URBAN GREEN SPACES & GREEN GENTRIFICATION IN BROOKLYN, NYC

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GSAPP Fall 2023
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BROOKLYN

Brooklyn, one of New York City's five boroughs, is a dynamic and culturally rich urban landscape known for its diversity and historical significance. Nestled on the western end of Long Island, Brooklyn's neighborhoods showcase a mosaic of cultures, reflecting the borough's status as a melting pot.

Spanning 71 square miles, Brooklyn is **the second-largest** borough in terms of land area within New York City. Despite its vast expanse, Brooklyn stands out as the **most populous** borough, boasting a diverse community of 2,736,074 residents as of 2020.

Brooklyn stands as a prominent **global city**, celebrated for its cultural diversity, economic significance, and dynamic urban landscape. In the 21st century, the borough has intentionally embraced a "green" identity, marked by the proliferation of green spaces and environmental initiatives. The emergence of numerous parks and eco-friendly projects has transformed Brooklyn into a **green city**, reflecting a commitment to sustainability.

However, this pursuit of environmental consciousness has contributed to a complex phenomenon—gentrification. As environmental resources and green amenities flourish in certain areas of Brooklyn, these spaces become increasingly attractive to wealthier, predominantly white residents.

"The increased "greening" occurring in Brooklyn is leading to a jump in the city's gentrification rate"

Kenneth A. Gould & Tammy L. Lewis

BACKGROUND

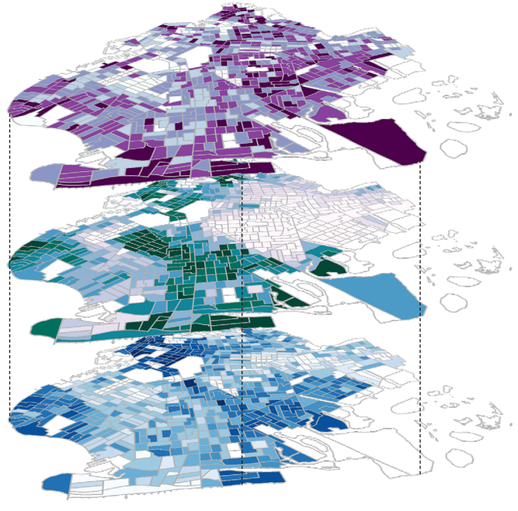
Urban areas are increasingly recognizing the health benefits associated with access to green spaces. However, urban landscapes are undergoing trans-formative changes with the emergence of green gentrification, a phenomenon driven by the development and improvement of green open spaces. As noted by Checker (2011), the expansion of green spaces, often considered a positive development for urban sustainability, may paradoxically lead to unintended consequences or challenges.

Cities today grapple with significant economic and ecological disparities, presenting citizens with substantial challenges (Checker, 2011). These concerns are not isolated, Anguelovski et al.(2018) argued that while new green amenities development and ecological enhancement bring new economic development and neighborhood transformation, it also seems to trigger the displacement of marginalized residents and environmental injustice.

To be more specific, initiatives aimed at enhancing access, although beneficial to citizens, have the potential to introduce new challenges, such as increased costs and alterations to the supportive social structure of neighborhoods (Cole et al., 2017). This concern is particularly pertinent for vulnerable residents disproportionately affected by environmental hazards in Brooklyn.

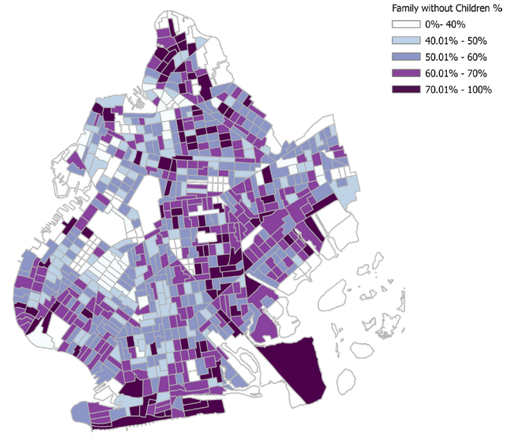
While the general concept of green gentrification has been acknowledged in broader urban studies, a focused investigation into the specific dynamics within Brooklyn is lacking. Identifying this gap in the literature emphasizes the need for a localized study that considers the unique socio-economic and environmental conditions of the borough.

Building on this background, our study strategically selects three pivotal demographic variables—**Family Structure**, **Race**, and **Income**. These variables offer a lens into the intricate interplay between green gentrification and socio-economic dynamics in Brooklyn.



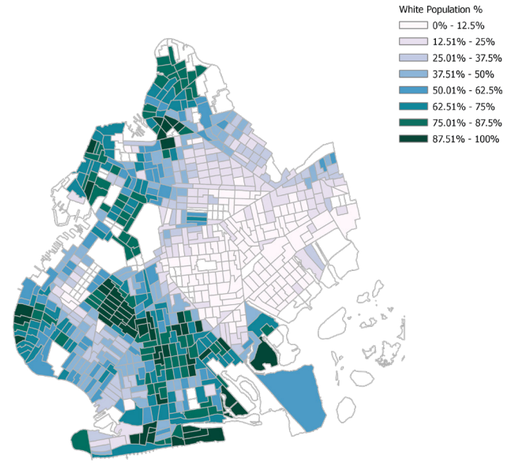
Family Structure

Brooklyn exhibits a diverse range of household compositions, including a notable presence of families without children. This demographic reflects the lifestyle choices and housing preferences of individuals and couples who may be particularly affected by changes in the urban landscape driven by green gentrification. Understanding the dynamics of this demographic group provides insights into how environmental shifts impact housing and community structures for those without children.



