MAPPING NEW YORK CITY PLAYGROUNDS

2023

BENEDETTA VON PALOMBINI

Geographic Information Systems, 2023

TABLE OF CONTENT

INTRODUCTION

Play is one of the most important things children can do.

This project draws inspiration from an interest in child psychology, and the potential of inclusive design s for children with a spectrum of abilities. When designing playground features, it's essential to consider the diverse needs of all children.

Free and Fearless Fun

"Free and fearless fun" refers to the pleasure children experience in a built environment where they play without fear, freely expressing their abilities without facing judgment, exclusion, or discrimination. An occupational therapist illustrates this with a scene: "On playgrounds, children overlook each other's disabilities or the reasons behind a wheelchair. This environment encourages them to ask questions, educate themselves, and engage in play. Inclusive playgrounds narrow the gap in how children interact and participate with one another" (London, 2022, p.6).

Hence, as children learn to interact, they grow accustomed to the idea that enjoyment can be shared freely, even though they may look, act, or play differently from one another. When play takes root in a community, it brings outsized benefits for children, from their well-being to safety and beyond. Whether through physical or social interactions, all children deserve to create fun memories and explore the dimensions of play that benefit the mind and body.

The aim of this research is to explore the playground landscape in New York and to assess the current infrastructure available for children with different abilities. The goal is to gather information that can help policymakers and planners identify where enhancements are needed. This study seeks to provide a clearer understanding of the current state of facilities for children in need, emphasizing the importance of catering to a diverse range of needs in public spaces.

Image: Giuliani, M.(2018).Chelsea Waterside Playground [Photograph]. Retrieved from https://hudsonriverpark.org/locations/chelsea-waterside/

Research Questions

To what extent are New York City public playgrounds inclusive for children with disabilities in areas in need?

The research wants to methodologically explore the current playground landscape in New York City and assess the availability of inclusive playgrounds in relation to areas in need by mapping the following key questions–

1. Which areas in NYC have the highest density of children?
2. Which areas in NYC have the highest percentage of children with disabilities?
3. Which areas in NYC have the highest percentage of low-income families?
4. Where are focus areas in NYC located based on density of children, percentage of low-income families and percentage of children living with disabilities?
5. Where are playgrounds in NYC located and which of those are inclusive?
6. What is the travel time to reach inclusive areas from the specified focus areas?
7. What types of playgrounds, in terms of their accessibility features are situated within walking distance of the focus areas and where are other facilities for children with disabilities located in relation to the focus areas?
8. How accessible is the area around proximate facilities in terms of curb- and sidewalk conditions?

Operationalizing Terms

INCLUSIVE DESIGN

Developmentally appropriate space for all children. It takes away barriers to exclusion, both physical and social, and provides a “sensory rich” experience.

NON-INCLUSIVE DESIGN

A space that does not account for social collaboration or sensory rich activities.

DEVELOPMENTAL DISABILITIES

A group of conditions due to an impairment in physical, learning, language, or behavior areas that begin during the developmental period, may impact day-to-day functioning, and usually last throughout a person’s lifetime.

Accessible Playground Definition

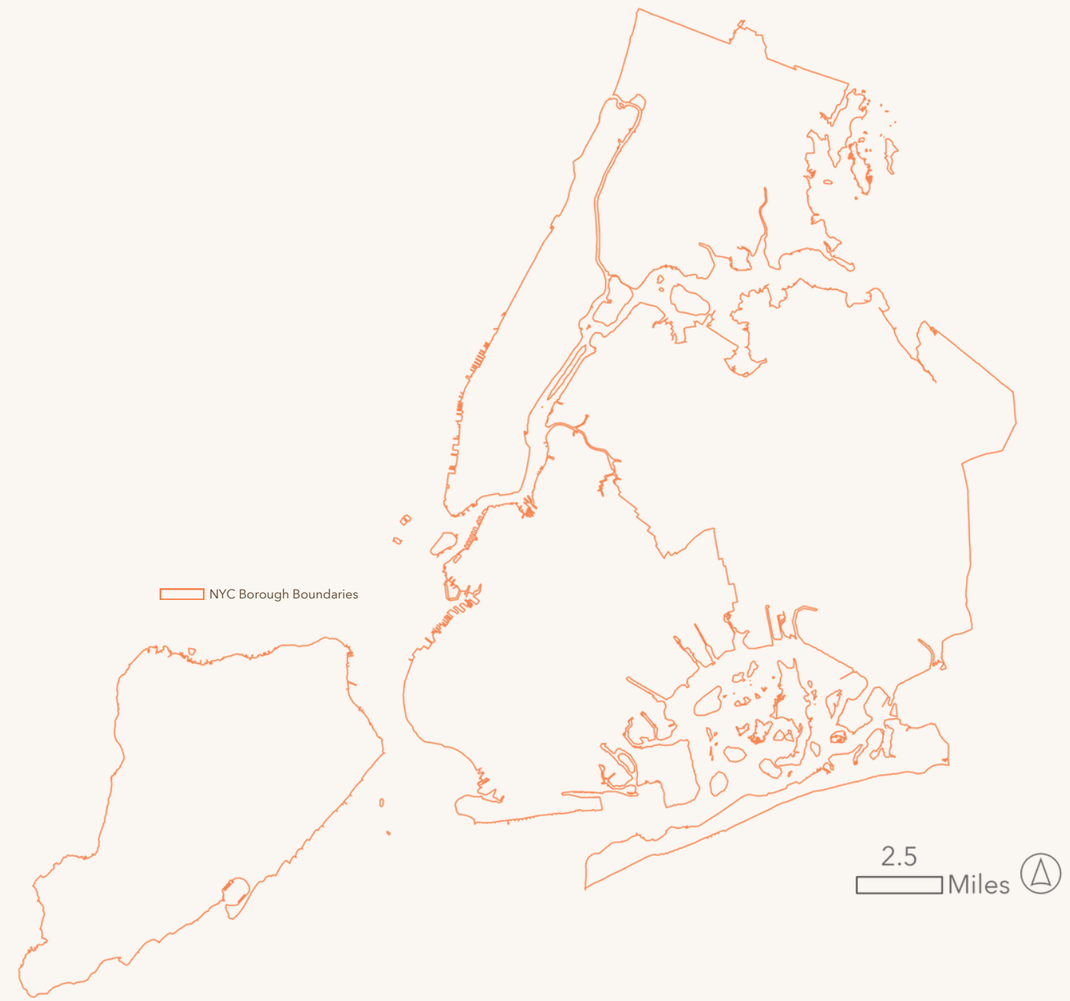
NYC Department of Parks & Recreation, 2023

Level 1: Playgrounds for All Children (Inclusive)
Designed to provide recreational opportunities for children of all ages and abilities. Playground features include ramped play equipment, ground level play features, accessible swings, wheelchair-accessible tables, and drinking fountains. Some playgrounds also have adjustable basketball backboards that can be raised and lowered for athletes of all abilities.

Level 2: Ramped Play Equipment and/or Universally Accessible Swings
Include accessible swings and/or ramped play equipment, transfer platforms, and ground level play features. These playgrounds can also include accessible amenities, which can include drinking fountains and comfort stations.

Level 3: Universally Accessible Swings
allow unimpeded access to the swing(s) and provide at least one universally accessible swing. May not have ramped play equipment.

Level 4: Transfer Platforms and Ground Level Play Features
Transfer platforms allow children to transfer out of their wheelchairs onto a play surface to use equipment such as slides and bridges.



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Assumptions and Limitations

The New York City Department of Parks and Recreation's definition of Accessible Playgrounds forms the basis for this research on Inclusive Playgrounds. These definitions base themselves on the Americans with Disabilities Act (ADA). A playground that meets all of the Americans with Disability Act is the least one can do according to the law, however research argues that ADA is insufficient to ensure that all kids can play. This research focuses on Level 1 playgrounds, as they come closest to what counts as Inclusive Playground as defined before.

As mentioned before, disabilities include a wide range of conditions that lead to different forms of impairment. The scope of this research is restricted to disabilities aggregated by a dataset on Disability characteristics by the U.S. Census Bureau. The author acknowledges that disabilities can manifest in various forms not represented in this research.

This research employs a dataset to analyze the prevalence of low-income families, specifically focusing on those whose income falls below the poverty line within the preceding 12 months. However, this temporal limitation presents a potential distortion in the data, as 12 months may be needed to capture longer-term income trends adequately. Consequently, data from additional years might have yielded variations in the geographical distribution of these low-income families.

Readers should cautiously interpret Curb and Sidewalk Complaints data, as this data relies on reported incidents. By nature, these reportings lead to bias, as the likelihood of a report varies depending on resident and neighborhood characteristics.

Another critical aspect of this research involves addressing the inherent incompleteness of the datasets utilized. Therefore the interpretation of the results should be considered indicative rather than definitive. This caution extends to the data concerning curb and sidewalk complaints, which is contingent on the reporting behavior of residents. The propensity to report such issues varies across different communities, often linked to their socio-economic status. Also, the dataset on play areas dates back to 2019. The researcher anticipates an increase in the number of inclusive playgrounds compared to the data from 2019, given the city's mission to make all playgrounds accessible [Statement of the Department of Parks and Recreation].

The study confines its geographical scope to four areas, each in the Bronx and Brooklyn. These areas have been delineated based on raster analysis, resulting in artificially constructed borders. Acknowledging that these borders are not definitive demarcations separating the focal areas from their surroundings is essential. Instead, they should be considered integral parts of a larger urban fabric. This perspective is crucial for policymakers and urban planners who aim to understand and improve the infrastructure for children of all abilities within these neighborhoods. The study underlines the need for a broader neighborhood examination in order to address urban planning challenges.

