4003	1813352.695	5777.655193	47	3	1400000US36047024900	Census Tract 249, Kings County, New York	MHI - Advanced Gentrification	0.441	0.479	3.46761674	Low to High	0
25000	BK28	Bensonhurst West	4017	1867289.953	5938.202539	47	3	1400000US36047025000	Census Tract 250, Kings County, New York	LI - Not Losing Low-Income Households	0.397	0.4415	-0.7623824	High to High	0
25100	BK75	Bedford	4003	1490422.82	5079.931019	47	3	1400000US36047025100	Census Tract 251, Kings County, New York	LI - Ongoing Gentrification	0.41	0.6285	3.92563812	Low to High	7
25200	BK28	Bensonhurst West	4017	1950979.095	6686.606727	47	3	1400000US36047025200	Census Tract 252, Kings County, New York	LI - Not Losing Low-Income Households			-0.549987	High to High	0
25300	BK75	Bedford	4003	1741981.224	5626.98783	47	3	1400000US36047025300	Census Tract 253, Kings County, New York	LI - Ongoing Gentrification	0.431	0.4727	3.8161153	Low to Low	45
25400	BK28	Bensonhurst West	4017	1888611.582	6302.394681	47	3	1400000US36047025400	Census Tract 254, Kings County, New York	LI - Not Losing Low-Income Households	0.419	0.5696	-0.7437795	High to High	0
25500	BK75	Bedford	4003	1492220.441	5088.553722	47	3	1400000US36047025500	Census Tract 255, Kings County, New York	LI - At Risk of Gentrification			2.73868549		1
25600	BK28	Bensonhurst West	4017	1869263.07	6298.065461	47	3	1400000US36047025600	Census Tract 256, Kings County, New York	LI - Not Losing Low-Income Households			-0.5585241	High to High	0
25700	BK75	Bedford	4003	1949087.306	6440.912734	47	3	1400000US36047025700	Census Tract 257, Kings County, New York	LI - Ongoing Gentrification			2.60891579	Low to Low	23
25800	BK28	Bensonhurst West	4017	1832115.625	6257.55432	47	3	1400000US36047025800	Census Tract 258, Kings County, New York	LI - Not Losing Low-Income Households			-0.6908839	Low to High	0
25901	BK75	Bedford	4003	863635.7669	4269.118632	47	3	1400000US36047025901	Census Tract 259.01, Kings County, New York	LI - Not Losing Low-Income Households			3.28062676	Low to Low	3
25902	BK75	Bedford	4003	642013.904	3211.235839	47	3	1400000US36047025902	Census Tract 259.02, Kings County, New York	LI - At Risk of Gentrification			1.23495645		4
26000	BK28	Bensonhurst West	4017	1753286.172	5699.189185	47	3	1400000US36047026000	Census Tract 260, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.423	0.4603	-0.5072195	High to High	0
26100	BK75	Bedford	4003	2146490.189	5880.897717	47	3	1400000US36047026100	Census Tract 261, Kings County, New York	LI - Ongoing Gentrification			4.50430302	Low to High	24
26200	BK28	Bensonhurst West	4017	1699503.058	5384.768035	47	3	1400000US36047026200	Census Tract 262, Kings County, New York	MHI - Stable Exclusion			-0.1883749	High to High	1
26300	BK75	Bedford	4003	1287405.971	4799.556849	47	3	1400000US36047026300	Census Tract 263, Kings County, New York	LI - Ongoing Gentrification	0.471	0.5277	3.81218321	Low to Low	9
26400	BK28	Bensonhurst West	4017	2038976.304	7095.086067	47	3	1400000US36047026400	Census Tract 264, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			-0.4089401	High to High	0
26500	BK75	Bedford	4003	1718284.13	5341.618067	47	3	1400000US36047026500	Census Tract 265, Kings County, New York	LI - Not Losing Low-Income Households	0.464	0.5803	3.34703371	Low to High	10
26600	BK28	Bensonhurst West	4017	1785503.086	7706.999647	47	3	1400000US36047026600	Census Tract 266, Kings County, New York	LI - Not Losing Low-Income Households	0.418	0.4298	-0.7167592	High to High	0
26700	BK75	Bedford	4003	1717367.878	5340.244066	47	3	1400000US36047026700	Census Tract 267, Kings County, New York	LI - Not Losing Low-Income Households	0.469	0.5014	3.45540031	Low to High	5
26800	BK28	Bensonhurst West	4017	1926489.204	6339.144273	47	3	1400000US36047026800	Census Tract 268, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.436	0.4871	-0.6031769	High to High	0
26900	BK75	Bedford	4003	1441848.772	5051.018932	47	3	1400000US36047026900	Census Tract 269, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.551	0.5665	3.17940527	Low to High	1
27000	BK28	Bensonhurst West	4017	1444005.58	5255.800772	47	3	1400000US36047027000	Census Tract 270, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			-0.0753596	High to High	0
27100	BK61	Crown Heights North	4006	2767086.525	9484.846072	47	3	1400000US36047027100	Census Tract 271, Kings County, New York	LI - Not Losing Low-Income Households	0.404	0.5491	2.88757443	Low to High	22
27200	BK28	Bensonhurst West	4017	1422363.403	7299.797685	47	3	1400000US36047027200	Census Tract 272, Kings County, New York	LI - Ongoing Gentrification			-0.3238285	High to High	0
27300	BK35	Stuyvesant Heights	4003	1611451.005	5273.313701	47	3	1400000US36047027300	Census Tract 273, Kings County, New York	LI - At Risk of Gentrification			2.31857449	Low to High	0
27400	BK28	Bensonhurst West	4017	1758627.07	6175.275942	47	3	1400000US36047027400	Census Tract 274, Kings County, New York	LI - Not Losing Low-Income Households	0.384	0.4613	-0.6678796	High to High	0
27500	BK35	Stuyvesant Heights	4003	1743574.538	5390.787752	47	3	1400000US36047027500	Census Tract 275, Kings County, New York	MHI - Ongoing Exclusion	0.399	0.4452	3.11608098	Low to High	1
27600	BK28	Bensonhurst West	4017	1607862.58	6258.678985	47	3	1400000US36047027600	Census Tract 276, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.446	0.4854	-0.217483	Low to High	0
27700	BK35	Stuyvesant Heights	4003	1745688.296	5391.765764	47	3	1400000US36047027700	Census Tract 277, Kings County, New York	LI - Not Losing Low-Income Households			2.95097189	Low to High	17
27800	BK28	Bensonhurst West	4017	1727742.077	6104.407843	47	3	1400000US36047027800	Census Tract 278, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.382	0.4238	0.22116176	High to High	0
27900	BK35	Stuyvesant Heights	4003	1743087.978	5389.745821	47	3	1400000US36047027900	Census Tract 279, Kings County, New York	MHI - Stable Exclusion	0.447	0.4724	3.59180179	Low to Low	18
28000	BK27	Bath Beach	4017	1494252.285	6067.523133	47	3	1400000US36047028000	Census Tract 280, Kings County, New York	MHI - Ongoing Exclusion			-0.253775	High to High	0
28100	BK35	Stuyvesant Heights	4003	1743468.124	5389.338368	47	3	1400000US36047028100	Census Tract 281, Kings County, New York	LI - At Risk of Gentrification	0.519	0.5471	3.17387668	Low to Low	8
28200	BK27	Bath Beach	4017	1826159.074	6296.177266	47	3	1400000US36047028200	Census Tract 282, Kings County, New York	MHI - Stable Exclusion	0.454	0.4743	-0.2025892	High to High	0
28300	BK35	Stuyvesant Heights	4003	1311680.724	4848.738184	47	3	1400000US36047028300	Census Tract 283, Kings County, New York	LI - Ongoing Gentrification			2.76105252	Low to Low	26
28400	BK28	Bensonhurst West	4017	1768012.327	6096.044707	47	3	1400000US36047028400	Census Tract 284, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			-0.4877596	High to High	0
28501	BK78	Bushwick South	4002	895739.6968	4167.689738	47	3	1400000US36047028501	Census Tract 285.01, Kings County, New York	Missing Data	0.368	0.4041	3.35676497		7
28502	BK35	Stuyvesant Heights	4003	1290359.375	4775.421094	47	3	1400000US36047028502	Census Tract 285.02, Kings County, New York	LI - At Risk of Gentrification	0.462	0.4907	1.72715193		12
28600	BK27	Bath Beach	4017	1901157.604	6844.90341	47	3	1400000US36047028600	Census Tract 286, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.444	0.4482	-0.3021607	Low to High	0
28700	BK35	Stuyvesant Heights	4003	1601115.444	5919.884687	47	3	1400000US36047028700	Census Tract 287, Kings County, New York	LI - Ongoing Gentrification	0.496	0.591	2.24197763	Low to Low	13
28800	BK28	Bensonhurst West	4017	1644934.164	5777.688164	47	3	1400000US36047028800	Census Tract 288, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			0.2010368	High to High	0
28900	BK35	Stuyvesant Heights	4003	1784157.559	6580.116634	47	3	1400000US36047028900	Census Tract 289, Kings County, New York	LI - Ongoing Gentrification			2.86237561	Low to Low	19
29000	BK28	Bensonhurst West	4017	1665073.458	5799.041459	47	3	1400000US36047029000	Census Tract 290, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.404	0.5076	-0.1089539	Low to High	0
29100	BK35	Stuyvesant Heights	4003	1772059.652	5439.939153	47	3	1400000US36047029100	Census Tract 291, Kings County, New York	LI - Not Losing Low-Income Households	0.476	0.478	3.07831682	Low to Low	6
29200	BK27	Bath Beach	4017	2183295.712	7237.068645	47	3	1400000US36047029200	Census Tract 292, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.453	0.4866	-0.3519665	Low to High	0
29300	BK35	Stuyvesant Heights	4003	1770060.576	5437.785217	47	3	1400000US36047029300	Census Tract 293, Kings County, New York	LI - At Risk of Gentrification	0.456	0.5611	2.65600948	Low to High	19
29400	BK28	Bensonhurst West	4017	2039332.552	6711.719378	47	3	1400000US36047029400	Census Tract 294, Kings County, New York	LI - Not Losing Low-Income Households			-0.7826038	High to High	0
29500	BK35	Stuyvesant Heights	4003	1771508.222	5437.799652	47	3	1400000US36047029500	Census Tract 295, Kings County, New York	LI - Ongoing Gentrification	0.438	0.5273	3.00554871	Low to High	8
29600	BK28	Bensonhurst West	4017	2300496.595	7396.971075	47	3	1400000US36047029600	Census Tract 296, Kings County, New York	LI - Not Losing Low-Income Households	0.45	0.4934	-0.596711	High to High	0
29700	BK61	Crown Heights North	4006	2211871.257	5857.455045	47	3	1400000US36047029700	Census Tract 297, Kings County, New York	LI - Not Losing Low-Income Households	0.46	0.5258	2.16973603	Low to High	22
29800	BK29	Bensonhurst East	4017	2379873.959	7431.077921	47	3	1400000US36047029800	Census Tract 298, Kings County, New York	LI - Not Losing Low-Income Households	0.438	0.4452	-0.843957	High to High	0
29900	BK61	Crown Heights North	4006	1597886.196	5913.209502	47	3	1400000US36047029900	Census Tract 299, Kings County, New York	LI - Ongoing Gentrification	0.392	0.4537	1.90381393	Low to High	9

CT2010	NTA	NTA Name	PUMA	shape_area	shape_leng	FIPS	Boro	Census Tract ID	CT Geographic Area Name	UDP Typology	Gini—2010	Gini—2019	SAIG Score	SAIG HOUSING Status	NUMPOINTS
30000	BK29	Bensonhurst East	4017	2099450.971	7243.131793	47	3	1400000US36047030000	Census Tract 300, Kings County, New York	LI - Not Losing Low-Income Households	0.362	0.5128	-0.9175246	High to High	0
30100	BK79	Ocean Hill	4007	2133891.754	7471.479687	47	3	1400000US36047030100	Census Tract 301, Kings County, New York	LI - Ongoing Gentrification	0.528	0.5571	2.01490195	Low to Low	4
30200	BK29	Bensonhurst East	4017	2273119.858	6921.914344	47	3	1400000US36047030200	Census Tract 302, Kings County, New York	MHI - Stable Exclusion	0.402	0.4432	-0.5589036	High to High	0
30300	BK79	Ocean Hill	4007	2690239.516	6898.560647	47	3	1400000US36047030300	Census Tract 303, Kings County, New York	LI - Ongoing Gentrification	0.519	0.5203	1.77855528	Low to Low	11
30400	BK29	Bensonhurst East	4017	4992246.287	13700.97413	47	3	1400000US36047030400	Census Tract 304, Kings County, New York	LI - Not Losing Low-Income Households	0.477	0.5008	-0.9484295	High to High	0
30500	BK61	Crown Heights North	4006	3478044.437	7369.226082	47	3	1400000US36047030500	Census Tract 305, Kings County, New York	MHI - Advanced Gentrification			2.9624952	Low to High	0
30600	BK26	Gravesend	4018	2084709.59	6092.763481	47	3	1400000US36047030600	Census Tract 306, Kings County, New York	LI - Not Losing Low-Income Households	0.439	0.4757	-0.2668608	Low to High	0
30700	BK61	Crown Heights North	4006	2805795.205	7103.16596	47	3	1400000US36047030700	Census Tract 307, Kings County, New York	LI - Ongoing Gentrification			2.64228311	Low to Low	20
30800	BK26	Gravesend	4018	7193618.241	12484.95484	47	3	1400000US36047030800	Census Tract 308, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.381	0.4309	-0.3367181	Low to Low	0
30900	BK61	Crown Heights North	4006	1587377.38	5470.581443	47	3	1400000US36047030900	Census Tract 309, Kings County, New York	LI - At Risk of Gentrification	0.425	0.4313	2.47154008	Low to Low	5
31100	BK61	Crown Heights North	4006	1587578.988	5467.523336	47	3	1400000US36047031100	Census Tract 311, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.473	0.4779	2.98448178	Low to Low	12
31300	BK61	Crown Heights North	4006	1832521.659	5465.787025	47	3	1400000US36047031300	Census Tract 313, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.459	0.5082	2.75336961	Low to High	26
31400	BK26	Gravesend	4018	8954917.626	23907.73073	47	3	1400000US36047031400	Census Tract 314, Kings County, New York	MHI - Ongoing Exclusion			-0.3675658	High to High	0
31500	BK61	Crown Heights North	4006	1886108.108	5658.75076	47	3	1400000US36047031500	Census Tract 315, Kings County, New York	MHI - Advanced Gentrification	0.422	0.4845	3.39668016	Low to High	1
31701	BK61	Crown Heights North	4006	1504293.97	5033.486008	47	3	1400000US36047031701	Census Tract 317.01, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			3.43220404	Low to High	1
31702	BK61	Crown Heights North	4006	1500336.662	5031.463063	47	3	1400000US36047031702	Census Tract 317.02, Kings County, New York	MHI - Ongoing Exclusion			2.65898295	Low to High	0
31900	BK63	Crown Heights South	4011	1631610.63	5787.188231	47	3	1400000US36047031900	Census Tract 319, Kings County, New York	LI - Not Losing Low-Income Households	0.45	0.4979	1.06305394	Low to High	0
32100	BK63	Crown Heights South	4011	1724842.136	6039.885637	47	3	1400000US36047032100	Census Tract 321, Kings County, New York	LI - Not Losing Low-Income Households	0.459	0.532	2.14536926	Low to High	0
32300	BK63	Crown Heights South	4011	1862860.631	6269.420677	47	3	1400000US36047032300	Census Tract 323, Kings County, New York	MHI - Advanced Gentrification	0.465	0.4732	2.48162184	Low to High	0