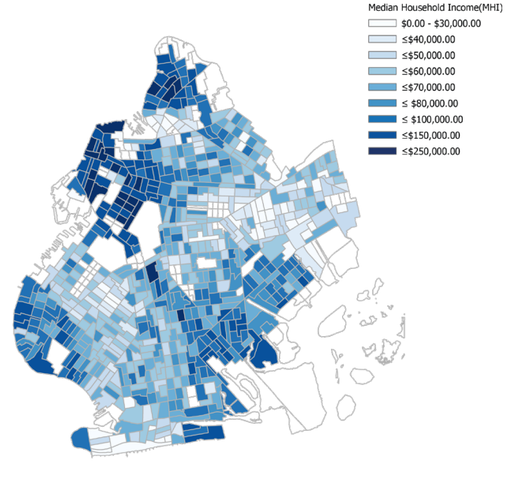
Race

Brooklyn is renowned for its cultural and ethnic diversity, encompassing a mosaic of racial groups. The borough's racial composition varies across neighborhoods, contributing to the vibrant tapestry of its communities. Analyzing the racial demographics in the context of green gentrification helps uncover how different racial groups experience and shape the changes brought about by environmental initiatives, offering crucial insights into potential disparities and community-specific challenges.



Income

Income levels in Brooklyn vary widely, reflecting the socio-economic diversity of its residents. The borough includes both affluent neighborhoods and areas with lower-income populations. Examining income as a demographic variable is essential for understanding the economic disparities associated with green gentrification. This analysis provides insights into how financial considerations influence individuals' ability to navigate and adapt to the evolving urban landscape, highlighting potential equity concerns in the process of urban transformation.



RESEARCH QUESTIONS

The research objectives are to understand how the creation or enhancement of green spaces influences housing markets and socio-economic variables change, potentially leading to gentrification.

How is the accessibility to UGS in Brooklyn?

How is the UGS spatially distributed?

What's the accessible UGS size for each census tract?

What is the relationship between UGS accessibility and demographics

Does the UGS disproportionately benefit wealthier and predominantly white communities?

How does the property value change in Brooklyn?

How is UGS affecting property prices, the primary indicator for resident wealth?

Is UGS accessibility related to green gentrification?

Where does green gentrification happen the most in Brooklyn?

KEY TERMS

Urban Green Spaces — UGS are open-space areas reserved for parks and other "green spaces", which can improve health and environmental outcomes for residents by providing green areas for recreation and relaxation while supporting ecosystem services. For the study, UGS is defined as NYC Park Properties data.

Accessibility — "Accessibility" is explicitly defined as the proximity within a 10-minute walking distance from designated green spaces. The 10-minute threshold is chosen based on the general willingness of individuals to walk for approximately this duration to access parks.

Gentrification — Gentrification is the transformation of areas historically inhabited by marginalized groups into areas used by the dominant class, it usually is along with the economic shifts. Therefore, the study will be looking at changes in demographic data such as race, income & family with children.

Green Gentrification — Green gentrification is an intersection of these two concepts, and links creation of environmental amenities with the inequitable access to spaces and "green" benefits.

DATASETS

Spatial Datasets

NYC Park Properties Data: NYC Department of Parks and Recreation (DPR)

Park locations, size, types, and purposes will be obtained from NYC Parks. Historical data on park development and changes will be gathered to understand the evolution of green spaces.