METHODOLOGY

DATA

SPATIAL DATA

- **US Census TIGER/Line Shapefile**
- **NYC Open Data**
  - Borough Boundaries
  - Children's Play Areas
  - Curb and Sidewalk Complaints
  - Land Use Map 2023
  - Parks Properties
  - NYC Street Centerline (CSCL)
- **Capital Planning Explorer**
  - Preschools for Children with Disabilities
  - Public and Private Special Education Schools

NON-SPATIAL DATA

- **US Census Bureau**
  - B17006: Ratio of income to poverty level in the past 12 months by nativity of Children under 18 years in families and subfamilies by living arrangements and nativity of parents
  - S1810: Disability Characteristics

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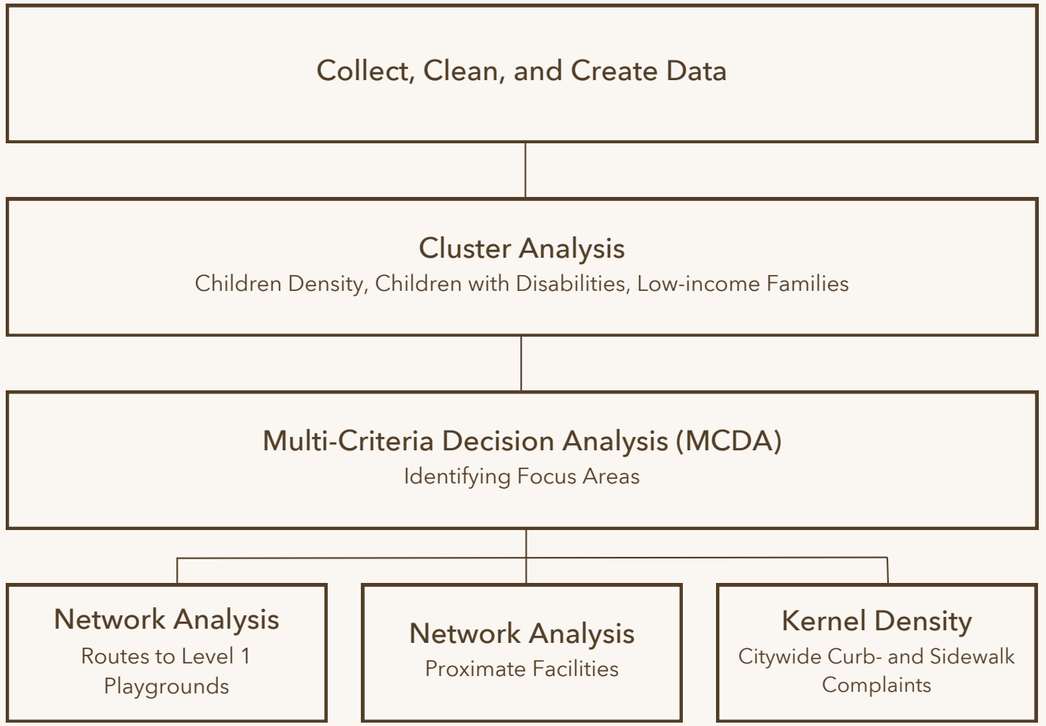
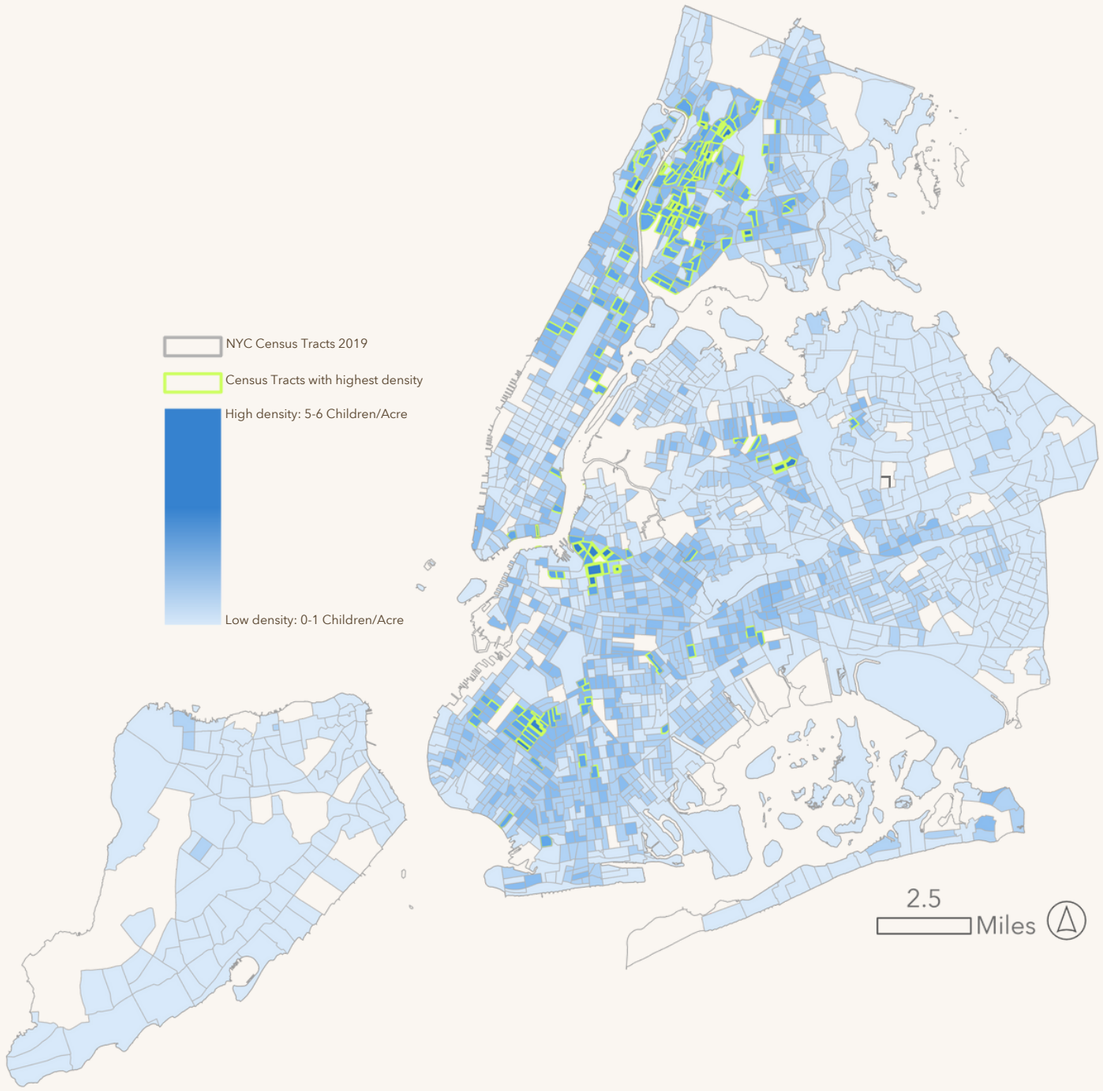
PROCESS



ANALYSIS

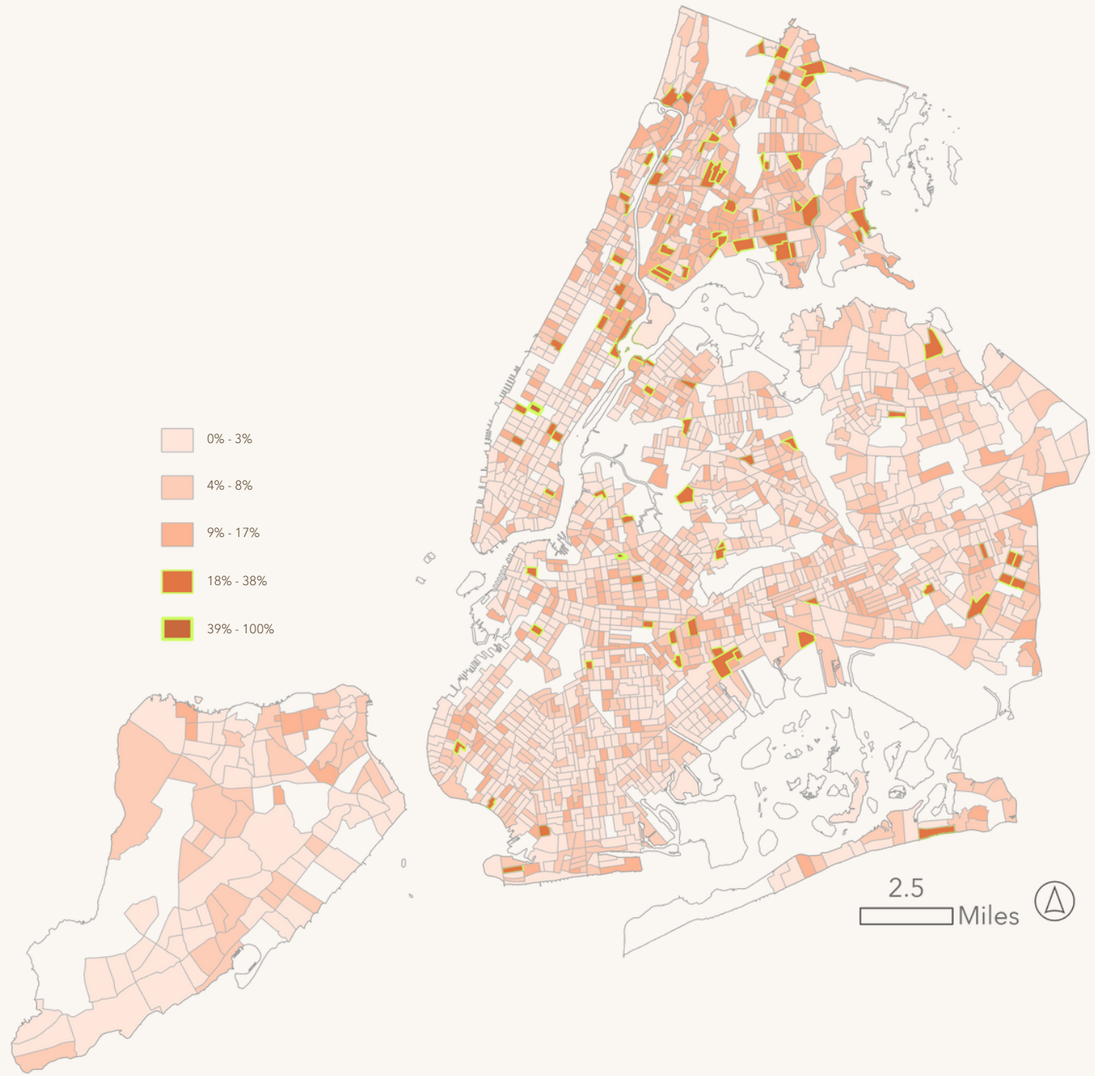
IDENTIFYING FOCUS AREAS

Which areas in New York City have the greatest concentration of children aged 5 to17 years?