32500	BK63	Crown Heights South	4011	1812075.226	6293.893579	47	3	1400000US36047032500	Census Tract 325, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			2.34707827	Low to High	0
32600	BK21	Seagate-Coney Island	4018	3542648.806	7873.196726	47	3	1400000US36047032600	Census Tract 326, Kings County, New York	LI - Ongoing Gentrification	0.439	0.5432	0.30526303	Low to High	0
32700	BK60	Prospect Lefferts Gardens-Wingate	4011	1904788.313	7322.874845	47	3	1400000US36047032700	Census Tract 327, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.463	0.4816	1.64111968	Low to High	0
32800	BK21	Seagate-Coney Island	4018	2507368.978	7628.209245	47	3	1400000US36047032800	Census Tract 328, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.418	0.687	0.5087203	Low to Low	0
32900	BK60	Prospect Lefferts Gardens-Wingate	4011	1683542.614	7138.852588	47	3	1400000US36047032900	Census Tract 329, Kings County, New York	LI - Not Losing Low-Income Households	0.434	0.5386	1.4006992	Low to High	8
33000	BK21	Seagate-Coney Island	4018	3887711.399	9907.859914	47	3	1400000US36047033000	Census Tract 330, Kings County, New York	LI - At Risk of Gentrification	0.449	0.4935	-0.3006572	Low to Low	0
33100	BK63	Crown Heights South	4011	1533546.784	7551.856927	47	3	1400000US36047033100	Census Tract 331, Kings County, New York	LI - Not Losing Low-Income Households	0.485	0.5142	0.6778659	Low to High	8
33300	BK63	Crown Heights South	4011	2005663.036	7463.47992	47	3	1400000US36047033300	Census Tract 333, Kings County, New York	LI - Not Losing Low-Income Households			0.28037069	Low to High	15
33500	BK63	Crown Heights South	4011	1944377.415	7422.437538	47	3	1400000US36047033500	Census Tract 335, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.502	0.5675	0.77965062	Low to High	1
33600	BK21	Seagate-Coney Island	4018	7258858.124	10968.01086	47	3	1400000US36047033600	Census Tract 336, Kings County, New York	MHI - Stable Exclusion	0.427	0.4358	0.55988808	High to Low	0
33700	BK61	Crown Heights North	4006	2126882.101	7545.478824	47	3	1400000US36047033700	Census Tract 337, Kings County, New York	LI - Ongoing Gentrification	0.451	0.4575	1.05802132	Low to High	2
33900	BK61	Crown Heights North	4006	1945657.673	7419.803528	47	3	1400000US36047033900	Census Tract 339, Kings County, New York	LI - Ongoing Gentrification	0.493	0.5584	1.82564756	Low to Low	11
34000	BK21	Seagate-Coney Island	4018	1419227.627	7165.49779	47	3	1400000US36047034000	Census Tract 340, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.426	0.4571	0.91582939		0
34100	BK61	Crown Heights North	4006	1504308.071	5030.776599	47	3	1400000US36047034100	Census Tract 341, Kings County, New York	LI - Ongoing Gentrification	0.433	0.5747	2.4505173	Low to High	11
34200	BK21	Seagate-Coney Island	4018	2475181.553	7381.417191	47	3	1400000US36047034200	Census Tract 342, Kings County, New York	LI - At Risk of Gentrification			0.21914406	Low to Low	0
34300	BK61	Crown Heights North	4006	1745164.215	5689.148339	47	3	1400000US36047034300	Census Tract 343, Kings County, New York	LI - At Risk of Gentrification			2.1979059	Low to High	13
34500	BK61	Crown Heights North	4006	1759937.396	5684.446148	47	3	1400000US36047034500	Census Tract 345, Kings County, New York	LI - Not Losing Low-Income Households	0.432	0.4863	1.46661185	Low to Low	20
34700	BK61	Crown Heights North	4006	1505056.739	5032.967041	47	3	1400000US36047034700	Census Tract 347, Kings County, New York	LI - Ongoing Gentrification	0.464	0.4864	1.54458123	Low to Low	11
34800	BK21	Seagate-Coney Island	4018	6985474.751	18444.69701	47	3	1400000US36047034800	Census Tract 348, Kings County, New York	MHI - Ongoing Exclusion			-0.0100906	Low to Low	0
34900	BK61	Crown Heights North	4006	1756872.767	6098.133457	47	3	1400000US36047034900	Census Tract 349, Kings County, New York	LI - Ongoing Gentrification	0.449	0.4769	0.60426201	Low to Low	7
35000	BK23	West Brighton	4018	2123245.339	5887.339343	47	3	1400000US36047035000	Census Tract 350, Kings County, New York	LI - Not Losing Low-Income Households	0.375	0.5134	-0.0708703		0
35100	BK61	Crown Heights North	4006	1755149.808	6101.303434	47	3	1400000US36047035100	Census Tract 351, Kings County, New York	LI - Ongoing Gentrification	0.447	0.496	-0.0542905	Low to Low	6
35200	BK21	Seagate-Coney Island	4018	10705559.22	33071.78431	47	3	1400000US36047035200	Census Tract 352, Kings County, New York	LI - Ongoing Gentrification	0.319	0.4987	-0.3651523		0
35300	BK61	Crown Heights North	4006	1755455.72	6099.146829	47	3	1400000US36047035300	Census Tract 353, Kings County, New York	LI - Not Losing Low-Income Households			1.26653595	Low to Low	4
35400	BK23	West Brighton	4018	4052038.461	11322.54123	47	3	1400000US36047035400	Census Tract 354, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.419	0.5452	-0.012638		0
35500	BK63	Crown Heights South	4011	1485518.486	5844.442145	47	3	1400000US36047035500	Census Tract 355, Kings County, New York	LI - Not Losing Low-Income Households			0.50840626	Low to Low	5
35601	BK23	West Brighton	4018	719554.0537	3524.799377	47	3	1400000US36047035601	Census Tract 356.01, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.474	0.4839	0.29120183		0
35602	BK23	West Brighton	4018	1843930.972	5704.670642	47	3	1400000US36047035602	Census Tract 356.02, Kings County, New York	LI - Ongoing Gentrification			0.47115393	Low to Low	0
35700	BK61	Crown Heights North	4006	1967031.04	6564.457402	47	3	1400000US36047035700	Census Tract 357, Kings County, New York	LI - Not Losing Low-Income Households	0.54	0.6058	0.57647688	Low to Low	8
35900	BK61	Crown Heights North	4006	1952759.904	6551.100871	47	3	1400000US36047035900	Census Tract 359, Kings County, New York	LI - Not Losing Low-Income Households	0.474	0.502	0.79035363	Low to Low	13
36001	BK19	Brighton Beach	4018	1019097.172	4459.303332	47	3	1400000US36047036001	Census Tract 360.01, Kings County, New York	LI - Not Losing Low-Income Households	0.512	0.5547	-0.3487689	Low to Low	0
36002	BK19	Brighton Beach	4018	924220.9318	3860.148355	47	3	1400000US36047036002	Census Tract 360.02, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.526	0.5448	0.18153445	Low to Low	0
36100	BK79	Ocean Hill	4007	1524420.557	6064.699936	47	3	1400000US36047036100	Census Tract 361, Kings County, New York	LI - At Risk of Gentrification	0.498	0.5137	0.54366314	Low to Low	7
36200	BK19	Brighton Beach	4018	1845171.628	6480.706949	47	3	1400000US36047036200	Census Tract 362, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			0.56054833	Low to Low	0
36300	BK79	Ocean Hill	4007	2785736.459	8445.466887	47	3	1400000US36047036300	Census Tract 363, Kings County, New York	LI - Ongoing Gentrification	0.484	0.5102	1.72479578	Low to Low	14
36400	BK19	Brighton Beach	4018	1539580.502	5980.182996	47	3	1400000US36047036400	Census Tract 364, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.415	0.4239	0.70177015	High to High	0
36501	BK79	Ocean Hill	4007	1368026.304	5490.943913	47	3	1400000US36047036501	Census Tract 365.01, Kings County, New York	LI - At Risk of Gentrification	0.427	0.4967	1.3585059	Low to Low	9
36502	BK79	Ocean Hill	4007	1253749.713	6139.771115	47	3	1400000US36047036502	Census Tract 365.02, Kings County, New York	LI - Ongoing Gentrification	0.333	0.4408	0.75139681	Low to Low	18
36600	BK19	Brighton Beach	4018	2516458.348	6655.721218	47	3	1400000US36047036600	Census Tract 366, Kings County, New York	LI - Not Losing Low-Income Households			-0.1179764	High to Low	0
36700	BK79	Ocean Hill	4007	2024543.155	5904.510337	47	3	1400000US36047036700	Census Tract 367, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			1.60831616	Low to Low	26
36900	BK79	Ocean Hill	4007	2433755.705	7215.256266	47	3	1400000US36047036900	Census Tract 369, Kings County, New York	LI - Not Losing Low-Income Households			1.92761239	Low to Low	24
37000	BK19	Brighton Beach	4018	3617774.273	7840.716418	47	3	1400000US36047037000	Census Tract 370, Kings County, New York	MHI - Stable Exclusion	0.456	0.4636	-0.3030986	High to High	0
37100	BK79	Ocean Hill	4007	2037041.369	5779.492475	47	3	1400000US36047037100	Census Tract 371, Kings County, New York	LI - Ongoing Gentrification			2.76522186	Low to Low	35
37300	BK79	Ocean Hill	4007	1838509.759	6148.269458	47	3	1400000US36047037300	Census Tract 373, Kings County, New York	LI - Ongoing Gentrification	0.512	0.5296	2.07132504	Low to Low	46
37401	BK26	Gravesend	4018	2422862.802	6927.204409	47	3	1400000US36047037401	Census Tract 374.01, Kings County, New York	LI - Not Losing Low-Income Households	0.481	0.4846	-0.1095617	High to High	0
37402	BK26	Gravesend	4018	3270756.176	7636.812718	47	3	1400000US36047037402	Census Tract 374.02, Kings County, New York	LI - Not Losing Low-Income Households	0.488	0.499	-0.4573895	Low to High	0
37500	BK35	Stuyvesant Heights	4003	1708660.149	5943.210168	47	3	1400000US36047037500	Census Tract 375, Kings County, New York	LI - Ongoing Gentrification			2.99919106	Low to Low	25
37700	BK35	Stuyvesant Heights	4003	2047553.373	5741.181435	47	3	1400000US36047037700	Census Tract 377, Kings County, New York	LI - Ongoing Gentrification	0.496	0.5777	1.74838071	Low to High	34
37900	BK35	Stuyvesant Heights	4003	1978231.332	5654.380786	47	3	1400000US36047037900	Census Tract 379, Kings County, New York	LI - Ongoing Gentrification	0.444	0.5107	1.99095805	Low to Low	22
38100	BK61	Crown Heights North	4006	2579146.117	6810.121309	47	3	1400000US36047038100	Census Tract 381, Kings County, New York	LI - At Risk of Gentrification	0.458	0.5119	1.7676627	Low to High	24
38200	BK26	Gravesend	4018	2526926.392	6175.104204	47	3	1400000US36047038200	Census Tract 382, Kings County, New York	LI - Ongoing Gentrification	0.491	0.5713	-0.4042401	Low to High	0
38300	BK35	Stuyvesant Heights	4003	1878496.832	5635.046786	47	3	1400000US36047038300	Census Tract 383, Kings County, New York	MHI - Advanced Gentrification	0.49	0.5357	2.07799176	Low to High	25
38500	BK35	Stuyvesant Heights	4003	1877794.572	5637.036617	47	3	1400000US36047038500	Census Tract 385, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			3.11495542	Low to High	19
38600	BK26	Gravesend	4018	2704025.384	7289.706914	47	3	1400000US36047038600	Census Tract 386, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			-0.2672462	High to High	0
38700	BK35	Stuyvesant Heights	4003	2027988.283	5708.765856	47	3	1400000US36047038700	Census Tract 387, Kings County, New York	LI - Ongoing Gentrification			2.75516902	Low to High	28
38800	BK25	Homecrest	4016	2130565.925	5947.056737	47	3	1400000US36047038800	Census Tract 388, Kings County, New York	MHI - Stable Exclusion	0.393	0.4328	0.12190691	High to High	0
38900	BK78	Bushwick South	4002	1753535.518	6785.379565	47	3	1400000US36047038900	Census Tract 389, Kings County, New York	LI - Ongoing Gentrification			3.10055	Low to High	3
39000	BK25	Homecrest	4016	1871911.315	6671.629552	47	3	1400000US36047039000	Census Tract 390, Kings County, New York	LI - Not Losing Low-Income Households			-0.13605	High to High	0
39100	BK78	Bushwick South	4002	1788881.479	6244.833686	47	3	1400000US36047039100	Census Tract 391, Kings County, New York	LI - Not Losing Low-Income Households	0.405	0.4567	3.61186024	Low to High	7
39200	BK25	Homecrest	4016	1875666.476	5599.31156	47	3	1400000US36047039200	Census Tract 392, Kings County, New York	LI - Not Losing Low-Income Households	0.435	0.4958	0.11461806	High to High	0
39300	BK78	Bushwick South	4002	2041139.83	6706.903111	47	3	1400000US36047039300	Census Tract 393, Kings County, New York	LI - Ongoing Gentrification			3.12246577	Low to High	7
39400	BK25	Homecrest	4016	2067691.425	7000.165098	47	3	1400000US36047039400	Census Tract 394, Kings County, New York	LI - Ongoing Gentrification	0.398	0.6787	0.15330143	High to High	0
39500	BK78	Bushwick South	4002	1718425.797	5825.771144	47	3	1400000US36047039500	Census Tract 395, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			2.67166746	Low to High	12
39600	BK25	Homecrest	4016	1757819.546	5569.960507	47	3	1400000US36047039600	Census Tract 396, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.522	0.5436	0.05168313	High to High	0
39700	BK78	Bushwick South	4002	1712820.273	6560.681694	47	3	1400000US36047039700	Census Tract 397, Kings County, New York	LI - Not Losing Low-Income Households	0.424	0.559	3.073548	Low to Low	14

CT2010	NTA	NTA Name	PUMA	shape_area	shape_leng	FIPS	Boro	Census Tract ID	CT Geographic Area Name	UDP Typology	Gini—2010	Gini—2019	SAIG Score	SAIG HOUSING Status	NUMPOINTS
39800	BK26	Gravesend	4018	2184133.661	7062.936825	47	3	1400000US36047039800	Census Tract 398, Kings County, New York	LI - Not Losing Low-Income Households	0.411	0.4706	0.01812049	High to High	0
39900	BK78	Bushwick South	4002	1627809.275	6391.348731	47	3	1400000US36047039900	Census Tract 399, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.452	0.5201	3.17593874	Low to Low	24
40000	BK29	Bensonhurst East	4017	2058373.047	6639.763571	47	3	1400000US36047040000	Census Tract 400, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.367	0.4579	-0.4580371	High to High	0
40100	BK78	Bushwick South	4002	1718318.954	5246.300165	47	3	1400000US36047040100	Census Tract 401, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.473	0.5064	3.17177292	Low to Low	18
40200	BK29	Bensonhurst East	4017	2126179.776	5858.271772	47	3	1400000US36047040200	Census Tract 402, Kings County, New York	LI - Not Losing Low-Income Households	0.438	0.4571	-0.5062132	High to High	0
40300	BK78	Bushwick South	4002	2208071.983	6937.017865	47	3	1400000US36047040300	Census Tract 403, Kings County, New York	LI - Not Losing Low-Income Households	0.477	0.4796	2.48044934	Low to Low	14