NYC Census Tracts Boundary Shape-files: 2020 TIGER/Line Shape-files

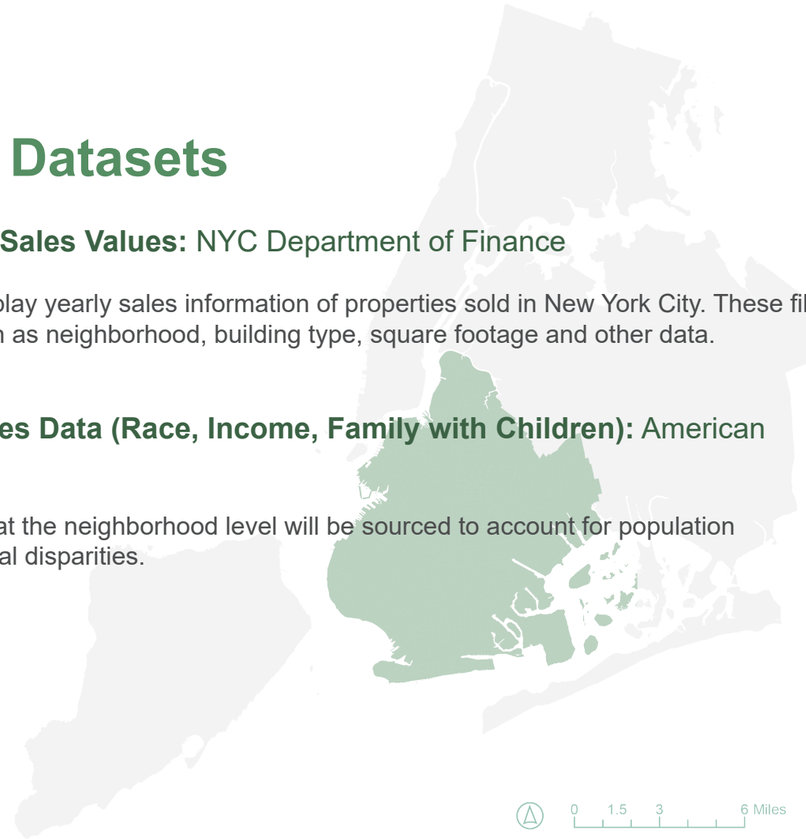
Non-Spatial Datasets

Annualized Property Sales Values: NYC Department of Finance

Annualized Sales files display yearly sales information of properties sold in New York City. These files also have information such as neighborhood, building type, square footage and other data.

Demographic Variables Data (Race, Income, Family with Children): American Community Survey

Demographic information at the neighborhood level will be sourced to account for population characteristics and potential disparities.



METHODOLOGY

The research will employ Geographic Information System (GIS) analysis to spatially assess the identified relationships. It begins with meticulous data collection and cleaning procedures.

Spatial and statistical analyses are used to visualize and interpret park accessibility, demographic variables change, and property values change.

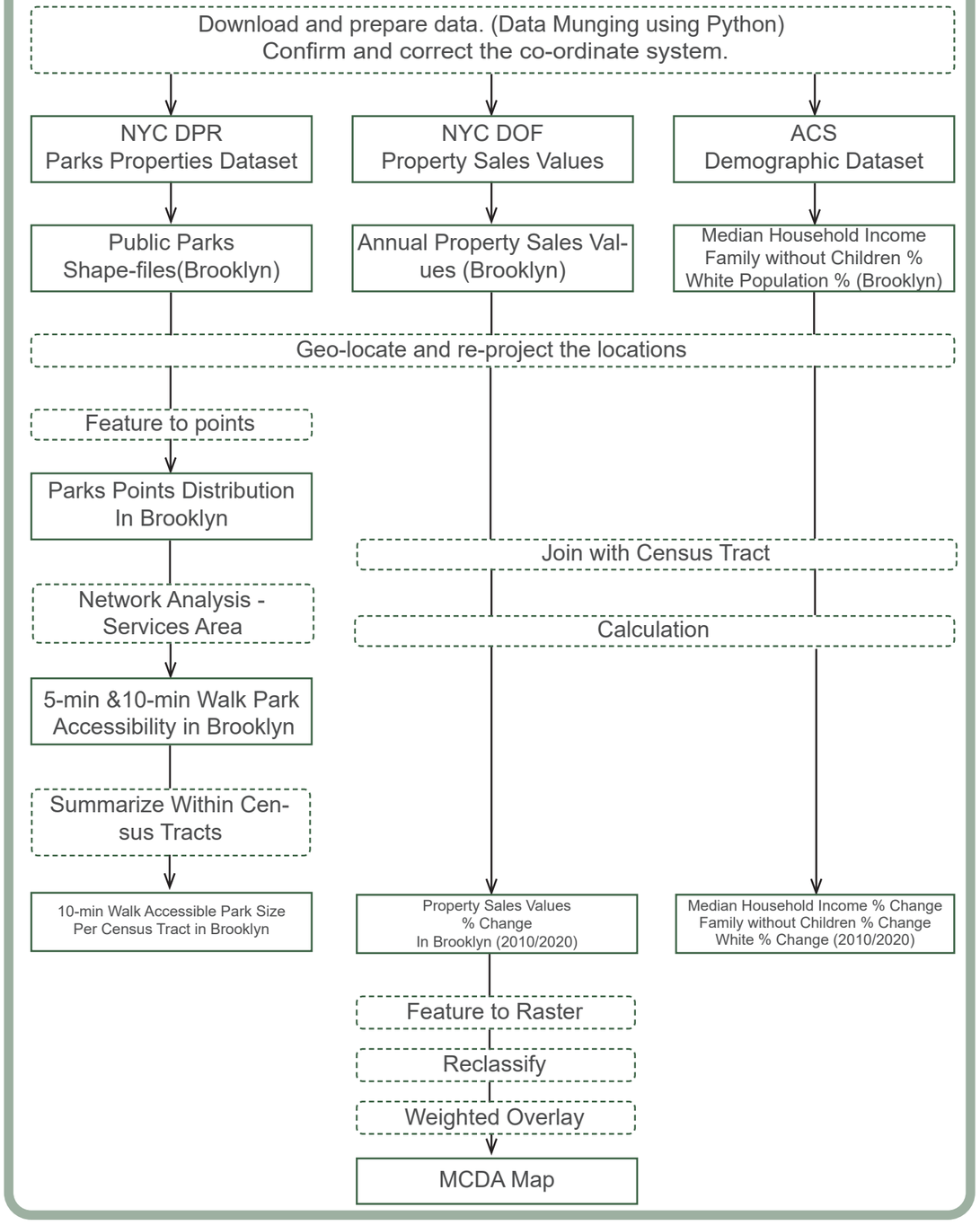
Multi-Criteria Decision Analysis (MCDA) serves as a pivotal analytical tool, enabling a thorough evaluation of factors influencing green gentrification.