Every child has the right to play, and playgrounds should be situated near where their users reside. Reflecting this, areas with a higher density of children should have more playgrounds, ensuring every child can engage in play.

Which areas in New York City have the highest percentage of children aged 5 to17 years with a disability?



Inclusive playgrounds serve children of all abilities, but inclusive design is especially essential for children with disabilities. By locating where children with disabilities are, policymakers can ensure that playgrounds adapted to these children's needs are built in respective locations.

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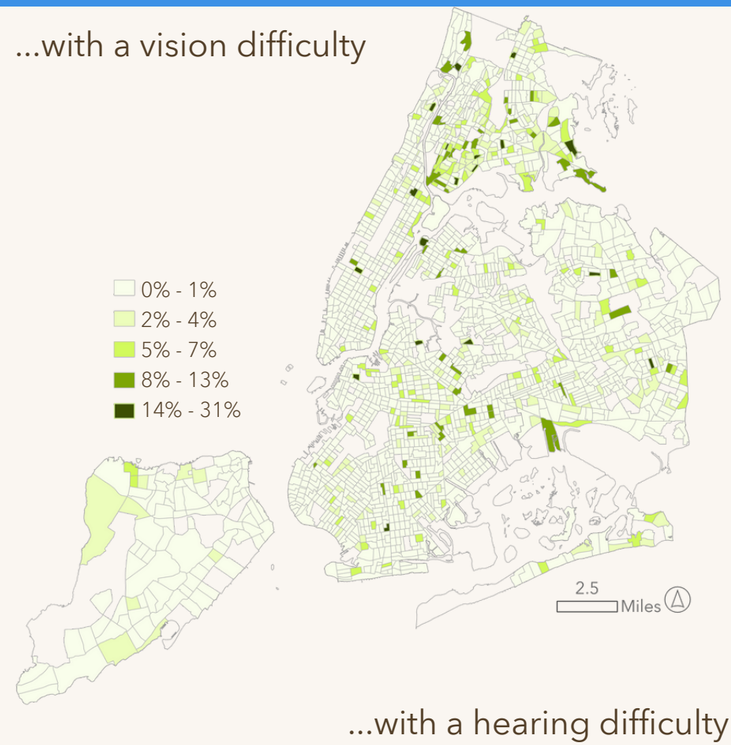
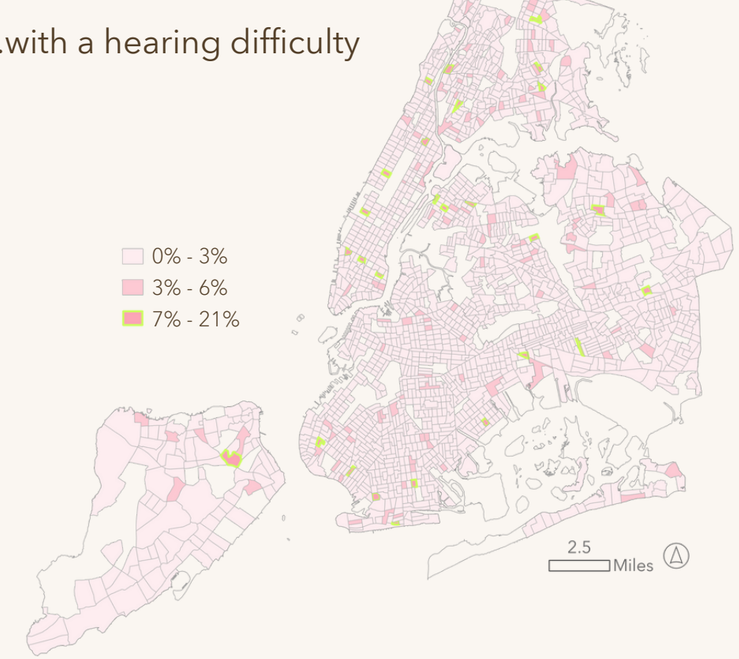
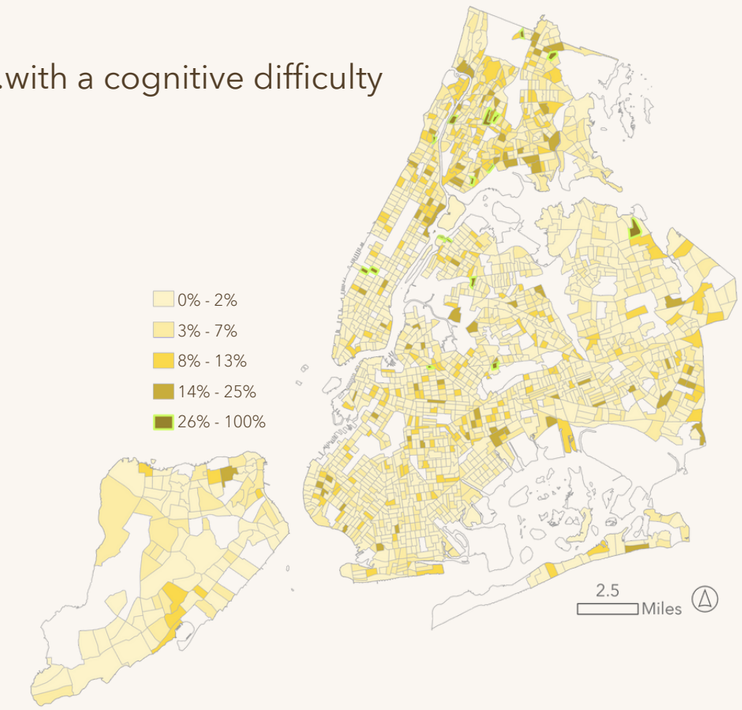
...with a vision difficulty



...with a hearing difficulty



...with a cognitive difficulty



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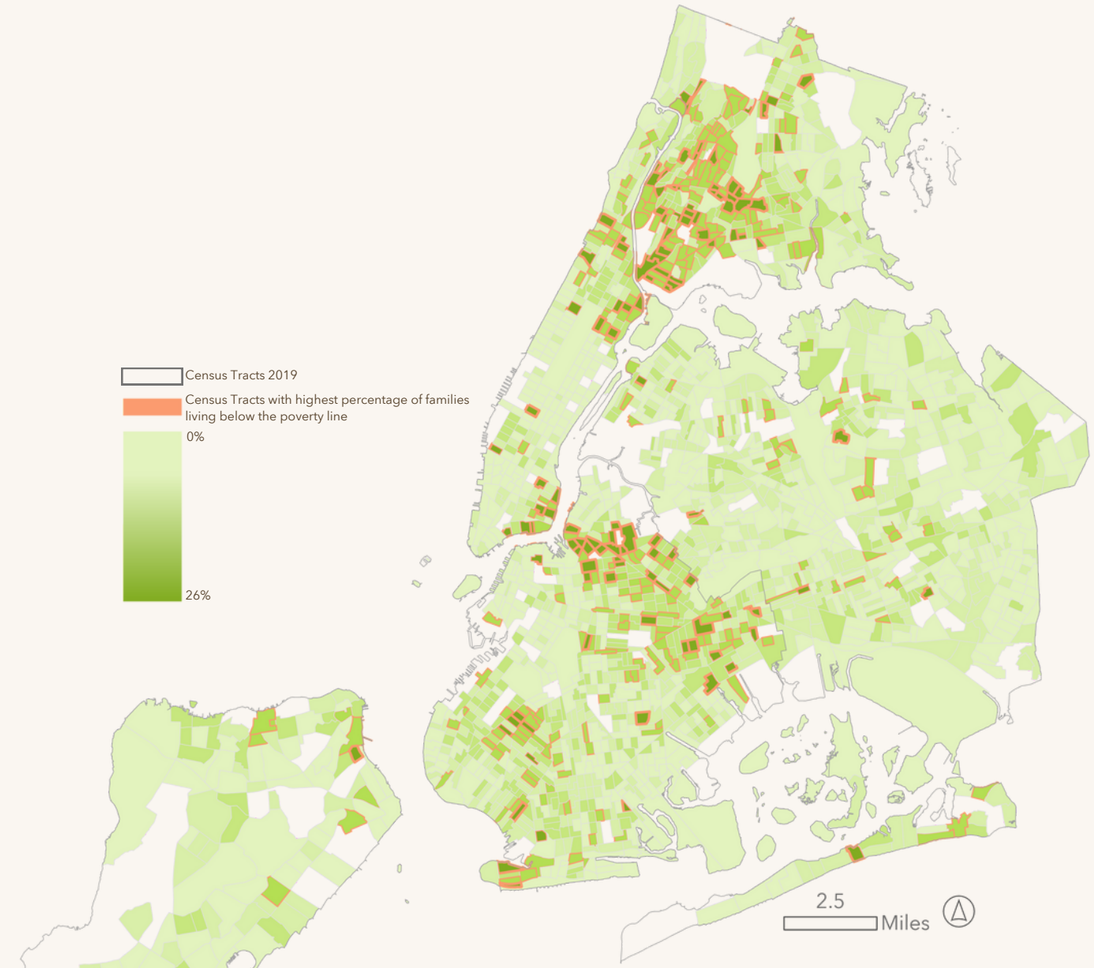
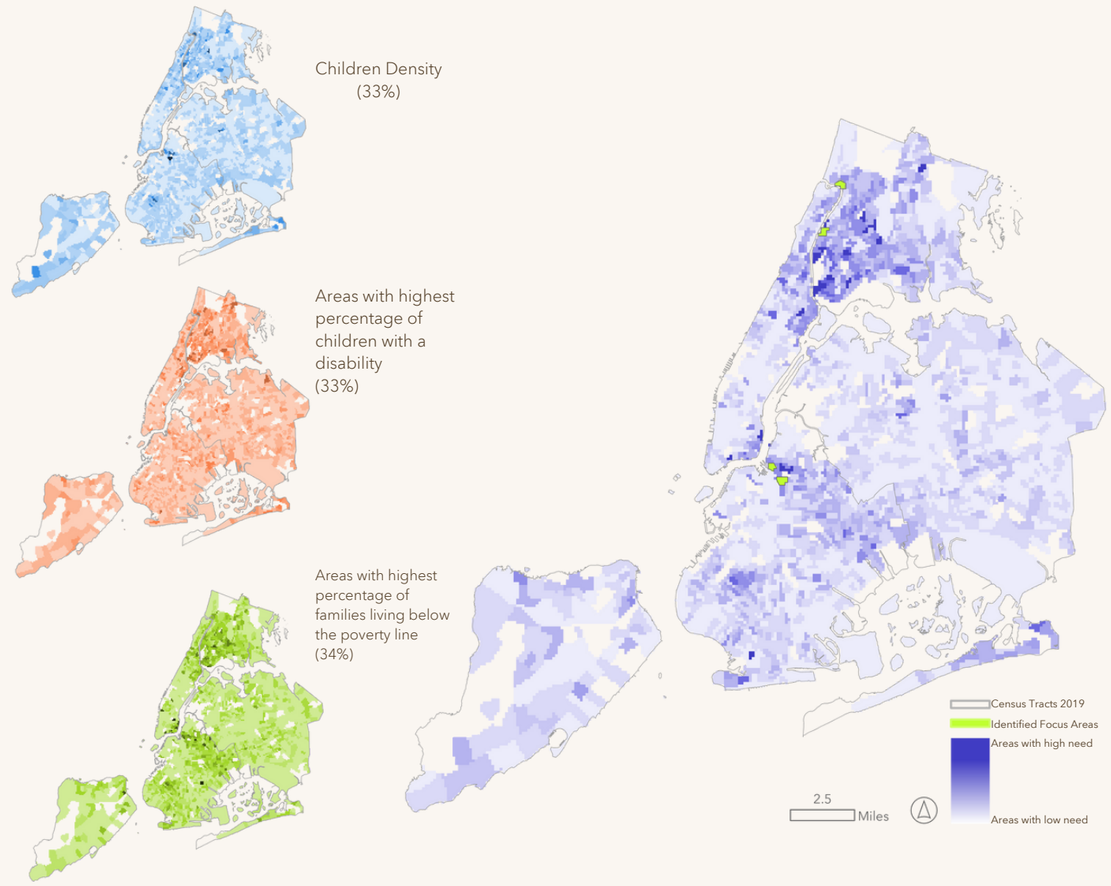
Which areas in New York City have the highest percentage of families living below the poverty line?