40400	BK29	Bensonhurst East	4017	1653839.791	7953.541649	47	3	1400000US36047040400	Census Tract 404, Kings County, New York	LI - Not Losing Low-Income Households			-0.5673778	High to High	0
40500	BK78	Bushwick South	4002	1496440.209	5083.977563	47	3	1400000US36047040500	Census Tract 405, Kings County, New York	LI - Ongoing Gentrification	0.313	0.452	2.14663121	Low to Low	16
40600	BK29	Bensonhurst East	4017	1582378.666	5548.54636	47	3	1400000US36047040600	Census Tract 406, Kings County, New York	LI - Not Losing Low-Income Households			-0.6672929	High to High	0
40700	BK99	park-cemetery-etc-Brooklyn	4002	5589606.613	10955.15141	47	3	1400000US36047040700	Census Tract 407, Kings County, New York	Missing Data			0	0	2
40800	BK29	Bensonhurst East	4017	1654268.744	5629.302552	47	3	1400000US36047040800	Census Tract 408, Kings County, New York	MHI - Stable Exclusion			-0.2428444	Low to High	0
40900	BK77	Bushwick North	4002	1773606.767	5315.537763	47	3	1400000US36047040900	Census Tract 409, Kings County, New York	LI - Not Losing Low-Income Households	0.37	0.4465	2.30044261	Low to Low	9
41000	BK29	Bensonhurst East	4017	1537209.751	5990.265168	47	3	1400000US36047041000	Census Tract 410, Kings County, New York	LI - Not Losing Low-Income Households	0.466	0.4895	-0.3999685	High to High	0
41100	BK78	Bushwick South	4002	1433607.264	4966.663577	47	3	1400000US36047041100	Census Tract 411, Kings County, New York	LI - At Risk of Gentrification	0.464	0.5868	2.64579131	Low to Low	6
41200	BK29	Bensonhurst East	4017	1780125.25	5466.782988	47	3	1400000US36047041200	Census Tract 412, Kings County, New York	LI - Not Losing Low-Income Households	0.424	0.5226	-0.3783271	High to High	8
41300	BK78	Bushwick South	4002	1745182.881	5284.902369	47	3	1400000US36047041300	Census Tract 413, Kings County, New York	LI - Ongoing Gentrification	0.442	0.487	2.2759871	Low to Low	21
41401	BK25	Homecrest	4016	1454192.396	5189.96885	47	3	1400000US36047041401	Census Tract 414.01, Kings County, New York	MHI - Stable Exclusion	0.298	0.5257	0.17399473	High to High	0
41402	BK25	Homecrest	4016	1659482.226	5695.766276	47	3	1400000US36047041402	Census Tract 414.02, Kings County, New York	LI - Not Losing Low-Income Households	0.492	0.5728	-0.1965604	High to High	0
41500	BK78	Bushwick South	4002	1750287.791	5326.724602	47	3	1400000US36047041500	Census Tract 415, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			2.4597062	Low to Low	25
41600	BK25	Homecrest	4016	1749784.701	6169.280798	47	3	1400000US36047041600	Census Tract 416, Kings County, New York	LI - Not Losing Low-Income Households	0.413	0.5779	-0.6182226	High to High	0
41700	BK78	Bushwick South	4002	1519400.535	5025.01525	47	3	1400000US36047041700	Census Tract 417, Kings County, New York	LI - At Risk of Gentrification	0.427	0.5401	2.25255039	Low to Low	29
41800	BK25	Homecrest	4016	1773170.32	6582.865969	47	3	1400000US36047041800	Census Tract 418, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.509	0.5983	-0.3691308	High to High	0
41900	BK78	Bushwick South	4002	1646861.671	5222.700541	47	3	1400000US36047041900	Census Tract 419, Kings County, New York	LI - Not Losing Low-Income Households	0.473	0.5101	2.84009366	Low to Low	13
42000	BK25	Homecrest	4016	1820929.02	6966.654885	47	3	1400000US36047042000	Census Tract 420, Kings County, New York	LI - Not Losing Low-Income Households	0.401	0.5371	-0.261992	High to High	0
42100	BK78	Bushwick South	4002	1651413.353	5252.771455	47	3	1400000US36047042100	Census Tract 421, Kings County, New York	LI - Ongoing Gentrification	0.422	0.5112	2.82281585	Low to High	12
42200	BK25	Homecrest	4016	2443185.634	6172.108861	47	3	1400000US36047042200	Census Tract 422, Kings County, New York	MHI - Stable Exclusion	0.391	0.5201	0.03363552	High to High	4
42300	BK78	Bushwick South	4002	1961468.148	5572.234988	47	3	1400000US36047042300	Census Tract 423, Kings County, New York	LI - Ongoing Gentrification			3.26430485	Low to High	13
42400	BK29	Bensonhurst East	4017	1733612.895	6586.200844	47	3	1400000US36047042400	Census Tract 424, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			-0.1084859	High to High	19
42500	BK78	Bushwick South	4002	1806379.811	5251.939679	47	3	1400000US36047042500	Census Tract 425, Kings County, New York	LI - Ongoing Gentrification			4.45038751	Low to High	30
42600	BK29	Bensonhurst East	4017	1829969.144	5548.580549	47	3	1400000US36047042600	Census Tract 426, Kings County, New York	LI - Not Losing Low-Income Households	0.427	0.4533	-0.3562961	High to High	5
42700	BK77	Bushwick North	4002	1595262.144	5232.076106	47	3	1400000US36047042700	Census Tract 427, Kings County, New York	LI - Ongoing Gentrification	0.421	0.4661	3.70359917	Low to High	11
42800	BK29	Bensonhurst East	4017	1773181.658	6669.645883	47	3	1400000US36047042800	Census Tract 428, Kings County, New York	LI - Not Losing Low-Income Households	0.437	0.4859	-0.192254	High to High	0
42900	BK77	Bushwick North	4002	1809836.599	5385.17065	47	3	1400000US36047042900	Census Tract 429, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.451	0.4666	3.07277462	Low to High	19
43000	BK29	Bensonhurst East	4017	1721309.636	6283.851112	47	3	1400000US36047043000	Census Tract 430, Kings County, New York	LI - Not Losing Low-Income Households			-0.4515732	High to High	0
43100	BK77	Bushwick North	4002	1810786.865	5386.799542	47	3	1400000US36047043100	Census Tract 431, Kings County, New York	LI - Ongoing Gentrification			2.84603351	Low to High	3
43200	BK29	Bensonhurst East	4017	1593340.969	5480.481648	47	3	1400000US36047043200	Census Tract 432, Kings County, New York	LI - Not Losing Low-Income Households			-0.3975854	High to High	2
43300	BK77	Bushwick North	4002	1810979.341	5387.201248	47	3	1400000US36047043300	Census Tract 433, Kings County, New York	LI - Not Losing Low-Income Households	0.496	0.551	2.23038203	Low to High	27
43400	BK29	Bensonhurst East	4017	1509164.808	5543.211492	47	3	1400000US36047043400	Census Tract 434, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.445	0.5524	-0.2292149	High to High	4
43500	BK77	Bushwick North	4002	1810895.363	5385.051872	47	3	1400000US36047043500	Census Tract 435, Kings County, New York	LI - Not Losing Low-Income Households	0.446	0.4553	2.0448688	Low to Low	21
43600	BK29	Bensonhurst East	4017	1480301.677	5828.14367	47	3	1400000US36047043600	Census Tract 436, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			-0.3263488	High to High	0
43700	BK77	Bushwick North	4002	1809983.845	5385.659379	47	3	1400000US36047043700	Census Tract 437, Kings County, New York	LI - Ongoing Gentrification			2.34789976	Low to Low	13
43800	BK46	Ocean Parkway South	4014	1671530.452	5435.941974	47	3	1400000US36047043800	Census Tract 438, Kings County, New York	LI - Not Losing Low-Income Households	0.47	0.5171	-0.1732715	High to High	1
43900	BK77	Bushwick North	4002	2152392.831	8162.503863	47	3	1400000US36047043900	Census Tract 439, Kings County, New York	LI - Not Losing Low-Income Households	0.438	0.474	1.37930437	Low to Low	15
44000	BK46	Ocean Parkway South	4014	2173529.656	6721.508464	47	3	1400000US36047044000	Census Tract 440, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.48	0.5711	-0.2133508	High to High	0
44100	BK77	Bushwick North	4002	1528572.533	5513.910688	47	3	1400000US36047044100	Census Tract 441, Kings County, New York	LI - Ongoing Gentrification	0.421	0.5026	1.77566742	Low to Low	17
44200	BK46	Ocean Parkway South	4014	1969036.007	6808.86938	47	3	1400000US36047044200	Census Tract 442, Kings County, New York	MHI - Stable Exclusion	0.451	0.5944	0.00460789	High to High	0
44300	BK77	Bushwick North	4002	1805749.998	5552.173245	47	3	1400000US36047044300	Census Tract 443, Kings County, New York	MHI - Advanced Gentrification	0.438	0.5297	1.57799902	Low to Low	8
44400	BK46	Ocean Parkway South	4014	1878090.012	6032.535557	47	3	1400000US36047044400	Census Tract 444, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.454	0.5331	-0.6796996	High to High	0
44500	BK77	Bushwick North	4002	1827456.087	5590.854697	47	3	1400000US36047044500	Census Tract 445, Kings County, New York	LI - Not Losing Low-Income Households	0.398	0.4274	1.70188238	High to High	11
44600	BK88	Borough Park	4014	1519495.979	6573.68922	47	3	1400000US36047044600	Census Tract 446, Kings County, New York	LI - Not Losing Low-Income Households	0.461	0.4797	-0.7307561	High to High	0
44700	BK77	Bushwick North	4002	1752244.61	5524.516493	47	3	1400000US36047044700	Census Tract 447, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.448	0.4856	2.70532991	Low to High	17
44800	BK46	Ocean Parkway South	4014	2423965.303	8077.930745	47	3	1400000US36047044800	Census Tract 448, Kings County, New York	LI - Not Losing Low-Income Households	0.389	0.5398	-0.8680459	High to High	0
44900	BK90	East Williamsburg	4001	22962571.39	33958.11143	47	3	1400000US36047044900	Census Tract 449, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			2.332892	High to High	6
45000	BK46	Ocean Parkway South	4014	2370291.994	6231.170724	47	3	1400000US36047045000	Census Tract 450, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.53	0.5348	-0.4271652	High to High	0
45200	BK46	Ocean Parkway South	4014	2005613.079	7171.838353	47	3	1400000US36047045200	Census Tract 452, Kings County, New York	MHI - Ongoing Exclusion	0.46	0.4967	-0.6982576	High to High	0
45300	BK77	Bushwick North	4002	3440160.269	8849.885992	47	3	1400000US36047045300	Census Tract 453, Kings County, New York	MHI - Advanced Gentrification	0.422	0.4972	2.99969814	Low to High	23
45400	BK46	Ocean Parkway South	4014	1423881.815	6358.012474	47	3	1400000US36047045400	Census Tract 454, Kings County, New York	LI - Not Losing Low-Income Households	0.418	0.4964	-0.6580973	High to High	0
45600	BK43	Midwood	4015	1653625.098	6877.053536	47	3	1400000US36047045600	Census Tract 456, Kings County, New York	LI - Not Losing Low-Income Households			-0.8471841	High to High	0
45800	BK43	Midwood	4015	1928211.694	7163.624036	47	3	1400000US36047045800	Census Tract 458, Kings County, New York	MHI - Stable Exclusion	0.546	0.5478	-1.0169719	High to High	0
46000	BK42	Flatbush	4015	2107798.136	9311.95976	47	3	1400000US36047046000	Census Tract 460, Kings County, New York	LI - Not Losing Low-Income Households	0.443	0.5135	-0.2652777	High to High	0
46201	BK42	Flatbush	4015	1381203.775	4984.099227	47	3	1400000US36047046201	Census Tract 462.01, Kings County, New York	LI - Not Losing Low-Income Households	0.549	0.5526	-0.5100624	Low to High	0
46202	BK46	Ocean Parkway South	4014	1866157.39	7378.235663	47	3	1400000US36047046202	Census Tract 462.02, Kings County, New York	LI - Not Losing Low-Income Households	0.538	0.6145	-0.5652232	High to High	0
46400	BK88	Borough Park	4014	1762932.757	6253.534015	47	3	1400000US36047046400	Census Tract 464, Kings County, New York	LI - Ongoing Gentrification	0.405	0.4078	-0.3468066	High to High	0
46800	BK88	Borough Park	4014	3193544.086	8979.001061	47	3	1400000US36047046800	Census Tract 468, Kings County, New York	LI - Not Losing Low-Income Households	0.374	0.4086	-0.3146554	High to High	0
47000	BK88	Borough Park	4014	1966226.07	7325.247742	47	3	1400000US36047047000	Census Tract 470, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.45	0.4933	-0.7262539	Low to High	0
47200	BK88	Borough Park	4014	1850619.132	6789.740082	47	3	1400000US36047047200	Census Tract 472, Kings County, New York	LI - Ongoing Gentrification	0.407	0.471	-0.5939343	High to High	0
47400	BK88	Borough Park	4014	1892923.476	6422.104553	47	3	1400000US36047047400	Census Tract 474, Kings County, New York	LI - Ongoing Gentrification	0.465	0.5621	-0.4729853	High to High	0
47600	BK88	Borough Park	4014	2236222.6	7553.380871	47	3	1400000US36047047600	Census Tract 476, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.49	0.5196	-0.774216	Low to High	0
47700	BK90	East Williamsburg	4001	2342852.906	8710.530136	47	3	1400000US36047047700	Census Tract 477, Kings County, New York	MHI - Advanced Gentrification			3.15232703	Low to High	1
47800	BK88	Borough Park	4014	2380722.109	6946.930637	47	3	1400000US36047047800	Census Tract 478, Kings County, New York	LI - Ongoing Gentrification	0.466	0.4778	-0.7679146	High to High	0
48000	BK42	Flatbush	4015	1643797.878	5432.248963	47	3	1400000US36047048000	Census Tract 480, Kings County, New York	LI - Not Losing Low-Income Households	0.503	0.5204	-0.3716411	Low to High	0
48100	BK90	East Williamsburg	4001	1629522.208	5314.739326	47	3	1400000US36047048100	Census Tract 481, Kings County, New York	MHI - Ongoing Exclusion	0.419	0.443	3.13447919	High to High	12
48200	BK42	Flatbush	4015	2121452.725	6712.515766	47	3	1400000US36047048200	Census Tract 482, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			0.06892053	Low to High	0
48400	BK41	Kensington-Ocean Parkway	4014	2251812.247	6302.72238	47	3	1400000US36047048400	Census Tract 484, Kings County, New York	LI - Not Losing Low-Income Households	0.383	0.4463	0.09668658	Low to High	0
48500	BK78	Bushwick South	4002	6253344.331	11637.64429	47	3	1400000US36047048500	Census Tract 485, Kings County, New York	MHI - Stable Exclusion			3.60109569	High to High	22
48600	BK41	Kensington-Ocean Parkway	4014	1888238.792	7156.659691	47	3	1400000US36047048600	Census Tract 486, Kings County, New York	LI - Not Losing Low-Income Households	0.43	0.4427	-0.3229989	Low to High	0
48800	BK41	Kensington-Ocean Parkway	4014	1542860.2	6228.754164	47	3	1400000US36047048800	Census Tract 488, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			-0.4077233	High to High	0
48900	BK78	Bushwick South	4002	985798.4982	4061.311143	47	3	1400000US36047048900	Census Tract 489, Kings County, New York	Missing Data	0.48	0.5203	2.38227661		1