The results are presented through clear visualizations, offering insights into the complex interplay between green spaces, urban development, and demographic shifts in Brooklyn. This methodological approach ensures a robust exploration of the research questions, providing a comprehensive understanding of the dynamics shaping the borough's evolving landscape.

Note:

The study will mainly examine census tracts as the spatial unit, and all the data will be gathered and analyzed based on the census tracts scale.

DIAGRAM



LIMITATIONS

It's crucial to acknowledge certain limitations in the study. When mapping accessible green spaces, the join between service area polygons and census tracts may not precisely reflect equal accessibility across entire tracts.

Furthermore, the assessment of property value relies on commercial and residential properties, presenting a limitation in capturing the full spectrum of housing values.

Lastly, the focus solely within Brooklyn's boundaries may overlook potential influences from green spaces just outside the borough but still within 10-minute walking distance.

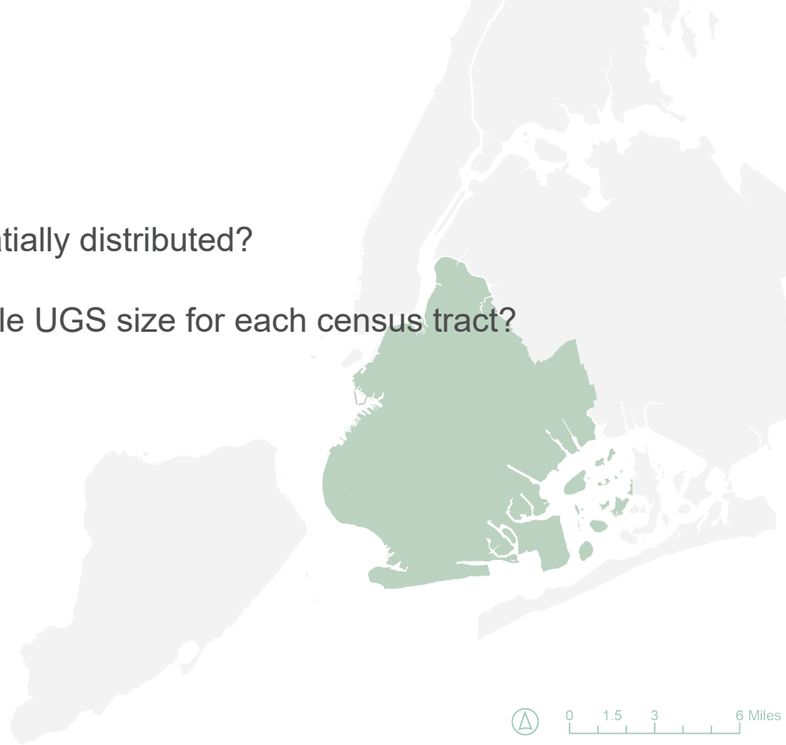
FINDINGS

Question 1

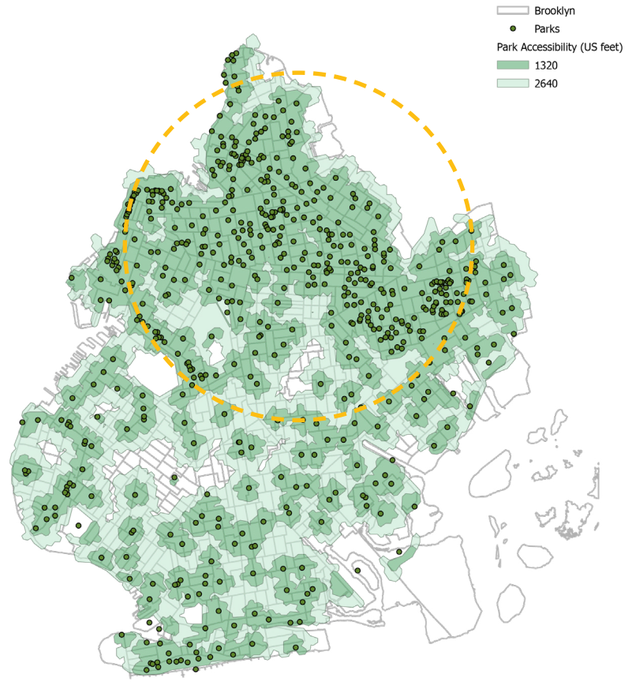
How is the accessibility to UGS in Brooklyn?

How is the UGS spatially distributed?

What's the accessible UGS size for each census tract?