Access to adequate playgrounds nearby is particularly vital for children from low-income families. For low-income families with limited resources for recreational activities or safe play spaces, nearby playgrounds provide an essential, cost-free environment for children to engage in physical activity, foster social interactions, and stimulate cognitive development. These spaces can act as a social equalizer, giving children from all backgrounds a common ground for interaction and growth. Moreover, in New York City, where green spaces are limited, playgrounds nearby offer a much-needed escape from confined living conditions, promoting mental well-being and a sense of community among neighborhood children. The availability of playgrounds can also relieve some stress on parents or guardians by providing a safe and accessible space for their children to play and explore.



Multi-Criteria Decision Analysis

Which areas in New York City have the greatest need for inclusive playgrounds?



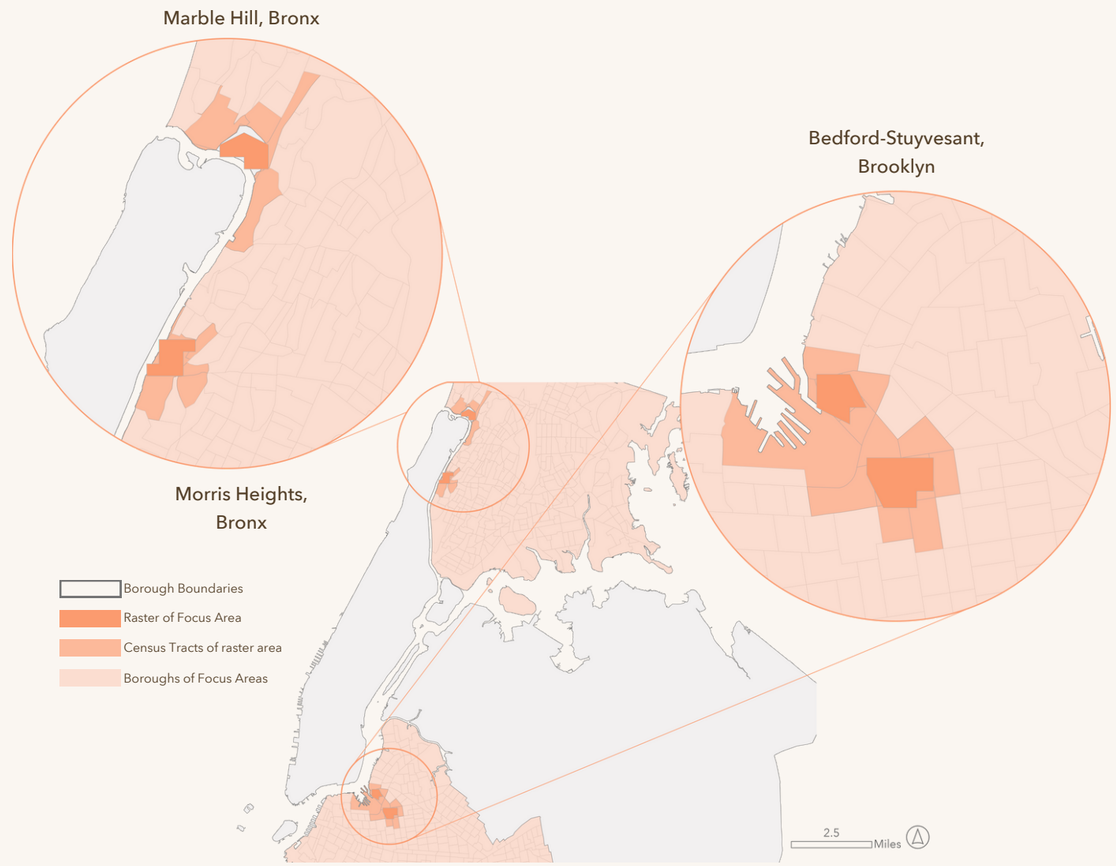
ArcGIS's Multi-Criteria Decision Analysis (MCDA) was used to identify areas most needing inclusive (Level 1) playgrounds. This analysis assumes that identifying the areas most in need depends on three key factors:

- Areas with highest density of children across the city
- Areas with the highest percentage of children with disabilities
- Regions where a significant percentage of families live below the poverty line

ANALYSIS

ANALYSIS OF FOCUS AREAS

In which neighborhoods are the focus areas located?



Through a spatial join of the raster areas indicating the highest need for inclusive playgrounds with New York City's Census Tracts, the analysis identified ten (10) census tracts in the Bronx, specifically in Marble Hill and Morris Heights, and twelve (12) census tracts in Brooklyn, within the Bedford-Stuyvesant neighborhood.

Contextualizing Focus Areas

NYC Department of City Planning, 2023

Marble Hill, Bronx

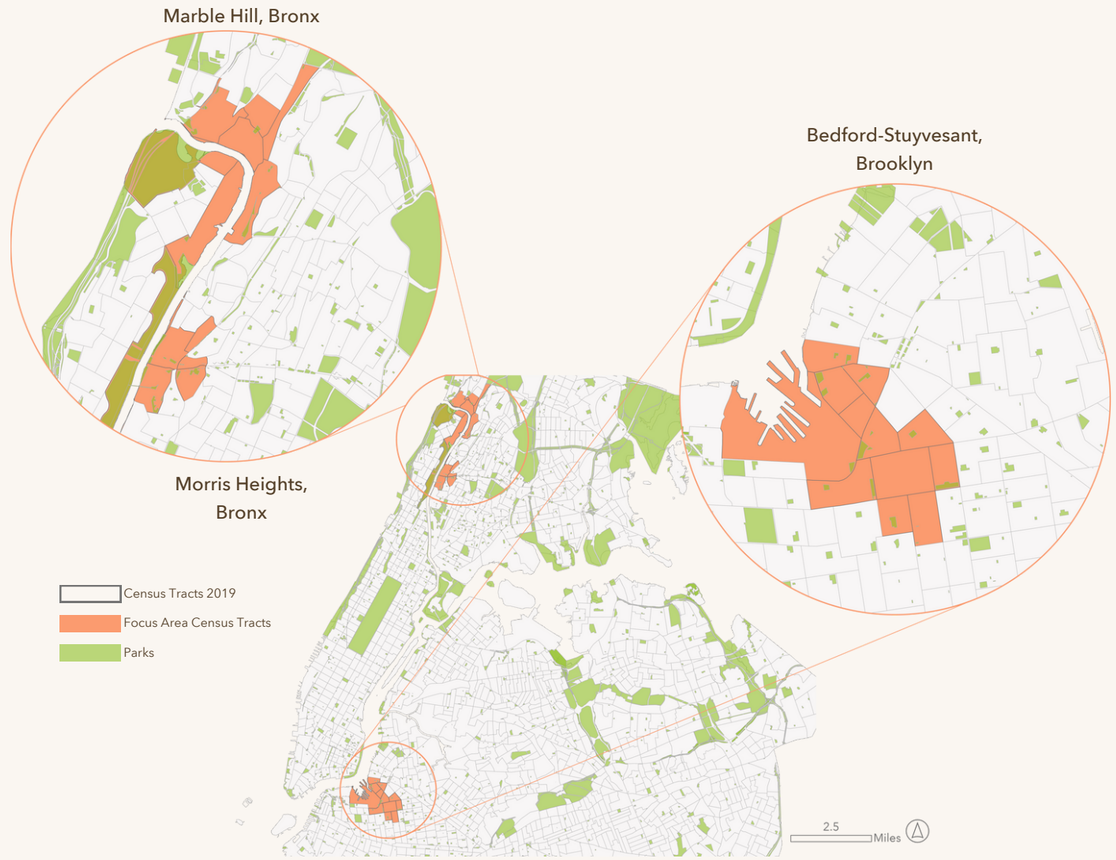
Located in the Bronx's Community Districts 7 & 8, exhibits its own distinct demographic characteristics. The neighborhood is diverse, with a **substantial Hispanic population (70%)** alongside **African American (15%)** and **White communities (7%).** This area contrasts with some of its more affluent neighboring regions in the Bronx and Manhattan. Marble Hill's median household income is lower than the average for New York City, and a notable percentage of its residents, about **25%, live below the poverty line** (percentages based on data of CD 7*).

