Childcare In Brooklyn

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Message From Our Authors

The U.S. Childcare Desert Map, published by the Center for American Progress in 2020 shows that Brooklyn has significant coverage of areas with less child care compared to the total population of children in the borough. This country-wide map was produced using the measurement method to analyze family access to early care and education introduced by Elizabeth E. Davis, Won F. Lee, and Aaron Sojourner (2019).

Inspired by the results presented in the Childcare Desert Map, this study aims to enrich the discussion in showcasing where there is a great need for additional childcare facilities.

This will be done by measuring the proximity of childcare facilities within a 10-minute walking radius, based on NYC's average residents' distance to the urban amenities they need (Logan, T.M., et al., 2022), while taking into account more specific population demographics. In this research, we analyze the need for childcare for children under 5 from low-income households, and working parent households, across census tracts in Brooklyn to determine a more defined level of need.
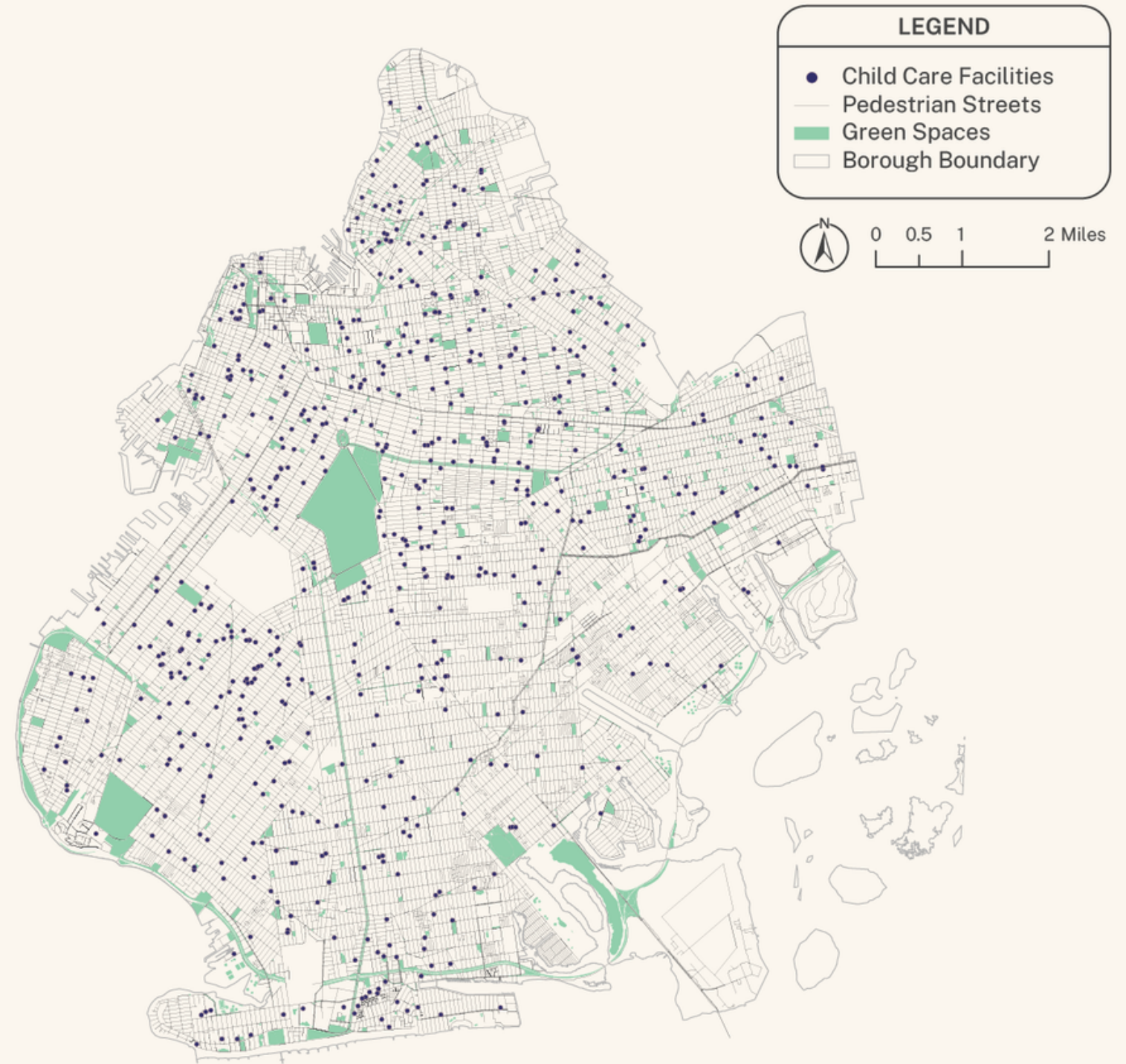
BX