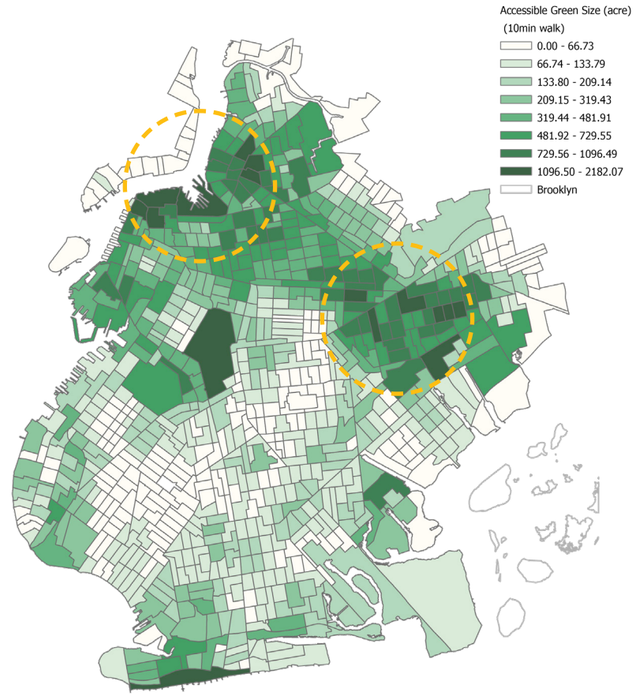


The map data visually represents the spatial arrangement of parks across Brooklyn. Following this, a service area network analysis was executed to visualize accessibility within 5-minute (1320 ft) and 10-minute (2640 ft) walking distances from each park. It is noteworthy that the majority of Brooklyn falls within the service area coverage for both 5-minute and 10-minute walking distances, indicating widespread accessibility. The northern area stands out with a denser distribution of parks compared to other regions in Brooklyn.



Park Distribution & Accessibility

Employing the "summarize within" function, the cumulative size of accessible parks within a 10-minute walking distance was calculated for each census tract. The results indicate a notable disparity in park accessibility between the northern and southern regions of Brooklyn, with the northern area demonstrating superior access to parks compared to the southern counterpart.



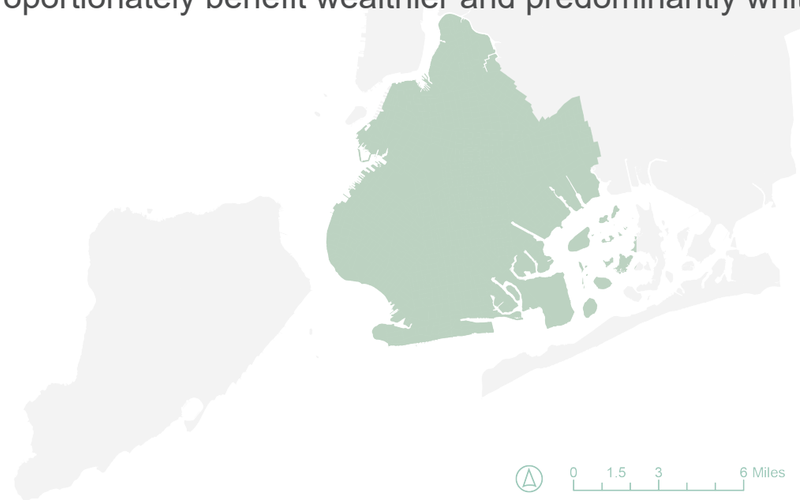
Park Accessibility (10min Walk)

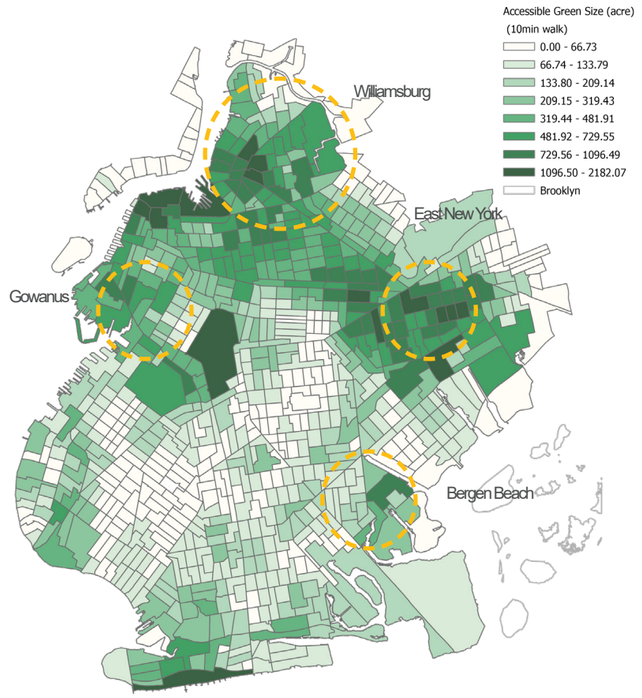
FINDINGS

Question 2

What is the relationship between UGS accessibility and demographics?

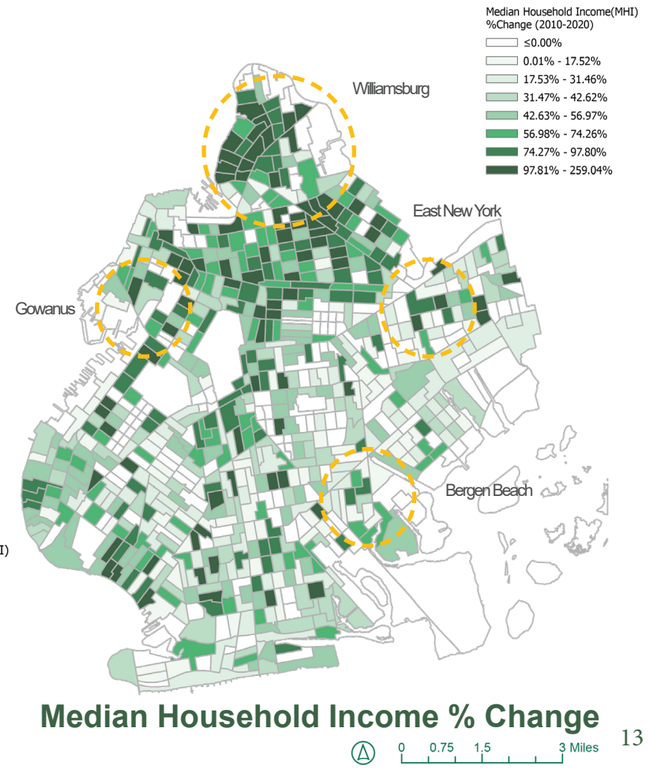
Does the UGS disproportionately benefit wealthier and predominantly white communities?