Morris Heights, Bronx

Located in the Bronx's Community Districts 5, Morris Heights shares a similar demographic profile to Marble Hill, including a significant **Hispanic (70%)** and **African American (27%)** population Economically, both neighborhoods face similar challenges, with median household incomes below the New York City average, but Morris Heights has a higher rate of poverty, with **37%** of its population **living below the poverty line**.

Bedford - Stuyvesant, Brooklyn

Located in Brooklyn's Community Districts 1 & 3, Bedford-Stuyvesant is a diverse area with a predominantly **African American (54%)** population, along with significant **Hispanic (18%)** and **White (22%)** communities. Despite being near wealthier, predominantly White regions, it experiences economic disparities, having a median household income below the New York City average. Furthermore, **22% of its residents live below the poverty line**, a stark contrast to the affluence of neighboring areas (percentages based on data of CD 3*).



*numbers slightly vary for each CD but the overall demographic profile remains similar

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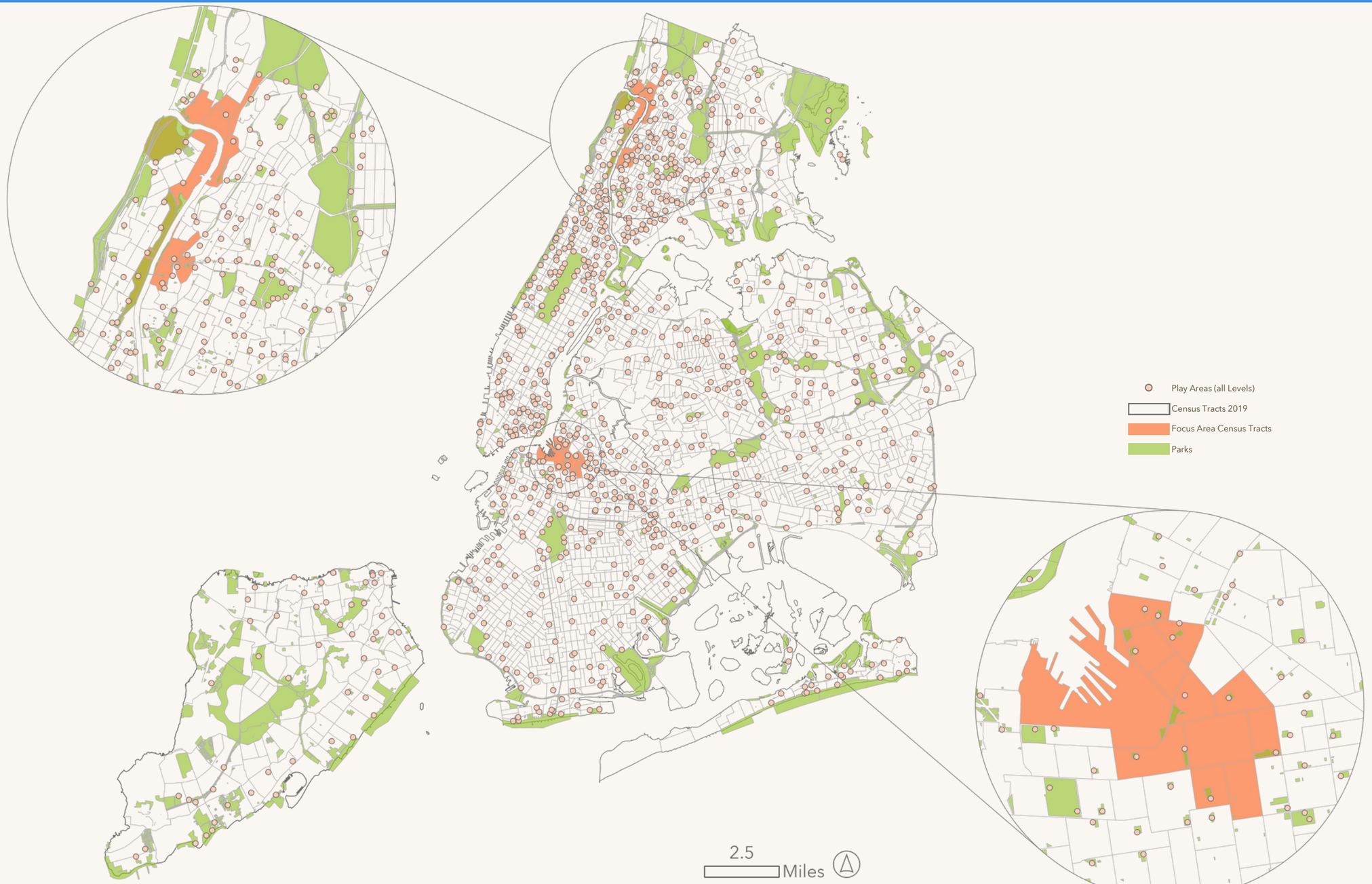
Where are playgrounds in NYC located?

Upon identifying the focus areas, the study explored the city's playground landscape. Playgrounds are distributed throughout the city, with a higher density in the north and central parts, particularly in neighborhoods like the Lower East Side and adjacent areas in Brooklyn.

New York City's Playground Landscape



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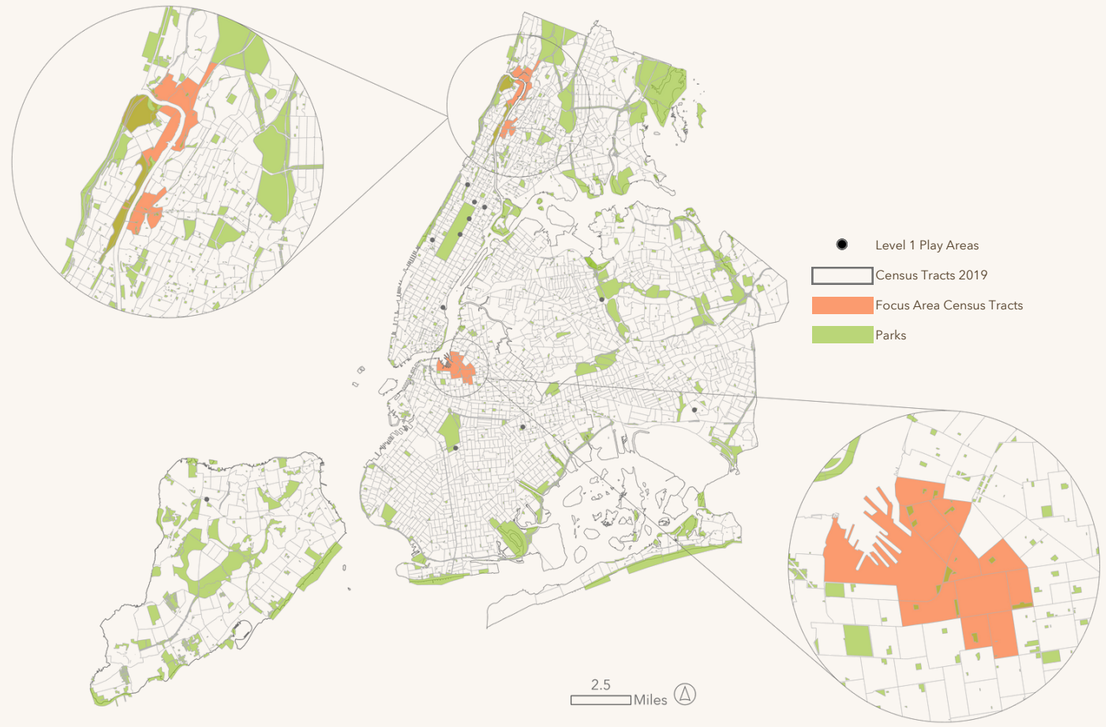
Inclusive Playground Landscape

Knowing where areas most in need of inclusive playgrounds are across New York City,
how then are Level playgrounds distributed in relation to these areas?