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Introduction

Background Summary

In May 2022, New York City (NYC) Mayor Eric Adams announced new funding for the Childcare Quality and Innovation Initiative that will provide grants to support the administration's broad child care plan (Office of The Mayor, 2022). This investment aims to broaden service plan in childcare deserts, as represented in the U.S. Child Care Deserts Map by the Center for American Progress (2020). This map identifies neighborhoods with childcare scarcity due to the unavailability of an adequate number of licensed childcare to supply the demand. Eventually, this issue holds parents back from entering the workforce to provide for their family's livelihood.

The U.S. Child Care Deserts Map (2020) indicates a major scarcity in the borough of Brooklyn despite the highest proportion of children in NYC residing in this borough, specifically reaching 580,130 (33.8%) of the total 1,715,077 children according to the Citizens' Committee for Children of New York (2019). As specified by the New York City Department of Health and Mental Hygiene (2018) in Article 47 Child Care Programs and Family Shelter-Based Drop-Off Child Supervision Programs, childcare is defined as any program providing child care for five or more hours per week, for more than 30 days in a 12-month period, to three or more children under six years of age.

LEGEND
- Child Care Facilities
- Pedestrian Streets
- Green Spaces
- Borough Boundary

0   0.5   1   2 Miles

Research Scope

Summary

The rampant shortage of childcare options in the United States poses a barrier to families finding care for their children. This is particularly of concern for low-income households and households where the single-parent or both parents are part of the labor force. While the U.S. Child Care Deserts Map (2020) helps identify the areas in Brooklyn with a scarcity of childcare supply in relation to poverty levels, the map fails to consider certain factors that could aid community advocates and childcare providers in deciding where to site or support the development of new daycare facilities.

These factors include identifying what census tracts house the highest proportion of children and low-income families, alongside those with the highest percentage of single-parent households where the parent is part of the labor force and two-parent households where both parents are part of the labor force. This study aims to report on census tracts in Brooklyn that are most in need of daycare facilities in 2022 based on the above criterion.

Where do low-income working parents need more childcare facilities in Brooklyn?

Brooklyn - defined by the Department of City Planning's 2022 boundaries for the borough of Brooklyn;

Childcare - including regulated daycare centers and community facilities providing care for children over 6 months old;

Children - defined by the population under the age of 5;

Labor force - includes anyone over the age of 16 who is employed or actively seeking employment that is either full-time, part-time, or freelance (US Census Bureau, 2021);

Low-income - this metric will be based on the median household income for Brooklyn in 2020, which is $63,973 (US Census Bureau, 2021);

Working Parents - including single-parent households where the individual parent is part of the labor force and two-parent households where both parents are part of the labor force.

Methodology

Methodological Summary

To answer the research question, the authors will use ArcGIS to perform a Multiple Criteria Decision Analysis (MCDA) using specific criteria for each census tract, including the proportions of children under five years, low-income households, single-parent households where the individual parent is part of the labor force, and two-parent households where both parents are part of the labor force. This includes Data Preparation, Network Analysis, and Creating Decision Scores. Data from the American Community Survey (ACS) comprising the aforementioned criteria will be table joined to census tracts.