49000	BK41	Kensington-Ocean Parkway	4014	2074872.144	6705.71985	47	3	1400000US36047049000	Census Tract 490, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.446	0.5183	0.23200184	High to High	0
49100	BK90	East Williamsburg	4001	2294137.31	7405.109004	47	3	1400000US36047049100	Census Tract 491, Kings County, New York	LI - At Risk of Gentrification	0.415	0.488	1.8560778		3
49200	BK41	Kensington-Ocean Parkway	4014	1780102.394	8133.973004	47	3	1400000US36047049200	Census Tract 492, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.463	0.5483	0.21512972	High to High	0
49300	BK78	Bushwick South	4002	2454524.78	7120.607955	47	3	1400000US36047049300	Census Tract 493, Kings County, New York	LI - Ongoing Gentrification	0.518	0.6301	2.38392523	Low to High	0
49400	BK41	Kensington-Ocean Parkway	4014	1970839.627	5704.768264	47	3	1400000US36047049400	Census Tract 494, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			0.33957597	Low to High	0
49500	BK90	East Williamsburg	4001	1389722.735	4737.978177	47	3	1400000US36047049500	Census Tract 495, Kings County, New York	MHI - Advanced Gentrification	0.401	0.4706	2.64620004	High to High	0

CT2010	NTA	NTA Name	PUMA	shape_area	shape_leng	FIPS	Boro	Census Tract ID	CT Geographic Area Name	UDP Typology	Gini—2010	Gini—2019	SAIG Score	SAIG HOUSING Status	NUMPOINTS
49600	BK41	Kensington-Ocean Parkway	4014	2184807.814	7240.570861	47	3	1400000US36047049600	Census Tract 496, Kings County, New York	MHI - Ongoing Exclusion	0.424	0.4248	0.39326891	High to High	0
49700	BK90	East Williamsburg	4001	1772554.257	5956.057214	47	3	1400000US36047049700	Census Tract 497, Kings County, New York	MHI - Advanced Gentrification	0.429	0.4742	2.55936121	Low to High	0
49800	BK41	Kensington-Ocean Parkway	4014	2199771.783	7162.915998	47	3	1400000US36047049800	Census Tract 498, Kings County, New York	MHI - Stable Exclusion	0.438	0.441	0.75175026	High to High	0
49900	BK76	Greenpoint	4001	1532199.801	5002.945382	47	3	1400000US36047049900	Census Tract 499, Kings County, New York	MHI - Ongoing Exclusion			2.72183729	High to High	0
50000	BK40	Windsor Terrace	4012	2138350.58	6705.494577	47	3	1400000US36047050000	Census Tract 500, Kings County, New York	MHI - Stable Exclusion			0.83012507	High to High	0
50100	BK90	East Williamsburg	4001	1857843.156	6239.761253	47	3	1400000US36047050100	Census Tract 501, Kings County, New York	MHI - Advanced Gentrification	0.397	0.4255	2.78487281	High to High	0
50202	BK40	Windsor Terrace	4012	1451525.222	5366.540642	47	3	1400000US36047050202	Census Tract 502.02, Kings County, New York	MHI - Ongoing Exclusion	0.432	0.4527	0.69050792	High to High	0
50300	BK90	East Williamsburg	4001	1348755.419	5030.788213	47	3	1400000US36047050300	Census Tract 503, Kings County, New York	MHI - Advanced Gentrification	0.354	0.4059	2.76483143	Low to High	0
50400	BK40	Windsor Terrace	4012	2516825.702	7398.004114	47	3	1400000US36047050400	Census Tract 504, Kings County, New York	MHI - Stable Exclusion	0.43	0.4608	0.65444017	High to High	0
50500	BK90	East Williamsburg	4001	1823285.676	6040.682134	47	3	1400000US36047050500	Census Tract 505, Kings County, New York	LI - Ongoing Gentrification	0.501	0.5101	1.90217731	Low to High	3
50600	BK42	Flatbush	4015	1773129.572	6694.889568	47	3	1400000US36047050600	Census Tract 506, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			1.33618435	Low to High	0
50700	BK75	Bedford	4003	1877636.941	6142.615377	47	3	1400000US36047050700	Census Tract 507, Kings County, New York	LI - Not Losing Low-Income Households	0.31	0.4921	2.32599238	Low to High	10
50801	BK42	Flatbush	4015	842216.0606	3753.545581	47	3	1400000US36047050801	Census Tract 508.01, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.409	0.5044	1.49843267	Low to Low	0
50803	BK42	Flatbush	4015	602995.5831	3257.534398	47	3	1400000US36047050803	Census Tract 508.03, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			2.3132015	Low to Low	0
50804	BK42	Flatbush	4015	1110945.631	4305.947623	47	3	1400000US36047050804	Census Tract 508.04, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.436	0.4368	2.0482205	Low to Low	0
50900	BK72	Williamsburg	4001	1526103.112	5020.25395	47	3	1400000US36047050900	Census Tract 509, Kings County, New York	LI - Not Losing Low-Income Households			0.96842663	Low to High	3
51001	BK42	Flatbush	4015	828176.5767	3652.72659	47	3	1400000US36047051001	Census Tract 510.01, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			1.53173464	Low to Low	0
51002	BK42	Flatbush	4015	1152098.91	4483.609815	47	3	1400000US36047051002	Census Tract 510.02, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.394	0.414	1.69650851	Low to High	0
51100	BK90	East Williamsburg	4001	1711548.774	5290.659228	47	3	1400000US36047051100	Census Tract 511, Kings County, New York	LI - Ongoing Gentrification	0.53	0.5415	1.81022744	Low to High	1
51200	BK42	Flatbush	4015	1510997.572	5531.84392	47	3	1400000US36047051200	Census Tract 512, Kings County, New York	LI - Not Losing Low-Income Households	0.415	0.4433	1.13597022	Low to Low	0
51300	BK73	North Side-South Side	4001	2779406.809	7232.677463	47	3	1400000US36047051300	Census Tract 513, Kings County, New York	MHI - Advanced Gentrification	0.38	0.4428	2.55971702	High to High	0
51400	BK42	Flatbush	4015	1949161.836	6293.562267	47	3	1400000US36047051400	Census Tract 514, Kings County, New York	LI - At Risk of Gentrification	0.435	0.4552	0.59769179	Low to Low	0
51500	BK73	North Side-South Side	4001	2013551.397	6866.833502	47	3	1400000US36047051500	Census Tract 515, Kings County, New York	MHI - Stable Exclusion			3.65807237	Low to High	0
51601	BK42	Flatbush	4015	1247781.408	4556.009525	47	3	1400000US36047051601	Census Tract 516.01, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			1.30800562	Low to Low	0
51602	BK42	Flatbush	4015	979567.9559	4557.163159	47	3	1400000US36047051602	Census Tract 516.02, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.413	0.4152	1.39506644	Low to Low	0
51700	BK73	North Side-South Side	4001	2020312.329	6225.178515	47	3	1400000US36047051700	Census Tract 517, Kings County, New York	MHI - Stable Exclusion	0.435	0.4553	2.69554855	High to High	0
51800	BK42	Flatbush	4015	2170111.34	6299.575326	47	3	1400000US36047051800	Census Tract 518, Kings County, New York	MHI - Stable Exclusion	0.515	0.517	0.34005296	High to High	0
51900	BK73	North Side-South Side	4001	2959028.011	7491.254749	47	3	1400000US36047051900	Census Tract 519, Kings County, New York	MHI - Advanced Gentrification			2.86478569	Low to High	0
52000	BK42	Flatbush	4015	2056594.475	6972.937631	47	3	1400000US36047052000	Census Tract 520, Kings County, New York	LI - Ongoing Gentrification	0.484	0.5186	0.30487113	High to High	0
52300	BK73	North Side-South Side	4001	1538749.403	4979.688799	47	3	1400000US36047052300	Census Tract 523, Kings County, New York	LI - Ongoing Gentrification	0.516	0.5391	2.890345	Low to High	0
52500	BK73	North Side-South Side	4001	1356123.738	5049.889017	47	3	1400000US36047052500	Census Tract 525, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.527	0.5834	2.01047958	Low to Low	0
52600	BK42	Flatbush	4015	1823527.02	6736.724751	47	3	1400000US36047052600	Census Tract 526, Kings County, New York	MHI - Stable Exclusion	0.394	0.4646	0.67498665	Low to High	0
52700	BK73	North Side-South Side	4001	2045672.642	6448.607567	47	3	1400000US36047052700	Census Tract 527, Kings County, New York	LI - Ongoing Gentrification	0.451	0.4701	2.54039549	Low to High	0
52800	BK42	Flatbush	4015	1891640.222	7275.902278	47	3	1400000US36047052800	Census Tract 528, Kings County, New York	MHI - Stable Exclusion	0.416	0.5016	-0.2580758	High to High	0
52900	BK72	Williamsburg	4001	1882580.923	6118.983997	47	3	1400000US36047052900	Census Tract 529, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.465	0.5372	1.52528789	Low to Low	11
53000	BK43	Midwood	4015	1861290.054	5637.114227	47	3	1400000US36047053000	Census Tract 530, Kings County, New York	LI - Not Losing Low-Income Households	0.466	0.5064	-0.2842375	High to High	0
53100	BK75	Bedford	4003	1741715.68	5569.472442	47	3	1400000US36047053100	Census Tract 531, Kings County, New York	LI - Ongoing Gentrification			1.72429775	Low to High	1
53200	BK43	Midwood	4015	1876179.01	6887.340455	47	3	1400000US36047053200	Census Tract 532, Kings County, New York	MHI - Stable Exclusion	0.408	0.4943	-0.1205436	High to High	0
53300	BK72	Williamsburg	4001	2078811.967	6035.102695	47	3	1400000US36047053300	Census Tract 533, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.511	0.6531	1.0491767	Low to High	7
53400	BK43	Midwood	4015	1866105.772	5639.951384	47	3	1400000US36047053400	Census Tract 534, Kings County, New York	LI - Not Losing Low-Income Households			-0.3905875	High to High	0
53500	BK72	Williamsburg	4001	1406193.252	5212.987853	47	3	1400000US36047053500	Census Tract 535, Kings County, New York	LI - Not Losing Low-Income Households	0.486	0.4867	0.40396974	Low to Low	1
53700	BK72	Williamsburg	4001	1802604.21	5673.156769	47	3	1400000US36047053700	Census Tract 537, Kings County, New York	LI - Not Losing Low-Income Households	0.417	0.4272	0.62682821	Low to Low	0
53800	BK43	Midwood	4015	1770108.615	5802.058584	47	3	1400000US36047053800	Census Tract 538, Kings County, New York	LI - Not Losing Low-Income Households	0.431	0.4637	-0.4111906	High to High	0
53900	BK72	Williamsburg	4001	1091631.4	4356.207114	47	3	1400000US36047053900	Census Tract 539, Kings County, New York	LI - At Risk of Gentrification	0.47	0.4947	0.76976136	Low to Low	1
54200	BK43	Midwood	4015	2036089.77	5962.813577	47	3	1400000US36047054200	Census Tract 542, Kings County, New York	LI - Not Losing Low-Income Households	0.489	0.5027	-0.0870117	High to High	0
54300	BK99	park-cemetery-etc-Brooklyn	4004	11164879.08	40356.38419	47	3	1400000US36047054300	Census Tract 543, Kings County, New York	Missing Data			0	0	7
54400	BK43	Midwood	4015	2045270.611	5970.775436	47	3	1400000US36047054400	Census Tract 544, Kings County, New York	LI - Not Losing Low-Income Households	0.437	0.4673	-0.5125967	High to High	0
54500	BK72	Williamsburg	4001	1802063.261	5308.784427	47	3	1400000US36047054500	Census Tract 545, Kings County, New York	LI - At Risk of Gentrification	0.496	0.5822	-0.3209908		4
54600	BK43	Midwood	4015	1942537.875	6699.315042	47	3	1400000US36047054600	Census Tract 546, Kings County, New York	LI - Not Losing Low-Income Households			-0.2716984	High to High	0
54700	BK73	North Side-South Side	4001	1825050.125	5664.399698	47	3	1400000US36047054700	Census Tract 547, Kings County, New York	LI - Not Losing Low-Income Households	0.505	0.5554	1.66929913	Low to High	0
54800	BK44	Madison	4016	1864436.429	7900.284113	47	3	1400000US36047054800	Census Tract 548, Kings County, New York	MHI - Stable Exclusion	0.455	0.5821	-0.3755768	High to High	0
54900	BK73	North Side-South Side	4001	2097786.273	6845.77556	47	3	1400000US36047054900	Census Tract 549, Kings County, New York	MHI - Advanced Gentrification			2.54752315	Low to High	0
55000	BK44	Madison	4016	1937232.771	5722.060885	47	3	1400000US36047055000	Census Tract 550, Kings County, New York	MHI - Stable Exclusion			-0.1302132	High to High	0
55100	BK73	North Side-South Side	4001	2510928.248	7122.677206	47	3	1400000US36047055100	Census Tract 551, Kings County, New York	MHI - Advanced Gentrification	0.547	0.5594	2.41884667	High to High	0
55200	BK44	Madison	4016	1805017.4	5520.894729	47	3	1400000US36047055200	Census Tract 552, Kings County, New York	LI - Not Losing Low-Income Households	0.428	0.4305	-0.1222936	High to High	0
55300	BK73	North Side-South Side	4001	1681865.775	5513.594123	47	3	1400000US36047055300	Census Tract 553, Kings County, New York	MHI - Ongoing Exclusion			2.65172243	Low to High	0
55400	BK25	Homecrest	4016	1821785.667	5578.364531	47	3	1400000US36047055400	Census Tract 554, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.407	0.469	-0.206178	Low to High	0
55500	BK73	North Side-South Side	4001	2846181.372	7343.450919	47	3	1400000US36047055500	Census Tract 555, Kings County, New York	MHI - Advanced Gentrification	0.486	0.4955	1.53548499	Low to High	0
55600	BK25	Homecrest	4016	2079990.279	5871.357228	47	3	1400000US36047055600	Census Tract 556, Kings County, New York	MHI - Stable Exclusion	0.446	0.4888	-0.1003062	High to High	0
55700	BK73	North Side-South Side	4001	3195112.214	7401.291918	47	3	1400000US36047055700	Census Tract 557, Kings County, New York	MHI - Advanced Gentrification	0.391	0.49	2.26960968	High to High	0
55800	BK44	Madison	4016	1847310.158	5599.344792	47	3	1400000US36047055800	Census Tract 558, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.413	0.4823	-0.2746145	High to High	0
56000	BK44	Madison	4016	1988439.594	5761.259478	47	3	1400000US36047056000	Census Tract 560, Kings County, New York	MHI - Ongoing Exclusion			-0.4255246	High to High	0
56100	BK76	Greenpoint	4001	3577947.655	8469.794427	47	3	1400000US36047056100	Census Tract 561, Kings County, New York	MHI - Advanced Gentrification	0.443	0.4875	2.6342316	Low to High	0
56200	BK44	Madison	4016	1838820.874	5590.084972	47	3	1400000US36047056200	Census Tract 562, Kings County, New York	MHI - Stable Exclusion	0.458	0.5021	0.19862744	High to High	0
56300	BK76	Greenpoint	4001	3983455.328	8210.172775	47	3	1400000US36047056300	Census Tract 563, Kings County, New York	MHI - Ongoing Exclusion			2.42246926	Low to High	0
56400	BK44	Madison	4016	1972387.642	6411.192904	47	3	1400000US36047056400	Census Tract 564, Kings County, New York	MHI - Stable Exclusion			-0.2001502	High to High	0
56500	BK76	Greenpoint	4001	2557074.304	6717.581837	47	3	1400000US36047056500	Census Tract 565, Kings County, New York	MHI - Ongoing Exclusion	0.411	0.447	2.77069191	High to High	0