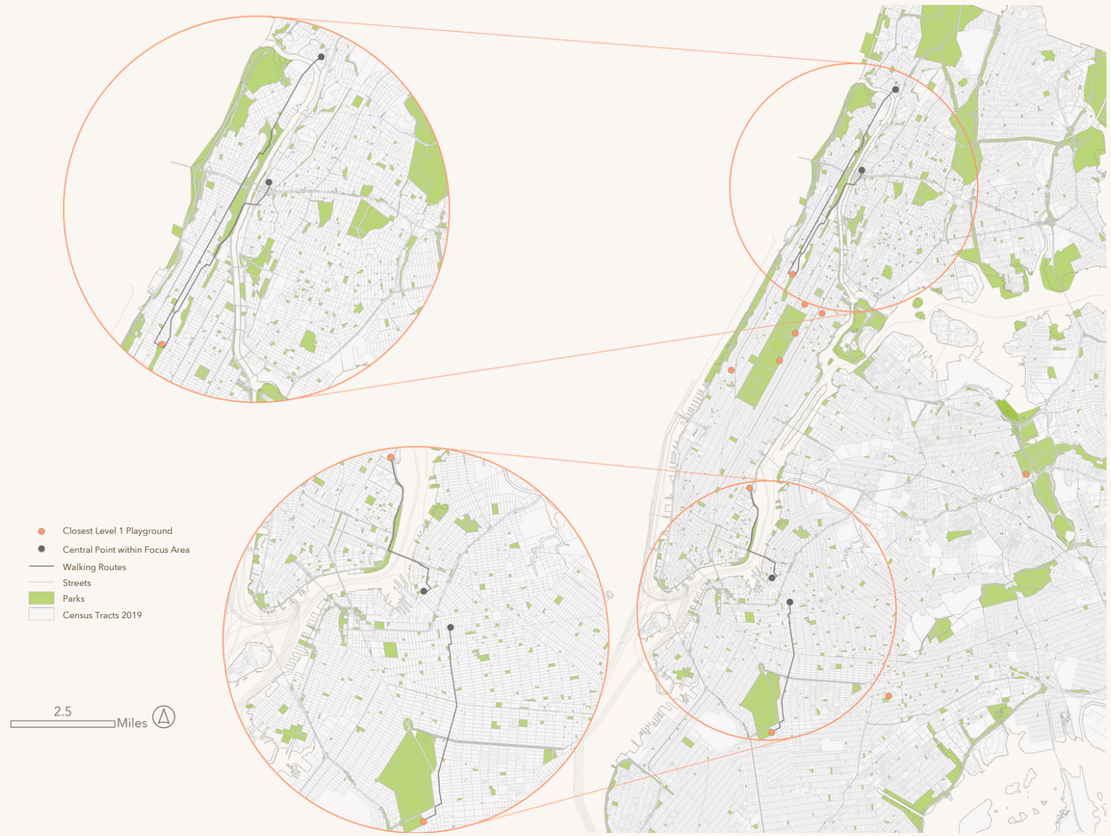
This study focuses on inclusive playgrounds classified as Level 1 by the NYC Department of Parks and Recreation, explicitly designed for children with diverse abilities. When examining playgrounds through this lens, the landscape shifts dramatically. **Citywide, only 12 playgrounds achieve Level 1 status**. Manhattan has seven, Staten Island one, and Brooklyn and Queens have two. Remarkably, the Bronx has no Level 1 playground, even though it has a high density of children, a significant percentage of whom have disabilities, and a large number of families living below the poverty line.

Reminder on inclusive playgrounds: This study adopts the NYC Department of Parks and Recreation definition. These are ranked as Level 1 and defined as "Playgrounds for All Children." Playgrounds for All Children are designed to provide recreational opportunities for children of all ages and abilities. Playground features include ramped play equipment, ground-level play features, accessible swings, wheelchair-accessible tables, and drinking fountains. Some playgrounds also have adjustable basketball backboards that can be raised and lowered for athletes of all abilities.

Route-Network Analysis

What is the travel time to reach inclusive areas from the specified focus areas?

In an ideal scenario, every child should be able to access an adapted playground within a reasonable distance. The New York City Department of Health and Mental Hygiene, NYC Tracking Program, defines walking distance to smaller sites like playgrounds as approximately 1/4 mile or around 5 minutes. The study conducted a route-network analysis to assess the time required to reach the nearest adequate (Level 1) playground from the designated focus areas. New York City's Street Centerline dataset was applied to establish potential walking paths. The analysis began by converting the raster from the MCDA, which outlined our focus areas, into a point feature. Following this, the analysis calculated the shortest walking route, linking the point feature in the focus area to the nearest Level 1 playground. This step-by-step process provided a clear picture of walking accessibility to inclusive playgrounds from the identified areas. **None of the areas most in need have a playground adapted to their needs at a distance reachable by foot.** From each area, children would have to walk for around
3 miles (around 45-60 minutes*).



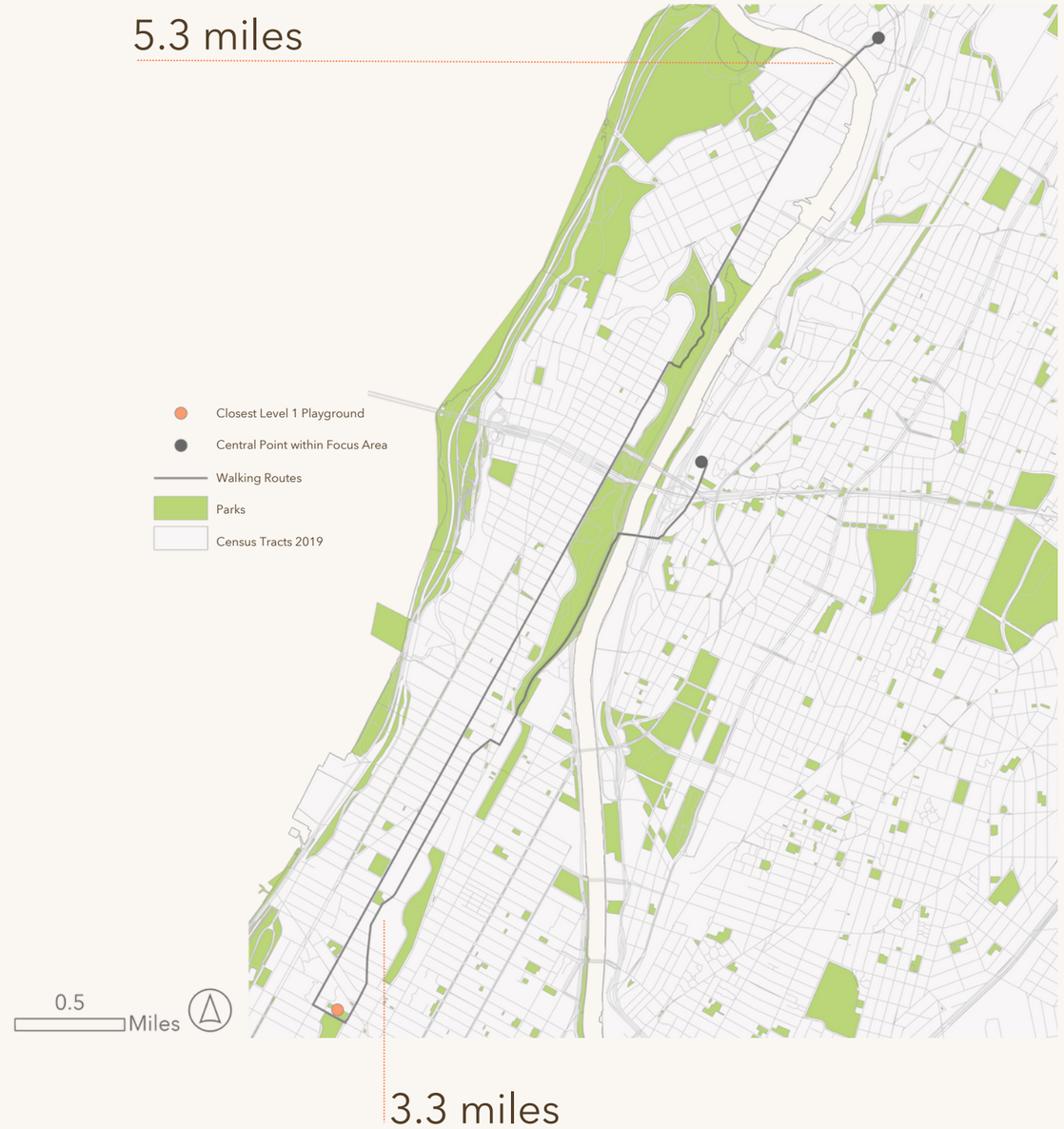
→ walking distance ≥ 3 miles

*Walking times are based on the estimate that children between 5-17 years need around 15-20 minutes for one mile (Carcreff et al., 2020)