Next, the overlapping service areas from a network analysis will be quantified by the Count Overlapping Feature tool. Subsequently, the overlapping service areas will be spatially joined to the feature layer containing the demographic data. Each criterion, including the overlapping service areas, will be reclassified. These reclassified feature layers become the decision layers for creating the decision scores. The weighted decision map will be based on the calculated decision scores that operationalize table calculations for each criterion. Lastly, the highest score will be used to measure the need for childcare.

Limitations

The study will be bounded to the census tract level due to data available in the ACS 2020. The assessments for the needs of childcare centers will be limited based on the aforementioned criteria. Additional factors impacting the need for or the development of childcare facilities - the availability of educators, the availability of daycare financial assistance programs, and the availability of unregulated daycare facilities - are beyond the scope of this study.
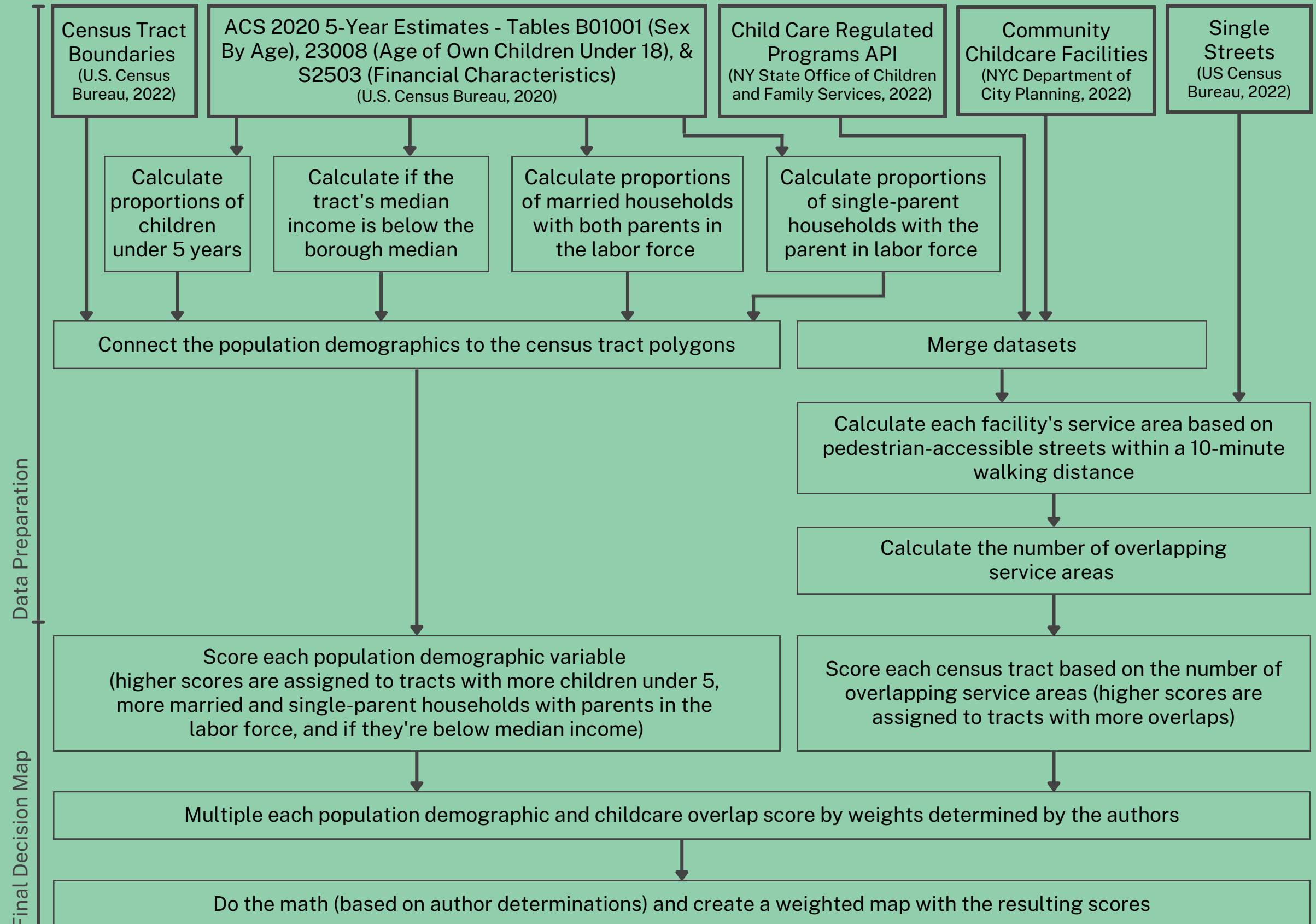
Assumptions