56600	BK44	Madison	4016	1846300.401	5577.840035	47	3	1400000US36047056600	Census Tract 566, Kings County, New York	MHI - Stable Exclusion	0.396	0.4198	-0.352367	High to High	0
56800	BK44	Madison	4016	1267976.136	5221.452802	47	3	1400000US36047056800	Census Tract 568, Kings County, New York	MHI - Stable Exclusion			-0.5776339	High to High	0
56900	BK76	Greenpoint	4001	1376243.887	5735.062634	47	3	1400000US36047056900	Census Tract 569, Kings County, New York	MHI - Stable Exclusion	0.406	0.4204	2.68938502	Low to High	0
57000	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	2824696.889	8653.416235	47	3	1400000US36047057000	Census Tract 570, Kings County, New York	MHI - Stable Exclusion			-0.3792461	High to High	0
57100	BK76	Greenpoint	4001	1892836.353	5516.210534	47	3	1400000US36047057100	Census Tract 571, Kings County, New York	MHI - Ongoing Exclusion			2.83149825	Low to High	0
57200	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	2622725.166	6491.895195	47	3	1400000US36047057200	Census Tract 572, Kings County, New York	LI - At Risk of Gentrification			-0.7583916		0
57300	BK76	Greenpoint	4001	1831149.589	5625.868599	47	3	1400000US36047057300	Census Tract 573, Kings County, New York	MHI - Ongoing Exclusion			2.90769352	High to High	0
57400	BK44	Madison	4016	1713577.629	6539.238886	47	3	1400000US36047057400	Census Tract 574, Kings County, New York	MHI - Stable Exclusion	0.383	0.4397	-0.599992	High to High	0
57500	BK76	Greenpoint	4001	2014844.591	7029.262137	47	3	1400000US36047057500	Census Tract 575, Kings County, New York	MHI - Advanced Gentrification	0.38	0.458	3.23476529	Low to High	0
57600	BK44	Madison	4016	1707334.544	5342.001098	47	3	1400000US36047057600	Census Tract 576, Kings County, New York	MHI - Stable Exclusion	0.395	0.4117	-0.7209951	High to High	0
57800	BK44	Madison	4016	1853782.133	5522.413912	47	3	1400000US36047057800	Census Tract 578, Kings County, New York	LI - Not Losing Low-Income Households	0.453	0.5008	-0.9154219	High to High	0
57900	BK76	Greenpoint	4001	7887548.879	16495.02633	47	3	1400000US36047057900	Census Tract 579, Kings County, New York	MHI - Ongoing Exclusion	0.387	0.4207	2.88110818	High to High	2
58000	BK44	Madison	4016	1707766.255	5340.45621	47	3	1400000US36047058000	Census Tract 580, Kings County, New York	LI - Not Losing Low-Income Households			-0.6597811	High to High	0
58200	BK25	Homecrest	4016	1738266.687	5388.123107	47	3	1400000US36047058200	Census Tract 582, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			-0.2948037	High to High	0
58400	BK25	Homecrest	4016	2029005.365	5767.691707	47	3	1400000US36047058400	Census Tract 584, Kings County, New York	MHI - Stable Exclusion			-0.0255588	High to High	0
58600	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	1759616.26	5442.139455	47	3	1400000US36047058600	Census Tract 586, Kings County, New York	MHI - Stable Exclusion			-0.6797025	High to High	0
58800	BK25	Homecrest	4016	1718520.699	5325.469296	47	3	1400000US36047058800	Census Tract 588, Kings County, New York	MHI - Stable Exclusion	0.455	0.5296	-0.1356635	High to High	0

CT2010	NTA	NTA Name	PUMA	shape_area	shape_leng	FIPS	Boro	Census Tract ID	CT Geographic Area Name	UDP Typology	Gini—2010	Gini—2019	SAIG Score	SAIG HOUSING Status	NUMPOINTS
58900	BK76	Greenpoint	4001	4574107.524	12130.36037	47	3	1400000US36047058900	Census Tract 589, Kings County, New York	MHI - Stable Exclusion	0.358	0.393	2.32064095	High to High	0
59000	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	1704089.777	5777.40968	47	3	1400000US36047059000	Census Tract 590, Kings County, New York	LI - Not Losing Low-Income Households	0.346	0.423	-0.031342	High to High	0
59100	BK76	Greenpoint	4001	2060784.36	5916.283998	47	3	1400000US36047059100	Census Tract 591, Kings County, New York	MHI - Ongoing Exclusion			2.92342251	High to High	0
59200	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	2360097.749	8185.09612	47	3	1400000US36047059200	Census Tract 592, Kings County, New York	LI - Not Losing Low-Income Households	0.408	0.4772	-0.5471701	High to High	0
59300	BK76	Greenpoint	4001	2033803.83	6065.459409	47	3	1400000US36047059300	Census Tract 593, Kings County, New York	MHI - Advanced Gentrification	0.418	0.4275	3.07563561	Low to High	0
59401	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	4528015.907	9659.798155	47	3	1400000US36047059401	Census Tract 594.01, Kings County, New York	LI - Not Losing Low-Income Households	0.45	0.4879	-0.4212527	High to High	0
59402	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	3470556.205	8094.774044	47	3	1400000US36047059402	Census Tract 594.02, Kings County, New York	MHI - Stable Exclusion			-0.3697351	High to High	0
59600	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	1863185.138	6850.705576	47	3	1400000US36047059600	Census Tract 596, Kings County, New York	MHI - Ongoing Exclusion	0.467	0.4872	-0.8125506	High to High	0
59800	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	2145271.497	7239.394544	47	3	1400000US36047059800	Census Tract 598, Kings County, New York	MHI - Stable Exclusion	0.428	0.459	-0.4612139	High to High	0
60000	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	4732242.741	9650.320534	47	3	1400000US36047060000	Census Tract 600, Kings County, New York	LI - Not Losing Low-Income Households			-0.291292	High to High	0
60600	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	1950213.568	7668.707031	47	3	1400000US36047060600	Census Tract 606, Kings County, New York	LI - Not Losing Low-Income Households	0.449	0.4647	-0.0339362	High to High	0
60800	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	4308322.454	17845.84871	47	3	1400000US36047060800	Census Tract 608, Kings County, New York	LI - Not Losing Low-Income Households	0.444	0.4591	-0.1326143	High to High	0
61002	BK19	Brighton Beach	4018	2430047.014	7328.467107	47	3	1400000US36047061002	Census Tract 610.02, Kings County, New York	MHI - Stable Exclusion			0.22453571	High to High	0
61003	BK19	Brighton Beach	4018	902889.4005	4774.85341	47	3	1400000US36047061003	Census Tract 610.03, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			-0.0552292	High to Low	0
61004	BK19	Brighton Beach	4018	2384898.608	7052.036222	47	3	1400000US36047061004	Census Tract 610.04, Kings County, New York	LI - Ongoing Gentrification			-0.2497359	High to High	0
61200	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	2130753.467	7180.601635	47	3	1400000US36047061200	Census Tract 612, Kings County, New York	MHI - Stable Exclusion	0.531	0.5691	-0.2577956	High to High	0
61600	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	7848777.366	18111.97532	47	3	1400000US36047061600	Census Tract 616, Kings County, New York	MHI - Stable Exclusion			-0.8563158	High to High	0
62000	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	3439027.739	9588.799946	47	3	1400000US36047062000	Census Tract 620, Kings County, New York	MHI - Stable Exclusion	0.45	0.4973	-0.4072704	High to High	0
62200	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	2689303.886	12096.86579	47	3	1400000US36047062200	Census Tract 622, Kings County, New York	MHI - Advanced Gentrification	0.406	0.5228	0.32241121	High to Low	0
62600	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	3425961.06	9998.504823	47	3	1400000US36047062600	Census Tract 626, Kings County, New York	LI - Not Losing Low-Income Households			-0.9620927	High to Low	0
62800	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	8274566.46	42885.41824	47	3	1400000US36047062800	Census Tract 628, Kings County, New York	MHI - Stable Exclusion			-0.345285	High to High	0
63200	BK17	Sheepshead Bay-Gerritsen Beach-Manhattan Beach	4016	1264075.903	5753.227368	47	3	1400000US36047063200	Census Tract 632, Kings County, New York	MHI - Stable Exclusion	0.375	0.401	0.60901886	High to High	0
63600	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	1230571.816	5230.945402	47	3	1400000US36047063600	Census Tract 636, Kings County, New York	MHI - Stable Exclusion			-0.4244892	High to High	0
63800	BK44	Madison	4016	1498401.257	8403.550142	47	3	1400000US36047063800	Census Tract 638, Kings County, New York	MHI - Ongoing Exclusion			-0.5075369	High to High	0
64000	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	1651211.884	5734.951869	47	3	1400000US36047064000	Census Tract 640, Kings County, New York	MHI - Advanced Gentrification	0.25	0.3908	-0.0543229	High to High	0
64200	BK44	Madison	4016	2530379.299	6854.435065	47	3	1400000US36047064200	Census Tract 642, Kings County, New York	MHI - Stable Exclusion			-0.3152534	High to High	0
64400	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	2145902.196	6505.531261	47	3	1400000US36047064400	Census Tract 644, Kings County, New York	MHI - Stable Exclusion	0.395	0.4009	0.06262807	High to High	4
64600	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	1782721.283	5619.588955	47	3	1400000US36047064600	Census Tract 646, Kings County, New York	MHI - Advanced Gentrification	0.338	0.4359	-0.1653937	High to High	0
64800	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	1631120.822	5217.264794	47	3	1400000US36047064800	Census Tract 648, Kings County, New York	MHI - Stable Exclusion			-0.5998802	High to High	3
65000	BK58	Flatlands	4009	1789145.881	5765.937557	47	3	1400000US36047065000	Census Tract 650, Kings County, New York	LI - Not Losing Low-Income Households			-0.265536	High to High	0
65200	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	1875210.128	6302.374451	47	3	1400000US36047065200	Census Tract 652, Kings County, New York	MHI - Stable Exclusion	0.341	0.3912	-0.8864091	High to High	0
65400	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	1631231.599	6780.003081	47	3	1400000US36047065400	Census Tract 654, Kings County, New York	MHI - Advanced Gentrification	0.326	0.4821	-0.2389175	High to High	0
65600	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	1653143.993	5236.660793	47	3	1400000US36047065600	Census Tract 656, Kings County, New York	MHI - Stable Exclusion			-0.6573278	High to High	0
65800	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	1650702.279	6272.716484	47	3	1400000US36047065800	Census Tract 658, Kings County, New York	MHI - Stable Exclusion	0.351	0.4249	-0.5561695	High to High	0
66000	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	1639605.383	5223.596856	47	3	1400000US36047066000	Census Tract 660, Kings County, New York	MHI - Stable Exclusion			-0.5656272	High to High	0
66200	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	2488662.649	8217.524555	47	3	1400000US36047066200	Census Tract 662, Kings County, New York	MHI - Stable Exclusion	0.412	0.4202	-0.4467832	High to High	0
66600	BK99	park-cemetery-etc-Brooklyn	4009	43484861.05	96981.54143	47	3	1400000US36047066600	Census Tract 666, Kings County, New York	Missing Data			0	0	0
67000	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	2244629.177	6204.720546	47	3	1400000US36047067000	Census Tract 670, Kings County, New York	MHI - Ongoing Exclusion			-0.8035666	High to Low	0
67200	BK58	Flatlands	4009	1876487.989	8351.807821	47	3	1400000US36047067200	Census Tract 672, Kings County, New York	MHI - Ongoing Exclusion	0.298	0.3733	-1.1125773	High to Low	0
67400	BK58	Flatlands	4009	2039940.895	7270.497882	47	3	1400000US36047067400	Census Tract 674, Kings County, New York	MHI - Stable Exclusion	0.349	0.3923	-0.6942166	High to High	0
67600	BK58	Flatlands	4009	1672665.675	6353.535031	47	3	1400000US36047067600	Census Tract 676, Kings County, New York	MHI - Stable Exclusion			-0.1891334	High to High	0
67800	BK58	Flatlands	4009	1789096.28	5416.415398	47	3	1400000US36047067800	Census Tract 678, Kings County, New York	MHI - Ongoing Exclusion			-0.3244753	Low to Low	0
68000	BK58	Flatlands	4009	1817783.466	5527.063945	47	3	1400000US36047068000	Census Tract 680, Kings County, New York	MHI - Stable Exclusion			-0.5869006	High to High	0
68200	BK58	Flatlands	4009	2176848.589	6486.696529	47	3	1400000US36047068200	Census Tract 682, Kings County, New York	MHI - Ongoing Exclusion	0.325	0.4019	-0.2760453	High to Low	0
68600	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	1592924.452	6255.090757	47	3	1400000US36047068600	Census Tract 686, Kings County, New York	LI - Not Losing Low-Income Households			-0.6418118	High to Low	0
68800	BK58	Flatlands	4009	1686416.912	5544.892835	47	3	1400000US36047068800	Census Tract 688, Kings County, New York	MHI - Stable Exclusion			-0.7351016	High to High	0
69000	BK58	Flatlands	4009	1861629.045	6663.143627	47	3	1400000US36047069000	Census Tract 690, Kings County, New York	MHI - Stable Exclusion	0.338	0.416	-0.3482336	High to High	0
69200	BK58	Flatlands	4009	1952887.726	6487.948729	47	3	1400000US36047069200	Census Tract 692, Kings County, New York	MHI - Advanced Gentrification			-0.3209202	High to Low	0
69601	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	4532216.029	10389.07411	47	3	1400000US36047069601	Census Tract 696.01, Kings County, New York	LI - Not Losing Low-Income Households	0.357	0.4395	-0.8012968	Low to Low	1
69602	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	7888386.266	17792.7217	47	3	1400000US36047069602	Census Tract 696.02, Kings County, New York	MHI - Stable Exclusion	0.335	0.4835	-0.7853708	High to High	0
69800	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	5424250.054	27352.55697	47	3	1400000US36047069800	Census Tract 698, Kings County, New York	MHI - Stable Exclusion			-0.75481	High to High	0
70000	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	2177085.964	6151.505666	47	3	1400000US36047070000	Census Tract 700, Kings County, New York	LI - Not Losing Low-Income Households	0.353	0.4666	-0.2816496	High to High	0