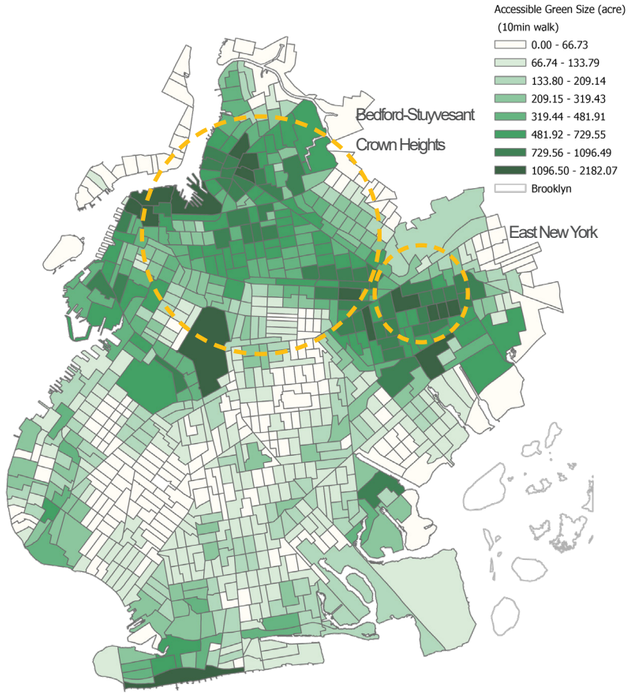


Accessibility

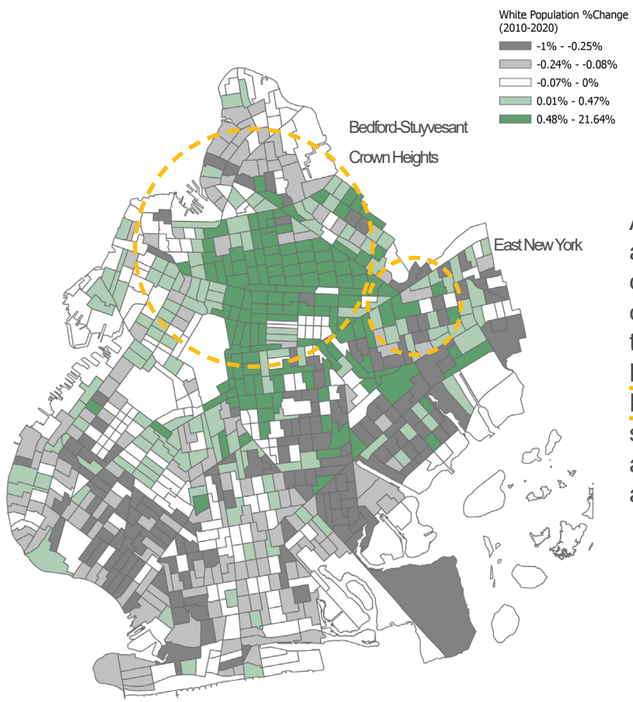
There are three prominent overlap hot spots become apparent on the map. These areas, namely Williamsburg, East New York, Gowanus, and Bergen Beach, exhibit a convergence of increased accessibility and notable changes in Median Household Income. This visual correlation suggests a potential connection between enhanced park accessibility and economic shifts in these specific neighborhoods. Further analysis and exploration of these overlap hot spots could yield valuable insights into the dynamics of green gentrification and its socio-economic implications in Brooklyn.