This research entails assumptions on the walking distance to the childcare facilities. In this case, the authors assigned a half-mile walking distance (ten-minute walk) to the existing locations of childcare facilities. This distance is chosen to provide a short yet realistic walking time for working parents.

The decision map also espouses assumptions created by the authors. The metrics and degree of scores for each criterion were measured based on the author's hypothesis. That said, the inferred weighted scores for each census tract are relative and not a fixed mechanism.
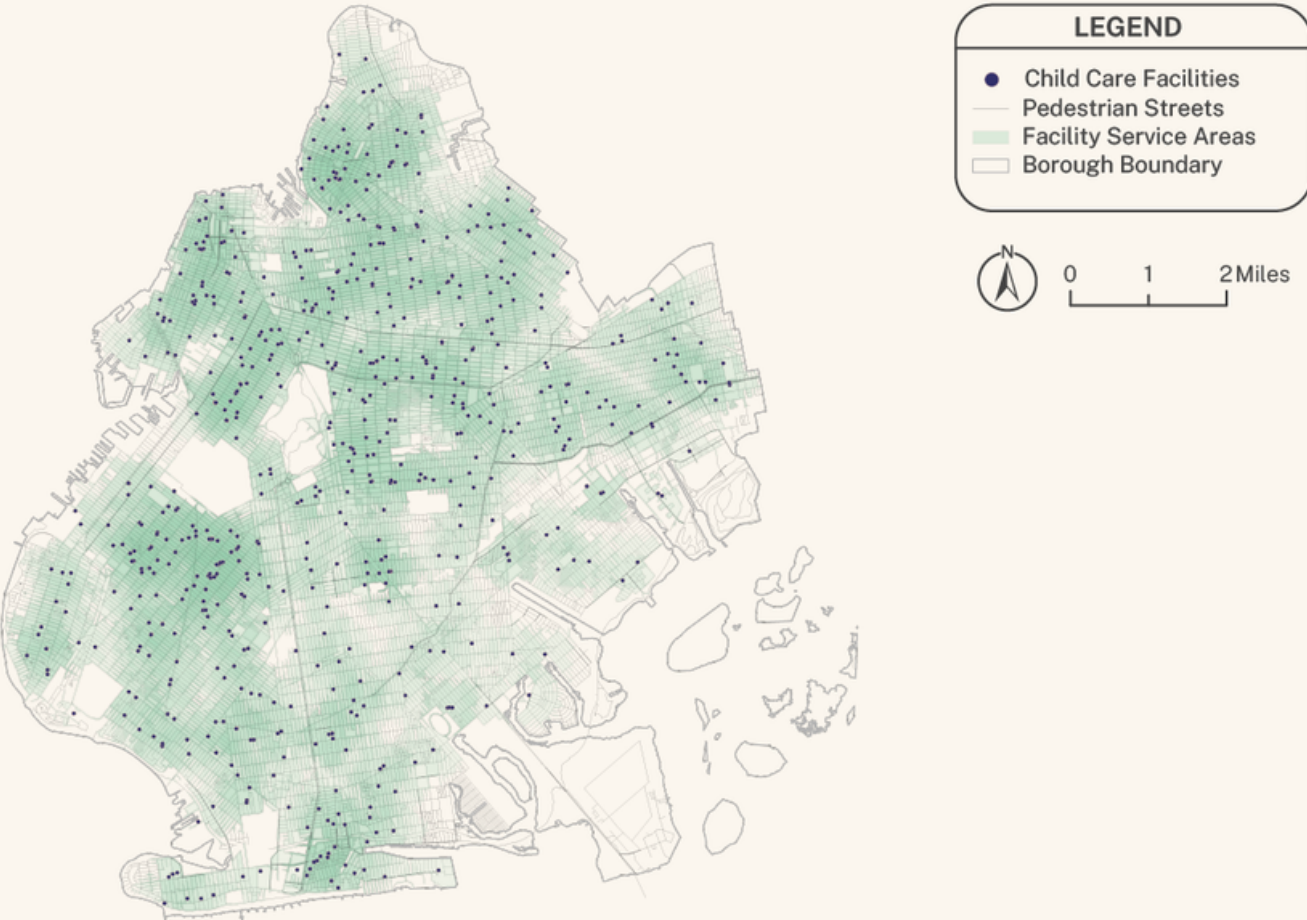
Operational Diagram