70201	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	11098403.26	19259.58645	47	3	1400000US36047070201	Census Tract 702.01, Kings County, New York	MHI - Stable Exclusion	0.47	0.5483	-1.2931157	High to High	0
70202	BK99	park-cemetery-etc-Brooklyn	4009	54491021.1	44372.28162	47	3	1400000US36047070202	Census Tract 702.02, Kings County, New York	Missing Data			0	0	0
70203	BK99	park-cemetery-etc-Brooklyn	4009	39715344.37	136860.3957	47	3	1400000US36047070203	Census Tract 702.03, Kings County, New York	Missing Data			0	0	0
70600	BK45	Georgetown-Marine Park-Bergen Beach-Mill Basin	4009	15125759.59	29508.07	47	3	1400000US36047070600	Census Tract 706, Kings County, New York	MHI - Stable Exclusion			-0.3249715	High to High	0
72000	BK58	Flatlands	4009	1701872.034	6664.51608	47	3	1400000US36047072000	Census Tract 720, Kings County, New York	MHI - Advanced Gentrification			-0.5944352	Low to Low	0
72200	BK58	Flatlands	4009	2769417.755	8425.527831	47	3	1400000US36047072200	Census Tract 722, Kings County, New York	MHI - Stable Exclusion	0.348	0.3625	-0.9072576	Low to Low	1
72400	BK58	Flatlands	4009	2068970.088	6556.412324	47	3	1400000US36047072400	Census Tract 724, Kings County, New York	MHI - Stable Exclusion	0.34	0.3776	-0.7712537	Low to Low	0
72600	BK58	Flatlands	4009	2962944.13	7156.178237	47	3	1400000US36047072600	Census Tract 726, Kings County, New York	MHI - Stable Exclusion	0.293	0.3276	-0.9339788	High to High	0
72800	BK58	Flatlands	4009	2282665.341	7568.728376	47	3	1400000US36047072800	Census Tract 728, Kings County, New York	MHI - Stable Exclusion			-0.8429231	Low to Low	0
73000	BK58	Flatlands	4009	1987945.353	7789.850212	47	3	1400000US36047073000	Census Tract 730, Kings County, New York	MHI - Stable Exclusion	0.352	0.4212	-0.4253378	Low to Low	0
73200	BK58	Flatlands	4009	1722429.099	5434.714415	47	3	1400000US36047073200	Census Tract 732, Kings County, New York	MHI - Ongoing Exclusion	0.403	0.4055	-0.9662006	Low to High	0
73400	BK58	Flatlands	4009	1626698.011	5187.844756	47	3	1400000US36047073400	Census Tract 734, Kings County, New York	MHI - Stable Exclusion	0.302	0.4023	-0.196927	High to High	1
73600	BK58	Flatlands	4009	1919003.261	5804.13607	47	3	1400000US36047073600	Census Tract 736, Kings County, New York	MHI - Stable Exclusion	0.408	0.4188	-0.4556586	High to Low	0
73800	BK58	Flatlands	4009	1944417.156	5801.495288	47	3	1400000US36047073800	Census Tract 738, Kings County, New York	LI - Not Losing Low-Income Households	0.347	0.4542	-0.2702383	Low to Low	0
74000	BK58	Flatlands	4009	1747894.616	5614.8792	47	3	1400000US36047074000	Census Tract 740, Kings County, New York	MHI - Advanced Gentrification	0.348	0.4062	-0.3879184	Low to Low	0
74200	BK58	Flatlands	4009	1876115.545	5663.839853	47	3	1400000US36047074200	Census Tract 742, Kings County, New York	MHI - Stable Exclusion	0.398	0.4662	-0.3995239	High to High	0
74400	BK58	Flatlands	4009	1844716.483	5612.220413	47	3	1400000US36047074400	Census Tract 744, Kings County, New York	MHI - Advanced Gentrification	0.372	0.4973	-0.2452153	High to High	0
74600	BK58	Flatlands	4009	2159993.828	7730.189302	47	3	1400000US36047074600	Census Tract 746, Kings County, New York	MHI - Stable Exclusion	0.38	0.3858	-0.1260892	High to High	0
74800	BK43	Midwood	4015	1900351.998	5679.863624	47	3	1400000US36047074800	Census Tract 748, Kings County, New York	MHI - Stable Exclusion	0.432	0.5137	-0.3678516	High to High	1
75000	BK43	Midwood	4015	1866699.15	5639.078726	47	3	1400000US36047075000	Census Tract 750, Kings County, New York	LI - Not Losing Low-Income Households	0.401	0.4255	-0.6386531	High to High	0
75200	BK43	Midwood	4015	1864085.121	5638.878715	47	3	1400000US36047075200	Census Tract 752, Kings County, New York	MHI - Stable Exclusion			0.02026817	High to High	0
75400	BK43	Midwood	4015	1867167.796	5639.972181	47	3	1400000US36047075400	Census Tract 754, Kings County, New York	MHI - Stable Exclusion			-0.2099783	High to High	0
75600	BK43	Midwood	4015	1867819.331	5582.965047	47	3	1400000US36047075600	Census Tract 756, Kings County, New York	MHI - Stable Exclusion			-0.4832617	High to High	0
75800	BK43	Midwood	4015	2209765.961	6398.444704	47	3	1400000US36047075800	Census Tract 758, Kings County, New York	MHI - Stable Exclusion			-0.1289681	High to High	0
76000	BK43	Midwood	4015	1954536.395	6345.003304	47	3	1400000US36047076000	Census Tract 760, Kings County, New York	LI - Not Losing Low-Income Households	0.439	0.5051	-0.3907265	High to High	0
76200	BK43	Midwood	4015	2024074.617	5822.844403	47	3	1400000US36047076200	Census Tract 762, Kings County, New York	LI - Not Losing Low-Income Households	0.461	0.6177	0.08516487	High to High	0
76400	BK42	Flatbush	4015	1740194.686	7034.140418	47	3	1400000US36047076400	Census Tract 764, Kings County, New York	LI - Not Losing Low-Income Households	0.491	0.4995	0.34227847	High to High	0
76600	BK42	Flatbush	4015	887314.0585	4504.392232	47	3	1400000US36047076600	Census Tract 766, Kings County, New York	MHI - Stable Exclusion	0.39	0.448	0.17087738	High to High	0
76800	BK43	Midwood	4015	3265655.286	9001.209896	47	3	1400000US36047076800	Census Tract 768, Kings County, New York	LI - Not Losing Low-Income Households	0.486	0.5106	-0.1684736	High to High	0
77000	BK42	Flatbush	4015	1760973.139	7131.172012	47	3	1400000US36047077000	Census Tract 770, Kings County, New York	LI - Not Losing Low-Income Households	0.418	0.5994	0.32261867	Low to Low	0
77200	BK42	Flatbush	4015	4351946.216	10391.96455	47	3	1400000US36047077200	Census Tract 772, Kings County, New York	MHI - Stable Exclusion	0.402	0.4823	0.03631695	High to High	0
77400	BK42	Flatbush	4015	1596845.358	7821.404532	47	3	1400000US36047077400	Census Tract 774, Kings County, New York	MHI - Ongoing Exclusion			-0.4847927	Low to High	0

CT2010	NTA	NTA Name	PUMA	shape_area	shape_leng	FIPS	Boro	Census Tract ID	CT Geographic Area Name	UDP Typology	Gini—2010	Gini—2019	SAIG Score	SAIG HOUSING Status	NUMPOINTS
77600	BK58	Flatlands	4009	2008023.221	6576.608373	47	3	1400000US36047077600	Census Tract 776, Kings County, New York	MHI - Stable Exclusion	0.36	0.4264	-0.6720754	High to Low	0
78000	BK91	East Flatbush-Farragut	4010	1770932.84	5470.955152	47	3	1400000US36047078000	Census Tract 780, Kings County, New York	MHI - Stable Exclusion	0.369	0.4297	-0.5078878	Low to Low	0
78200	BK91	East Flatbush-Farragut	4010	1811374.372	5948.145346	47	3	1400000US36047078200	Census Tract 782, Kings County, New York	MHI - Ongoing Exclusion	0.422	0.4372	-0.3420948	Low to Low	1
78400	BK91	East Flatbush-Farragut	4010	1801875.971	5509.694394	47	3	1400000US36047078400	Census Tract 784, Kings County, New York	MHI - Stable Exclusion	0.347	0.4287	-0.1533742	Low to Low	0
78600	BK42	Flatbush	4015	1834297.87	5904.534822	47	3	1400000US36047078600	Census Tract 786, Kings County, New York	LI - Not Losing Low-Income Households			-0.5819352	Low to Low	0
78800	BK42	Flatbush	4015	1698020.281	5907.541932	47	3	1400000US36047078800	Census Tract 788, Kings County, New York	LI - Not Losing Low-Income Households			-0.0712873	Low to Low	0
79000	BK95	Erasmus	4010	1965032.156	5950.853444	47	3	1400000US36047079000	Census Tract 790, Kings County, New York	LI - Not Losing Low-Income Households			0.46303266	Low to Low	0
79200	BK95	Erasmus	4010	2332263.87	6106.756505	47	3	1400000US36047079200	Census Tract 792, Kings County, New York	LI - Not Losing Low-Income Households	0.427	0.4417	0.38683615	Low to Low	0
79400	BK95	Erasmus	4010	2391961.702	6265.762733	47	3	1400000US36047079400	Census Tract 794, Kings County, New York	LI - Not Losing Low-Income Households	0.463	0.4719	0.56079143	Low to Low	0
79601	BK60	Prospect Lefferts Gardens-Wingate	4011	1188358.751	4382.684861	47	3	1400000US36047079601	Census Tract 796.01, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.442	0.4502	2.501965	Low to High	0
79602	BK60	Prospect Lefferts Gardens-Wingate	4011	1453524.832	5043.967955	47	3	1400000US36047079602	Census Tract 796.02, Kings County, New York	LI - At Risk of Gentrification			1.62226119	Low to High	0
79801	BK60	Prospect Lefferts Gardens-Wingate	4011	1397208.651	4764.35305	47	3	1400000US36047079801	Census Tract 798.01, Kings County, New York	MHI - Stable Exclusion			2.26526979	Low to High	0
79802	BK60	Prospect Lefferts Gardens-Wingate	4011	1145198.794	5259.379399	47	3	1400000US36047079802	Census Tract 798.02, Kings County, New York	MHI - Stable Exclusion	0.363	0.4653	2.12261412	Low to High	0
80000	BK60	Prospect Lefferts Gardens-Wingate	4011	1869357.374	5625.230504	47	3	1400000US36047080000	Census Tract 800, Kings County, New York	MHI - Stable Exclusion			1.1896414	Low to Low	0
80200	BK60	Prospect Lefferts Gardens-Wingate	4011	1994115.262	5767.215923	47	3	1400000US36047080200	Census Tract 802, Kings County, New York	LI - Not Losing Low-Income Households	0.462	0.5359	1.11786133	Low to High	0
80400	BK60	Prospect Lefferts Gardens-Wingate	4011	2042543.224	6685.941426	47	3	1400000US36047080400	Census Tract 804, Kings County, New York	LI - Not Losing Low-Income Households	0.458	0.5883	0.51533959	Low to High	25
80600	BK60	Prospect Lefferts Gardens-Wingate	4011	1790089.338	6017.656695	47	3	1400000US36047080600	Census Tract 806, Kings County, New York	LI - Ongoing Gentrification	0.426	0.463	1.36999617	Low to High	25
80800	BK60	Prospect Lefferts Gardens-Wingate	4011	3465286.313	11997.57741	47	3	1400000US36047080800	Census Tract 808, Kings County, New York	LI - Not Losing Low-Income Households	0.333	0.5245	0	0	14
81000	BK60	Prospect Lefferts Gardens-Wingate	4011	1748352.331	6573.868749	47	3	1400000US36047081000	Census Tract 810, Kings County, New York	LI - Ongoing Gentrification	0.441	0.4584	0.84739654	Low to Low	36
81400	BK91	East Flatbush-Farragut	4010	1831958.592	5579.355559	47	3	1400000US36047081400	Census Tract 814, Kings County, New York	LI - Not Losing Low-Income Households	0.428	0.4783	-0.8333336	Low to Low	0
81600	BK91	East Flatbush-Farragut	4010	1933154.427	6080.414319	47	3	1400000US36047081600	Census Tract 816, Kings County, New York	LI - Not Losing Low-Income Households	0.403	0.4925	-0.5550162	Low to Low	0
81800	BK95	Erasmus	4010	1699559.936	5542.998575	47	3	1400000US36047081800	Census Tract 818, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			0.08698773	Low to Low	3
82000	BK60	Prospect Lefferts Gardens-Wingate	4011	1599913.494	5582.419306	47	3	1400000US36047082000	Census Tract 820, Kings County, New York	LI - Not Losing Low-Income Households	0.38	0.4913	0.5964399	Low to Low	0
82200	BK60	Prospect Lefferts Gardens-Wingate	4011	1827423.044	5792.844437	47	3	1400000US36047082200	Census Tract 822, Kings County, New York	LI - Not Losing Low-Income Households	0.45	0.4817	1.43842307	Low to Low	0
82400	BK95	Erasmus	4010	2307258.416	6085.946919	47	3	1400000US36047082400	Census Tract 824, Kings County, New York	LI - Not Losing Low-Income Households	0.404	0.4317	0.31676456	Low to Low	0
82600	BK95	Erasmus	4010	2142838.824	5883.029455	47	3	1400000US36047082600	Census Tract 826, Kings County, New York	LI - Not Losing Low-Income Households			0.54229996	Low to Low	0
82800	BK95	Erasmus	4010	1683688.638	5535.269638	47	3	1400000US36047082800	Census Tract 828, Kings County, New York	LI - Ongoing Gentrification			0.84780983	Low to Low	0
83000	BK91	East Flatbush-Farragut	4010	2171914.93	6600.75403	47	3	1400000US36047083000	Census Tract 830, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			1.18976384	Low to Low	0
83200	BK91	East Flatbush-Farragut	4010	1566888.337	5511.624043	47	3	1400000US36047083200	Census Tract 832, Kings County, New York	MHI - Stable Exclusion	0.339	0.3811	-0.5000425	Low to Low	0
83400	BK91	East Flatbush-Farragut	4010	1355748.334	4991.015983	47	3	1400000US36047083400	Census Tract 834, Kings County, New York	MHI - Stable Exclusion			-0.6199308	Low to Low	0
83600	BK91	East Flatbush-Farragut	4010	2240975.58	6026.388951	47	3	1400000US36047083600	Census Tract 836, Kings County, New York	MHI - Stable Exclusion	0.369	0.418	-0.533207	Low to Low	0
83800	BK91	East Flatbush-Farragut	4010	1796855.892	5510.798765	47	3	1400000US36047083800	Census Tract 838, Kings County, New York	LI - Not Losing Low-Income Households	0.394	0.4696	-0.8309734	Low to Low	0
84000	BK91	East Flatbush-Farragut	4010	1830663.382	5550.282711	47	3	1400000US36047084000	Census Tract 840, Kings County, New York	LI - Not Losing Low-Income Households	0.383	0.4233	-0.8679479	Low to Low	0
84600	BK96	Rugby-Remsen Village	4010	1778802.697	5454.284446	47	3	1400000US36047084600	Census Tract 846, Kings County, New York	LI - Not Losing Low-Income Households	0.372	0.4114	-0.970994	Low to Low	0
84800	BK96	Rugby-Remsen Village	4010	1479845.466	4899.596749	47	3	1400000US36047084800	Census Tract 848, Kings County, New York	LI - Not Losing Low-Income Households			-0.5900789	Low to Low	0
85000	BK91	East Flatbush-Farragut	4010	1556707.691	7007.3374	47	3	1400000US36047085000	Census Tract 850, Kings County, New York	MHI - Stable Exclusion	0.352	0.4061	-0.8945014	Low to Low	0
85200	BK99	park-cemetery-etc-Brooklyn	4010	4318257.611	9230.939325	47	3	1400000US36047085200	Census Tract 852, Kings County, New York	Missing Data			0	0	0
85400	BK91	East Flatbush-Farragut	4010	1385790.069	7324.948251	47	3	1400000US36047085400	Census Tract 854, Kings County, New York	LI - Not Losing Low-Income Households	0.394	0.4779	-0.8545767	Low to Low	0
85600	BK91	East Flatbush-Farragut	4010	1700511.631	6259.329324	47	3	1400000US36047085600	Census Tract 856, Kings County, New York	LI - Not Losing Low-Income Households			-0.0710368	Low to Low	0