Median Household Income % Change



Accessibility

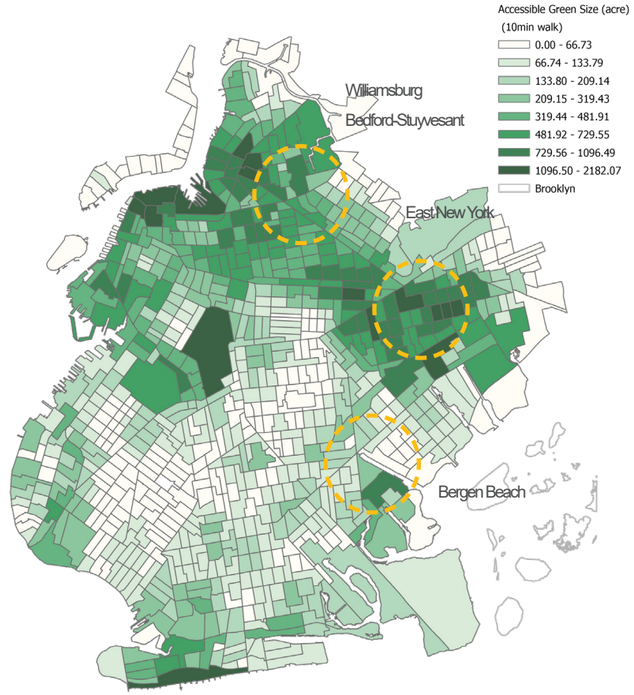


White % Change

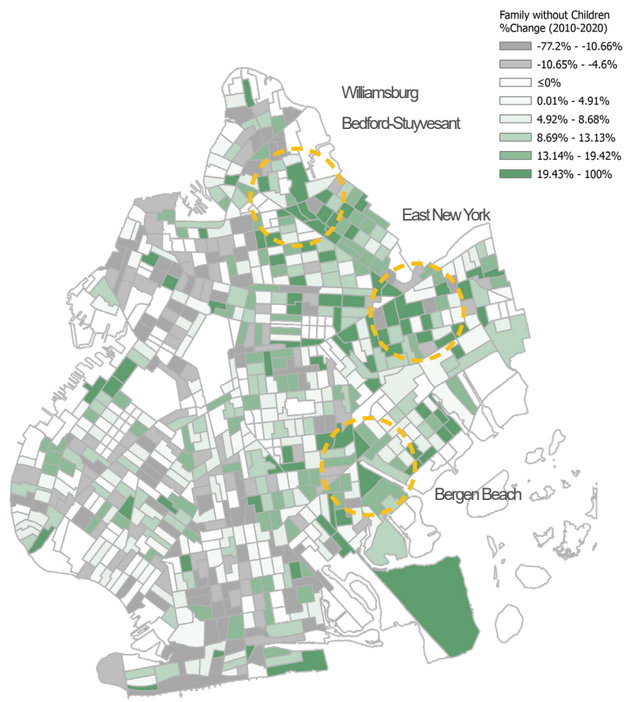
A clear overlap is evident when examining accessibility alongside the percentage change in the white population. This correlation is particularly pronounced in the northern neighborhoods, notably in Bedford-Stuyvesant, Crown Heights, and East New York. In these areas, there is a simultaneous rise in the white population alongside noticeable enhancements in park accessibility.

0 0.75 1.5 3 Miles

The visual correlation between the map representing families without children and accessibility is not as robust as observed in the previous two comparisons. However, notable associations still exist in certain areas, including Williamsburg,Bedford-Stuyvesant, East New York, and Bergen Beach. While the connection may be less pronounced, the presence of overlap suggests a potential link between park accessibility and the demographic variable of families without children in these specific neighborhoods. Further exploration in these areas could provide a nuanced understanding of the complex dynamics at play in the context of green gentrification in Brooklyn.



Accessibility



Family without Children % Change

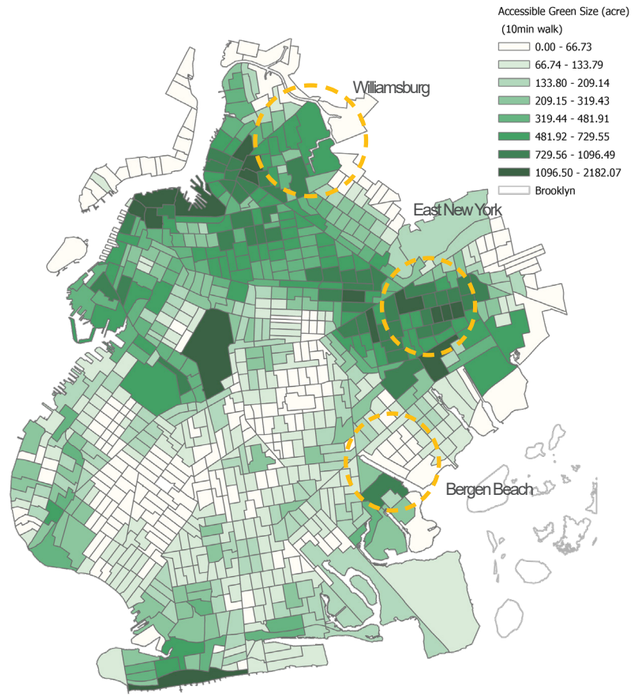
0 0.75 1.5 3 Miles

FINDINGS

Question 3

How does the property value change in Brooklyn?

How is UGS affecting property prices, the primary indicator for resident wealth?



Accessibility

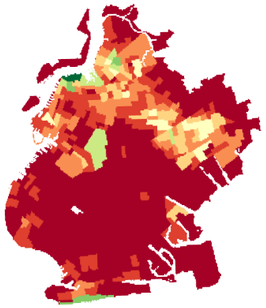
Three distinct hot spots with elevated accessibility exhibit a visual overlap with substantial changes in property values. These areas highlight a correlation between improved park accessibility and notable shifts in property values. This connection underscores the potential influence of green spaces on the real estate market and suggests that areas with enhanced accessibility may experience significant changes in property values.

Median Property Values % Change

Question 4

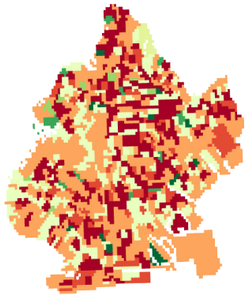
Is UGS accessibility related to green gentrification?

Where does green gentrification happen the most in Brooklyn?