*Note: This is a simplified diagram; a detailed operational version can be located in the appendix

Data Preparation

Census Tract Boundaries
(U.S. Census Bureau, 2022)

ACS 2020 5-Year Estimates - Tables B01001 (Sex By Age), 23008 (Age of Own Children Under 18), & S2503 (Financial Characteristics)
(U.S. Census Bureau, 2020)

Child Care Regulated Programs API
(NY State Office of Children and Family Services, 2022)

Community Childcare Facilities
(NYC Department of City Planning, 2022)

Single Streets
(US Census Bureau, 2022)

Calculate proportions of children under 5 years

Calculate if the tract's median income is below the borough median

Calculate proportions of married households with both parents in the labor force

Calculate proportions of single-parent households with the parent in labor force

Connect the population demographics to the census tract polygons

Merge datasets

Calculate each facility's service area based on pedestrian-accessible streets within a 10-minute walking distance

Calculate the number of overlapping service areas

Final Decision Map

Score each population demographic variable
(higher scores are assigned to tracts with more children under 5, more married and single-parent households with parents in the labor force, and if they're below median income)

Score each census tract based on the number of overlapping service areas (higher scores are assigned to tracts with more overlaps)

Multiple each population demographic and childcare overlap score by weights determined by the authors

Do the math (based on author determinations) and create a weighted map with the resulting scores