85800	BK91	East Flatbush-Farragut	4010	1447275.818	5743.59126	47	3	1400000US36047085800	Census Tract 858, Kings County, New York	LI - Not Losing Low-Income Households			-0.4304621	Low to Low	0
86000	BK91	East Flatbush-Farragut	4010	1879565.349	5825.888809	47	3	1400000US36047086000	Census Tract 860, Kings County, New York	LI - Ongoing Gentrification	0.4	0.5087	-1.1284223	Low to Low	0
86200	BK96	Rugby-Remsen Village	4010	1508724.512	4925.087366	47	3	1400000US36047086200	Census Tract 862, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			0.21219006	Low to Low	0
86400	BK96	Rugby-Remsen Village	4010	1621224.171	5386.181923	47	3	1400000US36047086400	Census Tract 864, Kings County, New York	LI - Not Losing Low-Income Households	0.331	0.4407	-0.4768462	Low to Low	0
86600	BK96	Rugby-Remsen Village	4010	1684237.127	7518.421482	47	3	1400000US36047086600	Census Tract 866, Kings County, New York	LI - Not Losing Low-Income Households	0.451	0.4637	-0.2973149	Low to Low	0
86800	BK96	Rugby-Remsen Village	4010	1879388.248	5606.519521	47	3	1400000US36047086800	Census Tract 868, Kings County, New York	MHI - Stable Exclusion	0.398	0.4124	0.13458532	Low to Low	0
87000	BK91	East Flatbush-Farragut	4010	1676352.267	5647.036225	47	3	1400000US36047087000	Census Tract 870, Kings County, New York	LI - Not Losing Low-Income Households	0.458	0.5114	-0.4747315	Low to Low	0
87200	BK91	East Flatbush-Farragut	4010	1583318.257	5610.411909	47	3	1400000US36047087200	Census Tract 872, Kings County, New York	LI - Not Losing Low-Income Households			-1.007233	Low to Low	0
87401	BK60	Prospect Lefferts Gardens-Wingate	4011	1405622.922	5380.177876	47	3	1400000US36047087401	Census Tract 874.01, Kings County, New York	LI - At Risk of Gentrification			-0.2344061	Low to Low	21
87600	BK60	Prospect Lefferts Gardens-Wingate	4011	1530933.262	5395.103287	47	3	1400000US36047087600	Census Tract 876, Kings County, New York	LI - At Risk of Gentrification	0.355	0.5522	-0.4743254	Low to Low	31
87800	BK60	Prospect Lefferts Gardens-Wingate	4011	1629552.999	6146.794989	47	3	1400000US36047087800	Census Tract 878, Kings County, New York	LI - Not Losing Low-Income Households	0.398	0.4513	-0.9202404	Low to Low	0
88000	BK60	Prospect Lefferts Gardens-Wingate	4011	1963161.808	7746.804968	47	3	1400000US36047088000	Census Tract 880, Kings County, New York	LI - Not Losing Low-Income Households	0.358	0.3967	0.27108619	Low to Low	3
88200	BK96	Rugby-Remsen Village	4010	2188027.926	8734.805687	47	3	1400000US36047088200	Census Tract 882, Kings County, New York	LI - Not Losing Low-Income Households			0.3795143	Low to Low	1
88400	BK96	Rugby-Remsen Village	4010	1797772.858	6494.429828	47	3	1400000US36047088400	Census Tract 884, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			0.55272728	Low to Low	8
88600	BK96	Rugby-Remsen Village	4010	1935334.277	6406.139884	47	3	1400000US36047088600	Census Tract 886, Kings County, New York	LI - Not Losing Low-Income Households	0.465	0.4934	-0.0010431	Low to Low	27
88800	BK96	Rugby-Remsen Village	4010	2165827.147	6449.767767	47	3	1400000US36047088800	Census Tract 888, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.375	0.4389	0.15926966	Low to Low	20
89000	BK96	Rugby-Remsen Village	4010	2672111.257	9452.909505	47	3	1400000US36047089000	Census Tract 890, Kings County, New York	LI - Not Losing Low-Income Households	0.403	0.4294	-0.0582376	Low to Low	33
89200	BK81	Brownsville	4007	1932413.375	7700.072985	47	3	1400000US36047089200	Census Tract 892, Kings County, New York	LI - At Risk of Gentrification	0.448	0.4618	-0.2552812	Low to Low	21
89400	BK81	Brownsville	4007	1853454.207	6291.046102	47	3	1400000US36047089400	Census Tract 894, Kings County, New York	LI - Not Losing Low-Income Households	0.447	0.4706	0.7624124	Low to Low	21
89600	BK81	Brownsville	4007	1605933.843	5646.716464	47	3	1400000US36047089600	Census Tract 896, Kings County, New York	LI - Not Losing Low-Income Households	0.392	0.4941	0.25636553	Low to Low	25
89800	BK81	Brownsville	4007	1661399.967	5546.683531	47	3	1400000US36047089800	Census Tract 898, Kings County, New York	LI - Ongoing Gentrification	0.426	0.5558	0.38284791	Low to Low	13
90000	BK81	Brownsville	4007	2645350.869	6709.230911	47	3	1400000US36047090000	Census Tract 900, Kings County, New York	LI - At Risk of Gentrification	0.448	0.5304	0.88379831	Low to Low	34
90200	BK81	Brownsville	4007	2051102.74	6035.680234	47	3	1400000US36047090200	Census Tract 902, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.556	0.6231	0.43642326	Low to Low	29
90600	BK81	Brownsville	4007	2107747.388	6160.463402	47	3	1400000US36047090600	Census Tract 906, Kings County, New York	LI - At Risk of Gentrification	0.494	0.6005	1.42029493	Low to Low	30
90800	BK81	Brownsville	4007	3194827.516	7555.778169	47	3	1400000US36047090800	Census Tract 908, Kings County, New York	LI - At Risk of Gentrification			0.67742096	Low to Low	90
91000	BK81	Brownsville	4007	2281443.6	6092.210532	47	3	1400000US36047091000	Census Tract 910, Kings County, New York	LI - At Risk of Gentrification	0.499	0.7612	1.08737318		59
91200	BK81	Brownsville	4007	1800466.587	5530.135777	47	3	1400000US36047091200	Census Tract 912, Kings County, New York	LI - At Risk of Gentrification	0.511	0.5782	1.58308927		25
91600	BK81	Brownsville	4007	2321085.511	6785.204327	47	3	1400000US36047091600	Census Tract 916, Kings County, New York	LI - Ongoing Gentrification	0.479	0.5554	0.23528899	Low to Low	48
91800	BK81	Brownsville	4007	2256021.139	6504.836748	47	3	1400000US36047091800	Census Tract 918, Kings County, New York	LI - At Risk of Gentrification	0.515	0.5858	0.95363516	Low to Low	18
92000	BK81	Brownsville	4007	2553557.139	6698.275072	47	3	1400000US36047092000	Census Tract 920, Kings County, New York	LI - Not Losing Low-Income Households	0.507	0.5179	1.06373544	High to Low	28
92200	BK81	Brownsville	4007	1745451.04	7857.783013	47	3	1400000US36047092200	Census Tract 922, Kings County, New York	LI - At Risk of Gentrification			0.6367256	Low to Low	12
92400	BK81	Brownsville	4007	2709111.047	8447.4214	47	3	1400000US36047092400	Census Tract 924, Kings County, New York	LI - At Risk of Gentrification	0.437	0.4875	0.654342	Low to Low	46
92800	BK96	Rugby-Remsen Village	4010	1692107.991	5286.460877	47	3	1400000US36047092800	Census Tract 928, Kings County, New York	LI - Not Losing Low-Income Households	0.336	0.4574	-0.5039534	Low to Low	18
93000	BK96	Rugby-Remsen Village	4010	2090418.963	6635.848345	47	3	1400000US36047093000	Census Tract 930, Kings County, New York	MHI - Stable Exclusion	0.32	0.4172	-0.8702408	Low to Low	22
93200	BK91	East Flatbush-Farragut	4010	3019000.008	6930.881117	47	3	1400000US36047093200	Census Tract 932, Kings County, New York	MHI - Stable Exclusion	0.377	0.4202	-0.5515487	Low to Low	0
93400	BK96	Rugby-Remsen Village	4010	1913351.798	7249.880347	47	3	1400000US36047093400	Census Tract 934, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.314	0.4417	-0.2315918	Low to Low	0
93600	BK96	Rugby-Remsen Village	4010	1777218.236	7495.433456	47	3	1400000US36047093600	Census Tract 936, Kings County, New York	MHI - Stable Exclusion			-0.9146612	Low to Low	0
93800	BK96	Rugby-Remsen Village	4010	1411409.756	5280.36113	47	3	1400000US36047093800	Census Tract 938, Kings County, New York	LI - Not Losing Low-Income Households			-0.2854743	Low to Low	0
94401	BK58	Flatlands	4009	3904893.551	10052.93262	47	3	1400000US36047094401	Census Tract 944.01, Kings County, New York	MHI - Stable Exclusion	0.379	0.4643	-0.858845	Low to Low	0
94402	BK58	Flatlands	4009	1150874.293	4373.555944	47	3	1400000US36047094402	Census Tract 944.02, Kings County, New York	Missing Data			-1.6823555		0
94600	BK96	Rugby-Remsen Village	4010	3111144.047	8936.664438	47	3	1400000US36047094600	Census Tract 946, Kings County, New York	MHI - Stable Exclusion	0.374	0.3786	-0.941102	Low to Low	0
95000	BK50	Canarsie	4009	2612150.74	7974.174843	47	3	1400000US36047095000	Census Tract 950, Kings County, New York	MHI - Stable Exclusion	0.389	0.3953	-0.7696789	Low to Low	0
95400	BK50	Canarsie	4009	2551621.316	6931.218491	47	3	1400000US36047095400	Census Tract 954, Kings County, New York	MHI - Stable Exclusion	0.388	0.4089	-1.0924974	Low to Low	0
95600	BK50	Canarsie	4009	2557813.938	8009.833149	47	3	1400000US36047095600	Census Tract 956, Kings County, New York	MHI - Stable Exclusion	0.385	0.4475	-0.8110188	Low to Low	0
95800	BK50	Canarsie	4009	2522663.379	6859.070496	47	3	1400000US36047095800	Census Tract 958, Kings County, New York	MHI - Stable Exclusion			-1.1523608	Low to Low	0

CT2010	NTA	NTA Name	PUMA	shape_area	shape_leng	FIPS	Boro	Census Tract ID	CT Geographic Area Name	UDP Typology	Gini—2010	Gini—2019	SAIG Score	SAIG HOUSING Status	NUMPOINTS
96000	BK50	Canarsie	4009	4574022.536	11062.66285	47	3	1400000US36047096000	Census Tract 960, Kings County, New York	Missing Data			0	0	9
96200	BK50	Canarsie	4009	1920772.157	5460.115474	47	3	1400000US36047096200	Census Tract 962, Kings County, New York	MHI - Advanced Gentrification	0.292	0.4343	0.01197593	Low to Low	0
96400	BK50	Canarsie	4009	1900792.266	5517.262746	47	3	1400000US36047096400	Census Tract 964, Kings County, New York	MHI - Stable Exclusion	0.363	0.4263	-0.8507378	Low to Low	1
96600	BK50	Canarsie	4009	1950813.549	6518.290734	47	3	1400000US36047096600	Census Tract 966, Kings County, New York	MHI - Stable Exclusion	0.379	0.4985	-0.8705465	High to Low	0
96800	BK50	Canarsie	4009	1603786.871	5097.840527	47	3	1400000US36047096800	Census Tract 968, Kings County, New York	MHI - Stable Exclusion	0.252	0.364	-0.1414504	High to Low	0
97000	BK50	Canarsie	4009	1759315.575	5377.961137	47	3	1400000US36047097000	Census Tract 970, Kings County, New York	MHI - Ongoing Exclusion	0.379	0.4076	0.06596647	Low to Low	0
97400	BK50	Canarsie	4009	2712076.723	7198.095853	47	3	1400000US36047097400	Census Tract 974, Kings County, New York	MHI - Stable Exclusion	0.333	0.4085	-0.7157398	High to Low	1
98200	BK50	Canarsie	4009	3723765.687	8952.013164	47	3	1400000US36047098200	Census Tract 982, Kings County, New York	LI - At Risk of Gentrification	0.518	0.5838	-0.4001057		0
98400	BK50	Canarsie	4009	1214786.691	4686.586215	47	3	1400000US36047098400	Census Tract 984, Kings County, New York	MHI - Stable Exclusion			-0.7123567	Low to Low	0
98600	BK50	Canarsie	4009	1677791.553	5278.877116	47	3	1400000US36047098600	Census Tract 986, Kings County, New York	MHI - Stable Exclusion			-1.0482255	Low to Low	0
98800	BK50	Canarsie	4009	1743233.098	5359.197586	47	3	1400000US36047098800	Census Tract 988, Kings County, New York	MHI - Advanced Gentrification			-0.819904	High to Low	1
99000	BK50	Canarsie	4009	1762100.884	5378.754287	47	3	1400000US36047099000	Census Tract 990, Kings County, New York	MHI - Advanced Gentrification	0.402	0.4163	-0.4225797	High to Low	6
99200	BK50	Canarsie	4009	1448961.107	5262.824766	47	3	1400000US36047099200	Census Tract 992, Kings County, New York	MHI - Advanced Gentrification	0.299	0.3468	-1.0941023	High to Low	3
99400	BK50	Canarsie	4009	1872516.877	5763.484841	47	3	1400000US36047099400	Census Tract 994, Kings County, New York	MHI - Ongoing Exclusion	0.259	0.3634	-1.0052455	High to Low	2
99600	BK50	Canarsie	4009	2041897.35	5666.141948	47	3	1400000US36047099600	Census Tract 996, Kings County, New York	MHI - Ongoing Exclusion	0.353	0.3796	-0.8016089	Low to Low	0
99800	BK50	Canarsie	4009	4646409.386	13384.97791	47	3	1400000US36047099800	Census Tract 998, Kings County, New York	MHI - Stable Exclusion			-0.8149336	Low to Low	0
100400	BK50	Canarsie	4009	1421504.199	4996.868566	47	3	1400000US36047100400	Census Tract 1004, Kings County, New York	MHI - Stable Exclusion	0.363	0.4491	-0.9094789	Low to Low	0
100600	BK50	Canarsie	4009	1637144.158	5220.149814	47	3	1400000US36047100600	Census Tract 1006, Kings County, New York	MHI - Stable Exclusion	0.329	0.3799	-0.8287907	High to Low	0
100800	BK50	Canarsie	4009	1602833.033	5432.52851	47	3	1400000US36047100800	Census Tract 1008, Kings County, New York	MHI - Stable Exclusion			-1.0413004	High to Low	0
101000	BK50	Canarsie	4009	1844400.828	5605.215519	47	3	1400000US36047101000	Census Tract 1010, Kings County, New York	MHI - Stable Exclusion	0.384	0.4369	-0.7290478	Low to Low	0
101200	BK50	Canarsie	4009	1730658.17	5338.743116	47	3	1400000US36047101200	Census Tract 1012, Kings County, New York	LI - Not Losing Low-Income Households			-1.2501097	High to Low	0
101400	BK50	Canarsie	4009	1668038.251	5259.876734	47	3	1400000US36047101400	Census Tract 1014, Kings County, New York	MHI - Stable Exclusion			-1.1160595	High to Low	0
101600	BK50	Canarsie	4009	1210060.371	4674.608494	47	3	1400000US36047101600	Census Tract 1016, Kings County, New York	MHI - Ongoing Exclusion			-1.3654967	Low to Low	0
101800	BK50	Canarsie	4009	2623263.401	14375.58102	47	3	1400000US36047101800	Census Tract 1018, Kings County, New York	MHI - Stable Exclusion	0.375	0.4828	-1.0309355	Low to Low	0
102000	BK50	Canarsie	4009	1690994.82	5294.223201	47	3	1400000US36047102000	Census Tract 1020, Kings County, New York	MHI - Advanced Gentrification	0.292	0.3709	-1.1063369	High to Low	0
102200	BK50	Canarsie	4009	1752586.566	5377.817152	47	3	1400000US36047102200	Census Tract 1022, Kings County, New York	MHI - Stable Exclusion	0.417	0.4492	-0.9769577	High to Low	0
102400	BK50	Canarsie	4009	1540219.432	5452.825317	47	3	1400000US36047102400	Census Tract 1024, Kings County, New York	MHI - Stable Exclusion			-0.4753591	Low to Low	0
102600	BK50	Canarsie	4009	1462012.237	5343.140587	47	3	1400000US36047102600	Census Tract 1026, Kings County, New York	MHI - Stable Exclusion			-1.0164835	Low to Low	0
102800	BK50	Canarsie	4009	8901544.617	14144.03581	47	3	1400000US36047102800	Census Tract 1028, Kings County, New York	MHI - Stable Exclusion			0.14427534	Low to Low	0