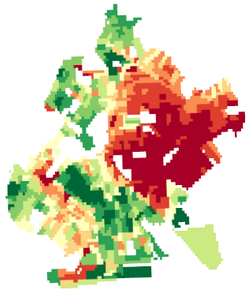
Accessibility

30%



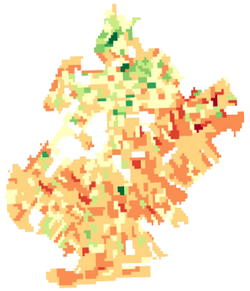
Housing

25%



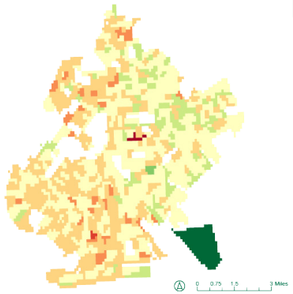
Race

20%



Income

20%

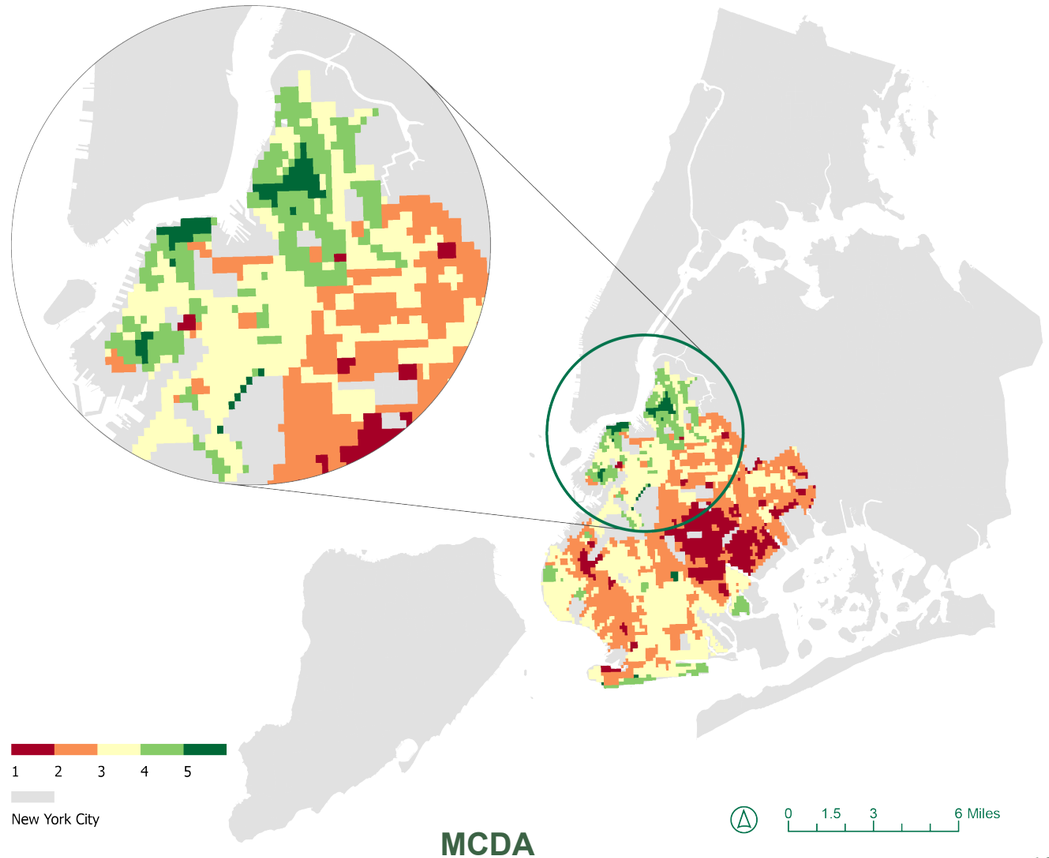


Family Type

5%

The Multi-Criteria Decision Analysis (MCDA) was employed to illustrate patterns of green gentrification. Utilizing rasters representing indicators such as Park accessibility, percent change in the white population, median household income, families without children, and property value from 2010 to 2020, the analysis aimed to delineate areas undergoing green gentrification.

The map showcases census tracts with the highest index values, effectively pinpointing locations where green gentrification is most prevalent. The heightened green index in these areas signifies a convergence of factors, emphasizing the nuanced interplay between improved park accessibility and socio-economic changes within Brooklyn. This comprehensive analysis contributes to a clearer understanding of the spatial patterns and intensity of green gentrification across the borough.



MCDA

CONCLUSION

In conclusion, this study has provided a comprehensive examination of green gentrification dynamics in Brooklyn. It was discerned significant patterns and hot spots indicative of the interplay between improved park accessibility, socio-economic shifts, and demographic changes. The visual overlaps in certain neighborhoods, such as Williamsburg, East New York, and Bergen Beach, underscore the complex relationship between green spaces, housing values, and demographic transformations.

The findings suggest that enhanced park accessibility is associated with changes in property values and demographic compositions, particularly in northern neighborhoods.

This study contributes valuable insights for urban planners, policymakers, and researchers, emphasizing the need for a holistic approach to sustainable urban development that considers the interconnected nature of green spaces, socio-economic factors, and demographic shifts. As Brooklyn continues to evolve, understanding the dynamics of green gentrification is essential for fostering equitable and resilient urban environments.

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December 2023