Route-Network Analysis

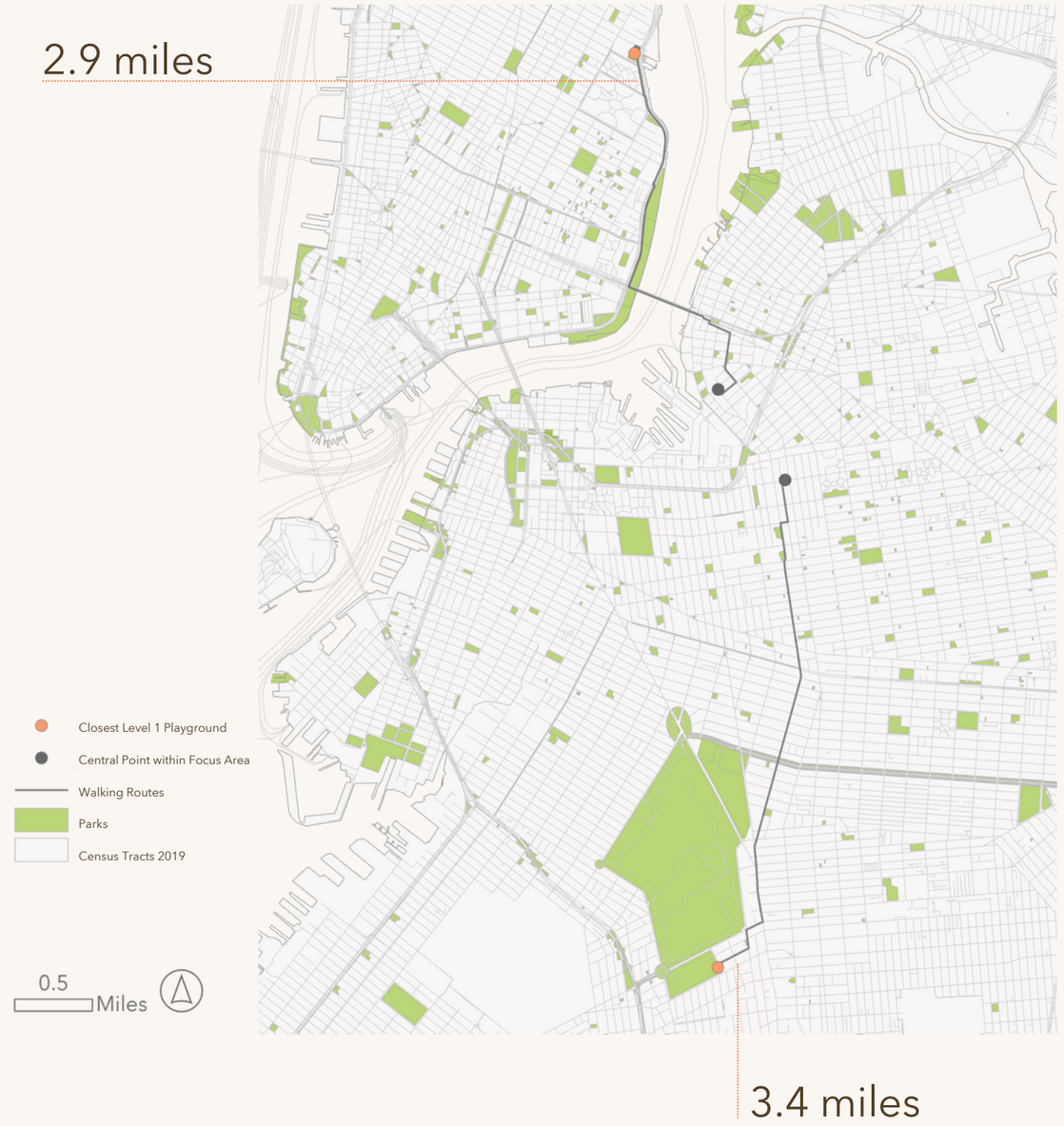
What is the travel time to reach inclusive areas from the specified focus areas in the **Bronx**?

The walking distance to the closest playground with an inclusive design for children living in Marble Hill is around 5.3 miles. They have a walking time of around 1.5 hours. Children living in Morris Heights have a slightly shorter distance (3.3. miles). However, it would still take them around one hour to reach the closest Level 1 playground, Playground One Twenty-Five CXXV (1), on Morningside Avenue in Manhattan. This playground is named for 125th Street, which bounds the property to the north, and for the adjacent P.S. 125, also known as the Ralph Bunche School.



Route-Network Analysis

What is the travel time to reach inclusive areas from the specified focus areas in **Brooklyn**?



Children living in the location between Bedford-Stuyvesant and South Williamsburg in Brooklyn have to cross the Williamsburg Bridge to reach the Asser Levy Playground (2) on 23rd Street in Manhattan. The closest walking distance is 2.9 which is around 50 minutes. Children living near Park Avenue would have to walk at least 3.4 miles (one hour) to the south of Prospect Park. There Detective Dillon Stewart Playground (3) is located. This playground is named after Detective Dillon Stewart, a five-year veteran of the New York City Police Department assigned to the 70th Precinct in Brooklyn who was killed in the line of duty on November 28, 2005.

Sites

1. **Playground One Twenty-Five CXXV**
   Morningside Ave., W. 123 St. and W. 124 St.,
   New York, NY 10027

2. **Asser Levy Playground**
   392 Asser Levy Place,
   New York, NY 10010

3. **Detective Dillon Stewart Playground**
   70 Parade Place
   Brooklyn, NY 11218

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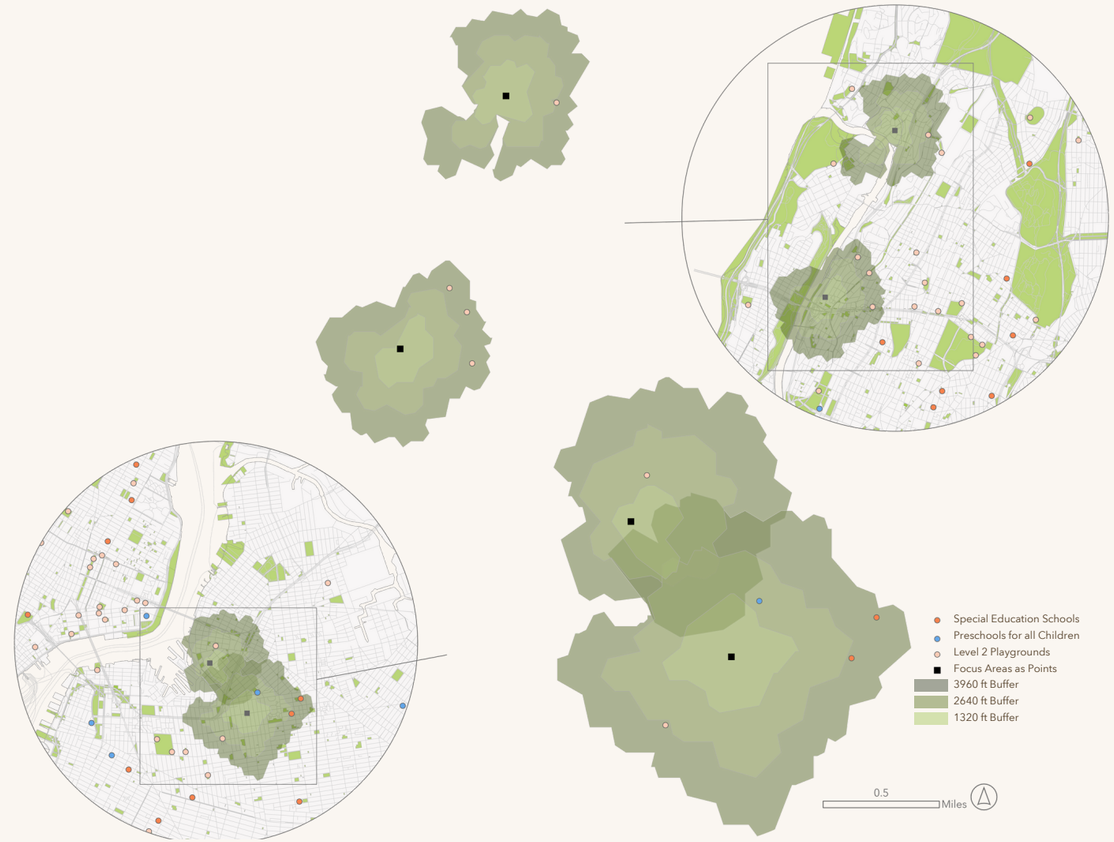
Images: NYC Department of Parks and Recreation [Photograph]. Retrieved from https://www.nycgovparks.org/

Network-Buffer Analysis

Which Level 2 playgrounds and other facilities for children of all abilities are situated within walking distance of the focus areas?

The next stage of the study involves evaluating current playgrounds and related facilities near the identified focus areas. The objective is to assess whether these sites, particularly Level 2 Playgrounds, are within walking distance and can be modified to accommodate children of diverse abilities. Additionally, the research seeks to determine the presence of other educational facilities designed for children with varying abilities near these focus areas. The study converted the census tracts of focus to centroids to create distance buffers for the spatial analysis. To adjust for any minor discrepancies in distances to points of interest, it established three concentric buffers, each extending 1/4 mile, thereby covering all facilities within an overall radius of approximately 3/4 mile.



Reminder on Level 2 Playgrounds: can include accessible swings and/or ramped play equipment, transfer platforms, and ground level play features. These playgrounds can also include accessible amenities, which can include drinking fountains and comfort stations (NYC Department of Parks and Recreation, n.d.).

The Bronx generally show a scarcity of educational facilities, however the areas do have playgrounds within (a longer) walking distance. Marble Hill has one playground within a 3/4 mile radius, whereas Morris Heights has three playgrounds within the same distance. These findings present an opportunity for the city to enhance the existing infrastructure at these sites to meet their users' needs better, particularly those requiring inclusive amenities.

In Brooklyn, two special education schools and one preschool for children with disabilities are within walking distance, but this applies only to the southern focus area. Both focus areas in Brooklyn have one playground within a 1/2 mile radius. These playgrounds represent pivotal locations for improvement. Enhancing these sites would significantly contribute to creating inclusive spaces accessible to all children, marking a substantial stride in promoting inclusivity.

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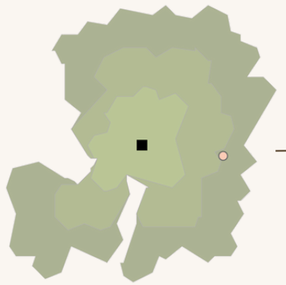
A. Fort #4 Playground

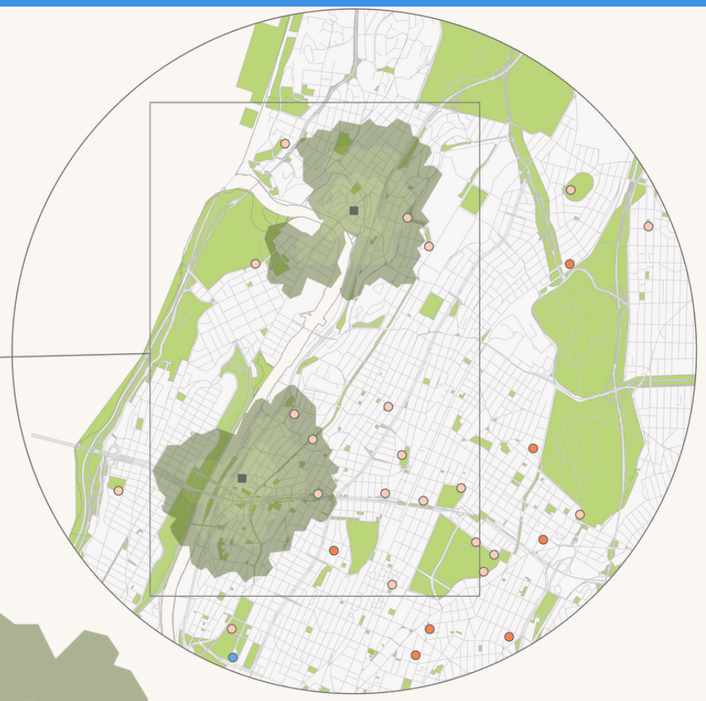
B. Beanstalk Playground

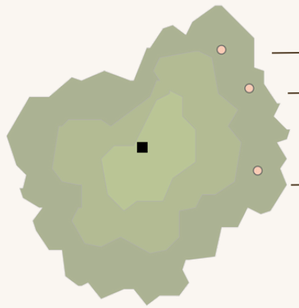
C. Morton Playground

D. Jenny Jerome Playground



A.