103400	BK50	Canarsie	4009	6216304.309	12076.88916	47	3	1400000US36047103400	Census Tract 1034, Kings County, New York	LI - At Risk of Gentrification	0.454	0.5076	-0.7644682		0
105801	BK93	Starrett City	4008	4521101.278	10687.62517	47	3	1400000US36047105801	Census Tract 1058.01, Kings County, New York	LI - At Risk of Gentrification			-0.4115783		0
105804	BK93	Starrett City	4008	7077851.22	15701.52843	47	3	1400000US36047105804	Census Tract 1058.04, Kings County, New York	LI - At Risk of Gentrification			-0.9390489		0
107000	BK82	East New York	4008	33769400.59	40095.85822	47	3	1400000US36047107000	Census Tract 1070, Kings County, New York	MHI - Stable Exclusion	0.143	0.4458	0	0	4
107800	BK82	East New York	4008	5449630.334	13423.83975	47	3	1400000US36047107800	Census Tract 1078, Kings County, New York	MHI - Stable Exclusion	0.397	0.4001	-0.1003679	Low to Low	45
109800	BK82	East New York	4008	9189937.841	13569.35668	47	3	1400000US36047109800	Census Tract 1098, Kings County, New York	LI - Not Losing Low-Income Households			0.07024769	Low to Low	4
110400	BK82	East New York	4008	8007940.397	14967.90294	47	3	1400000US36047110400	Census Tract 1104, Kings County, New York	LI - At Risk of Gentrification			-0.2184833	Low to Low	31
110600	BK82	East New York	4008	1841331.756	5477.130207	47	3	1400000US36047110600	Census Tract 1106, Kings County, New York	Missing Data			-0.8099098		12
111000	BK82	East New York	4008	1326238.836	4637.069265	47	3	1400000US36047111000	Census Tract 1110, Kings County, New York	LI - At Risk of Gentrification			-0.7957241		12
111600	BK82	East New York	4008	5375782.478	9498.351995	47	3	1400000US36047111600	Census Tract 1116, Kings County, New York	LI - Not Losing Low-Income Households	0.463	0.5131	0.2294782	Low to Low	83
111800	BK82	East New York	4008	1745783.827	5292.340113	47	3	1400000US36047111800	Census Tract 1118, Kings County, New York	LI - Not Losing Low-Income Households			0.49138112	Low to Low	11
112000	BK82	East New York	4008	1861982.547	5493.04568	47	3	1400000US36047112000	Census Tract 1120, Kings County, New York	LI - Ongoing Gentrification	0.418	0.4964	0.17310625	Low to Low	11
112200	BK85	East New York (Pennsylvania Ave)	4007	1747124.122	5931.017107	47	3	1400000US36047112200	Census Tract 1122, Kings County, New York	LI - Not Losing Low-Income Households	0.472	0.4812	0.5331582	Low to Low	8
112400	BK82	East New York	4008	1914338.597	5874.918288	47	3	1400000US36047112400	Census Tract 1124, Kings County, New York	LI - Not Losing Low-Income Households	0.426	0.5074	0.13843489	Low to Low	9
112600	BK85	East New York (Pennsylvania Ave)	4007	1813472.222	5460.421472	47	3	1400000US36047112600	Census Tract 1126, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.466	0.5815	0.81364822	Low to Low	0
112800	BK85	East New York (Pennsylvania Ave)	4007	1982798.096	5742.492823	47	3	1400000US36047112800	Census Tract 1128, Kings County, New York	LI - Not Losing Low-Income Households	0.444	0.6064	0.37819299	Low to Low	0
113000	BK85	East New York (Pennsylvania Ave)	4007	2086280.511	7587.901797	47	3	1400000US36047113000	Census Tract 1130, Kings County, New York	LI - Not Losing Low-Income Households			0.27364789	Low to Low	0
113200	BK85	East New York (Pennsylvania Ave)	4007	2109759.692	7996.134552	47	3	1400000US36047113200	Census Tract 1132, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.366	0.4235	0.42517319	Low to Low	2
113400	BK85	East New York (Pennsylvania Ave)	4007	1651198.272	5266.485037	47	3	1400000US36047113400	Census Tract 1134, Kings County, New York	LI - Ongoing Gentrification	0.483	0.5068	0.11586779	Low to Low	36
114201	BK83	Cypress Hills-City Line	4008	3222957.04	10545.18659	47	3	1400000US36047114201	Census Tract 1142.01, Kings County, New York	LI - Not Losing Low-Income Households	0.393	0.4969	0.42073571	Low to Low	12
114202	BK83	Cypress Hills-City Line	4008	1286732.413	5260.697776	47	3	1400000US36047114202	Census Tract 1142.02, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			-0.9077083	Low to Low	4
114400	BK85	East New York (Pennsylvania Ave)	4007	4617777.953	9940.299246	47	3	1400000US36047114400	Census Tract 1144, Kings County, New York	LI - At Risk of Gentrification	0.46	0.4903	0.58279121	Low to Low	84
114600	BK83	Cypress Hills-City Line	4008	1723239.684	5921.102177	47	3	1400000US36047114600	Census Tract 1146, Kings County, New York	LI - Not Losing Low-Income Households	0.416	0.4898	-0.1239542	Low to Low	24
115000	BK82	East New York	4008	1703334.326	5234.745011	47	3	1400000US36047115000	Census Tract 1150, Kings County, New York	LI - Not Losing Low-Income Households	0.417	0.4676	1.1486291	Low to Low	39
115200	BK82	East New York	4008	1788251.721	5358.559601	47	3	1400000US36047115200	Census Tract 1152, Kings County, New York	LI - Not Losing Low-Income Households			0.72370186	Low to Low	45
115600	BK85	East New York (Pennsylvania Ave)	4007	1720940.1	5354.677995	47	3	1400000US36047115600	Census Tract 1156, Kings County, New York	LI - At Risk of Gentrification	0.525	0.5269	0.52331168	Low to Low	33
115800	BK85	East New York (Pennsylvania Ave)	4007	1668175.775	5290.733504	47	3	1400000US36047115800	Census Tract 1158, Kings County, New York	LI - Ongoing Gentrification	0.392	0.5562	0.64670126	Low to Low	41
116000	BK82	East New York	4008	1629832.721	5240.898039	47	3	1400000US36047116000	Census Tract 1160, Kings County, New York	LI - At Risk of Gentrification	0.474	0.4792	-0.5417464	Low to Low	41
116200	BK82	East New York	4008	1543810.231	5134.956699	47	3	1400000US36047116200	Census Tract 1162, Kings County, New York	LI - Not Losing Low-Income Households	0.373	0.4475	0.46327893	Low to Low	39
116400	BK82	East New York	4008	1954432.435	5646.047737	47	3	1400000US36047116400	Census Tract 1164, Kings County, New York	LI - Not Losing Low-Income Households			0.78252862	Low to Low	49
116600	BK82	East New York	4008	1715753.207	5251.656864	47	3	1400000US36047116600	Census Tract 1166, Kings County, New York	LI - Ongoing Gentrification	0.434	0.4717	0.66451622	Low to Low	29
116800	BK82	East New York	4008	1549248.026	5447.520896	47	3	1400000US36047116800	Census Tract 1168, Kings County, New York	LI - Ongoing Gentrification			0.23245741	Low to Low	29
117000	BK82	East New York	4008	1653944.02	5331.20046	47	3	1400000US36047117000	Census Tract 1170, Kings County, New York	LI - Not Losing Low-Income Households	0.287	0.4966	-0.1449098	Low to Low	17
117201	BK83	Cypress Hills-City Line	4008	1390018.174	5149.182118	47	3	1400000US36047117201	Census Tract 1172.01, Kings County, New York	LI - Ongoing Displacement of Low-Income Households	0.448	0.4869	-0.3881077	Low to Low	25
117202	BK83	Cypress Hills-City Line	4008	1634622.217	5193.718509	47	3	1400000US36047117202	Census Tract 1172.02, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			0.1840403	Low to Low	54
117400	BK83	Cypress Hills-City Line	4008	2295155.614	6842.141947	47	3	1400000US36047117400	Census Tract 1174, Kings County, New York	LI - Not Losing Low-Income Households	0.423	0.4252	-0.0721289	Low to Low	49
117601	BK83	Cypress Hills-City Line	4008	1639988.144	6040.079355	47	3	1400000US36047117601	Census Tract 1176.01, Kings County, New York	LI - Not Losing Low-Income Households	0.456	0.4702	-0.1126302	Low to Low	35
117602	BK83	Cypress Hills-City Line	4008	1548007.981	5876.214934	47	3	1400000US36047117602	Census Tract 1176.02, Kings County, New York	LI - Not Losing Low-Income Households	0.429	0.4548	-0.4864149	Low to Low	37
117800	BK83	Cypress Hills-City Line	4008	1539547.703	5868.456474	47	3	1400000US36047117800	Census Tract 1178, Kings County, New York	LI - Not Losing Low-Income Households	0.385	0.4917	-0.6497352	Low to Low	13
118000	BK99	park-cemetery-etc-Brooklyn	4008	8100960.114	15889.66982	47	3	1400000US36047118000	Census Tract 1180, Kings County, New York	Missing Data			0	0	4
118201	BK83	Cypress Hills-City Line	4008	1360340.361	4880.982434	47	3	1400000US36047118201	Census Tract 1182.01, Kings County, New York	LI - Not Losing Low-Income Households	0.44	0.4734	0.43287543	Low to Low	22
118202	BK83	Cypress Hills-City Line	4008	1337869.627	4918.21285	47	3	1400000US36047118202	Census Tract 1182.02, Kings County, New York	LI - Ongoing Gentrification			-0.1752258	Low to Low	48
118400	BK83	Cypress Hills-City Line	4008	2204317.9	5966.706885	47	3	1400000US36047118400	Census Tract 1184, Kings County, New York	LI - Not Losing Low-Income Households	0.463	0.4675	-0.0512419	Low to Low	35
118600	BK83	Cypress Hills-City Line	4008	1415166.44	5801.67111	47	3	1400000US36047118600	Census Tract 1186, Kings County, New York	LI - Ongoing Displacement of Low-Income Households			-0.2017669	Low to Low	13
118800	BK83	Cypress Hills-City Line	4008	1877213.405	6036.017264	47	3	1400000US36047118800	Census Tract 1188, Kings County, New York	LI - Not Losing Low-Income Households	0.476	0.5353	-0.0011349	Low to Low	14
119000	BK83	Cypress Hills-City Line	4008	1493408.429	6353.711374	47	3	1400000US36047119000	Census Tract 1190, Kings County, New York	LI - Not Losing Low-Income Households	0.473	0.505	-0.1766729	Low to Low	25
119200	BK82	East New York	4008	2427894.541	6348.753689	47	3	1400000US36047119200	Census Tract 1192, Kings County, New York	LI - Ongoing Gentrification			0.74331723	Low to Low	46
119400	BK82	East New York	4008	1964536.042	5622.863766	47	3	1400000US36047119400	Census Tract 1194, Kings County, New York	LI - Ongoing Gentrification			0.67802882	Low to Low	31
119600	BK82	East New York	4008	3290524.898	7989.559667	47	3	1400000US36047119600	Census Tract 1196, Kings County, New York	LI - Ongoing Gentrification			-0.1169112	Low to Low	59
119800	BK82	East New York	4008	3527651.629	8959.334517	47	3	1400000US36047119800	Census Tract 1198, Kings County, New York	LI - Not Losing Low-Income Households	0.392	0.5586	0.09059275	Low to Low	41
120000	BK82	East New York	4008	1623803.909	6327.942919	47	3	1400000US36047120000	Census Tract 1200, Kings County, New York	LI - Not Losing Low-Income Households			-0.9127684	Low to Low	12
120200	BK83	Cypress Hills-City Line	4008	1641233.46	6114.455546	47	3	1400000US36047120200	Census Tract 1202, Kings County, New York	LI - Not Losing Low-Income Households	0.457	0.5218	-0.3686206	Low to Low	20
120800	BK82	East New York	4008	5187397.5	10815.55753	47	3	1400000US36047120800	Census Tract 1208, Kings County, New York	LI - Not Losing Low-Income Households	0.486	0.4971	-0.1388707	Low to Low	14
121000	BK82	East New York	4008	1733948.443	5665.443602	47	3	1400000US36047121000	Census Tract 1210, Kings County, New York	LI - At Risk of Gentrification	0.495	0.5717	0.88316217		25
121400	BK82	East New York	4008	1831282.518	5466.969991	47	3	1400000US36047121400	Census Tract 1214, Kings County, New York	LI - At Risk of Gentrification	0.471	0.58	0.9088839		51

CT2010	NTA	NTA Name	PUMA	shape_area	shape_leng	FIPS	Boro	Census Tract ID	CT Geographic Area Name	UDP Typology	Gini—2010	Gini—2019	SAIG Score	SAIG HOUSING Status	NUMPOINTS
122000	BK82	East New York	4008	11415816.56	20018.11664	47	3	1400000US36047122000	Census Tract 1220, Kings County, New York	LI - Not Losing Low-Income Households	0.386	0.5378	0.29605977	Low to Low	36
123700	BK75	Bedford	4003	3459462.49	7492.844596	47	3	1400000US36047123700	Census Tract 1237, Kings County, New York	LI - Not Losing Low-Income Households			2.29838495	Low to High	6
150200	BK40	Windsor Terrace	4012	3430496.811	11171.74988	47	3	1400000US36047150200	Census Tract 1502, Kings County, New York	MHI - Stable Exclusion	0.351	0.4178	1.15044813	High to High	0
152200	BK42	Flatbush	4015	4192019.562	9342.803909	47	3	1400000US36047152200	Census Tract 1522, Kings County, New York	MHI - Stable Exclusion	0.448	0.4494	0.44739725	High to High	0

Abbreviations

Table 12: In-Text Abbreviations

ACS	American Community Survey
AHS	American Housing Survey
ANHD	Association for Neighborhood and Housing Development
CD	Community District
Co-op	Cooperative Housing
COVID	Coronavirus Disease
CRA	Community Reinvestment Act
CSO	Combined Sewer Outfall/Overflow
CWA	Clean Water Act
DEC	NYS Department of Environmental Conservation
DEP	NYC Department of Environmental Protection
DRIE	Disability Rent Increase Exemption
EH	Extreme Heat
EPA	United States Environmental Protection Agency
EVRAP	Extensive Vegetative Roof Acreage Potential
FEMA	United States Federal Emergency Management Agency
FOIA	Freedom of Information Act
FOIL	Freedom of Information Law
GIS	Geographic Information Systems Software
GISc	Geographic Information Systems/Science
H&H	Hydrological and Hydraulic
HVAC	Heating, Ventilation, and Air Conditioning
HVI	Heat Vulnerability Index
LEK	Local Ecological Knowledge
LI	Low Income
LIHTC	Low Income Housing Tax Credits
LLC	Limited Liability Corporation
LTCP	Long-Term Control Plan
LULU	Locally-Unwanted Land Uses
MHI	Moderate to High Income
MRSA	Methicillin-Resistant *Staphylococcus Aureus*
MTNYC	MillionTreesNYC
NOAA	National Oceanic and Atmospheric Administration
NTA	Neighborhood Tabulation Area
NY/NYS	New York State
NYC	New York City
NYCHA	New York City Housing Authority
P_3	Public-Private Partnership
PUMA	Public Use Microarea
ROW	Right-of-Way

RWI	Recreational Water Illnesses
SAIG	Small Area Index of Gentrification
SCRIE	Senior Citizen Rent Increase Exemption/
SPDES	State Pollution Discharge Elimination System
SSI	Social Security Income
SVI	Social Vulnerability Index
SWR	Storm Water Runoff
UDP	Urban Displacement Project
UHIE	Urban Heat Island Effects
VDL	Vacant and Derelict Land
VHI	Very High Income
Vs.	Versus
WWTP	Wastewater Treatment Plant
Yuppie	Young Upwardly-mobile/Urban Professional

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