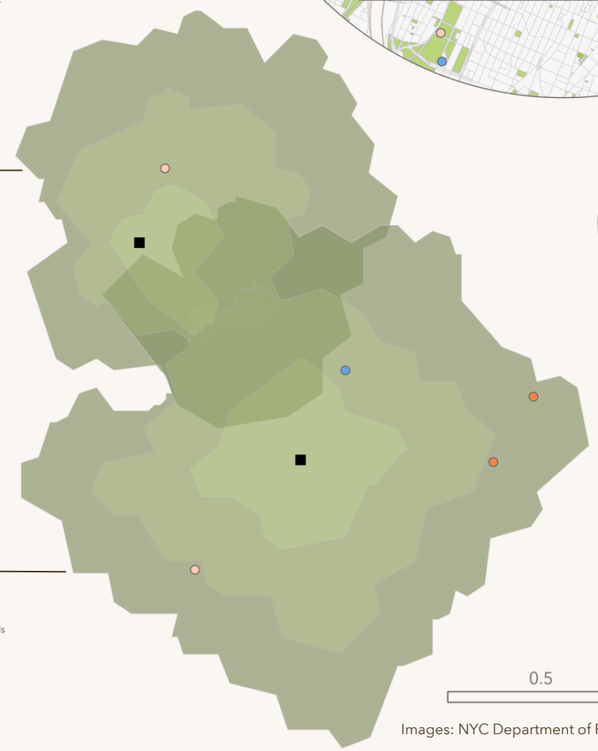




B.

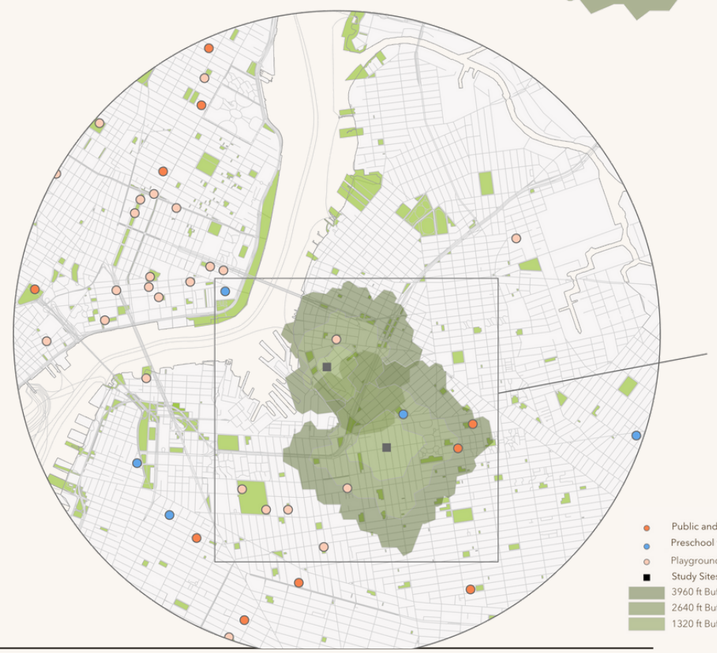
C.

D.



E.

F.



E. Bedford Playground

F. Pratt Playground

0.5 Miles

Images: NYC Department of Parks and Recreation [Photograph]. Retrieved from https://www.nycgovparks.org/

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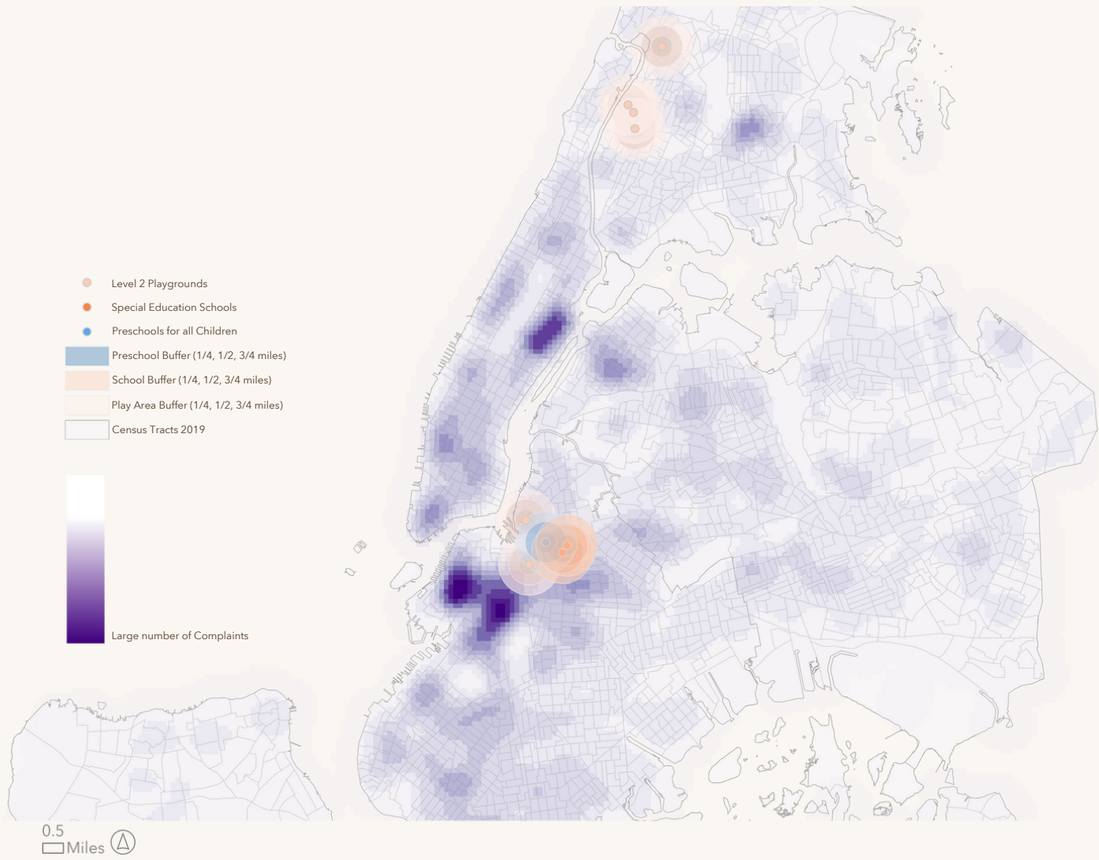
Kernel Density Analysis

How well maintained are the sidewalk around facilities that are in proximity to the area of study?



There are several possibilities to analyze the 'walkability' of an area. This study operationalized this variable by drawing on the NYC Dataset on Curb and Sidewalk Complaints. The data was cleaned only to include reports made after December 2020 and filtered out complaints unrelated to curb- and sidewalk complaints. The idea was to determine whether the area surrounding the selected sites that qualify as potential improvement sites is accessible for children who require well-maintained streets because of physical impairments. Considering that the analysis is biased regarding caller profile, it reveals that the areas around specified sites and inclusive facilities do not appear to suffer from poorly maintained side and curbwalks.

CONCLUSION

Implications

The guiding question of this research was:
To what extent are New York City's public playgrounds inclusive for children of various abilities in areas of need?
The study revealed a significant disparity between the availability of inclusive public playgrounds in New York City and the areas with the most pressing need for such facilities. The scarcity of inclusive playgrounds is stark - with **only 12 playgrounds for approximately 1 million children under 18 living with a disability** (Mayors Office for People with Disabilities, n.d.) and a **complete absence in the areas where they are most critically needed**. These areas are characterized by higher poverty levels, dense child populations, and a more significant percentage of children with disabilities compared to other boroughs. Additionally, there is a general need for more educational facilities catering to children with varying abilities in specific areas, including **Morris Heights** and **Marble Hill** in the Bronx and **Bedford-Stuyvesant** in Brooklyn. This research aimed to identify potential sites for improvement based on their proximity to areas of need. The study successfully **identified six playgrounds** that, if adapted, would represent significant progress toward the city's goal of providing inclusive amenities for all children. These findings underscore the urgent need for strategic planning and investment in inclusive playground infrastructure in New York City.

Future Research

This research represents an initial foray into identifying areas that would greatly benefit from inclusive amenities. However, it is imperative for policymakers also to consider the quality of play spaces, focusing on factors like openness, absence of pollution, attractiveness, and safety. Future research could delve deeper by integrating data on environmental factors such as the Heat Vulnerability Index and air quality.

Additionally, forthcoming studies should seek eIRB approvals to gather, document, and analyze children's perspectives and needs concerning playgrounds. This could involve in-person documentation of playground activities using photos, videos, and participant diagramming, enriching the research with direct insights from children's experiences.

Engaging more directly with communities through expanded networking and outreach will also be crucial in future research endeavors. Such engagement can provide firsthand insights, enhancing understanding of diverse needs and preferences.

Lastly, focusing on what genuinely benefits children is vital. Prioritizing the children's well-being and play experiences should remain at the forefront of playground development and research.

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