Analysis & Discussion

Service Areas Analysis Of Child Care Facilities

Network Analysis Of Childcare Facility Service Areas

We seek to analyse the service area coverage of existing childcare facilities that provide care for children from 6 months old to 5 years old within 10 minutes walking distance (Logan et al., 2022) based on the network of pedestrian streets centerline. In the service area analysis we translate the length of walk as half a mile distance and trim the polygons to fit the 60 feet Right of Way of Brooklyn (NYC Department of Transportation).
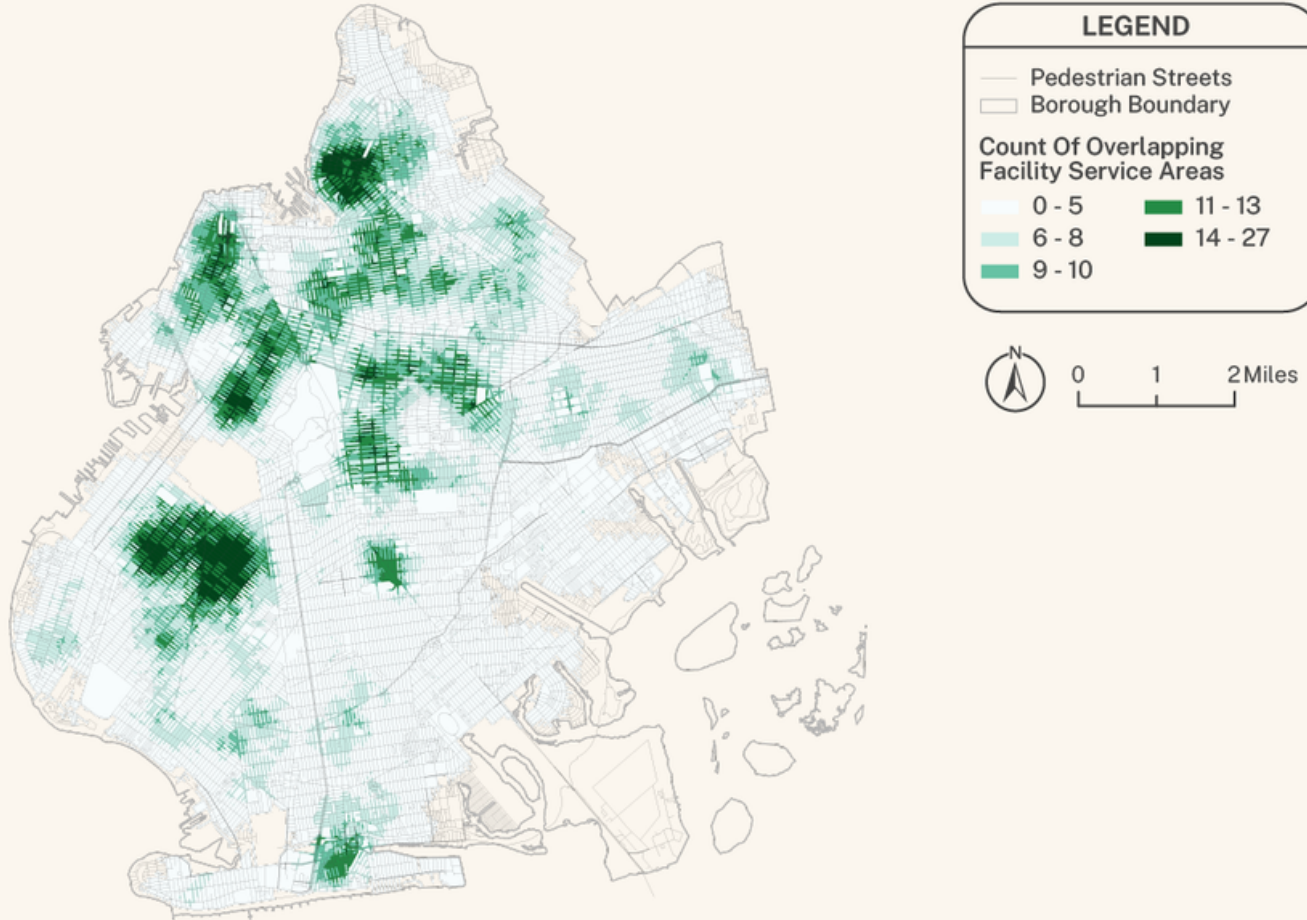
Count Overlap Of Childcare Facility Service Areas

Based on the observation that there are multiple overlapping service area polygons in the solved network analysis layer (left), the authors calculated the overlapping features, starting the count from 0 for areas with no overlaps, but with proximity to 1 childcare facility. This way the analysis of areas with more childcare facilities available within the borough is possible.

Analysis & Discussion

Decision Layers

To suit the spatial resolution used for this study, the count results of overlapping features were spatially joined to determine the number of overlapping features intersecting with each census tract boundary. This way we can determine which census tracts have more childcare facilities available compared to the others.

It is worth mentioning that within each census tract, there might be several overlapping values that intersect with the census tract. For incorporating the values of overlapping childcare service areas into the census tract, we selected the maximum values as the representative number (proxy) to measure childcare availability within close distance to the census tracts.
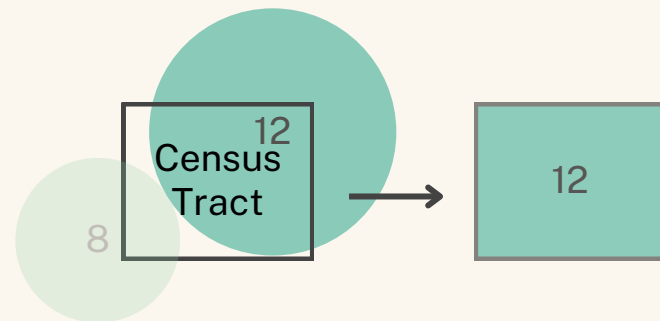
This study acknowledges that more options for childcare facilities might be available within 10 minutes of walking distance from each census tract. Despite the limitations, the results made from this analysis still present a rational level of availability of childcare facilities in proximity to the census tracts.
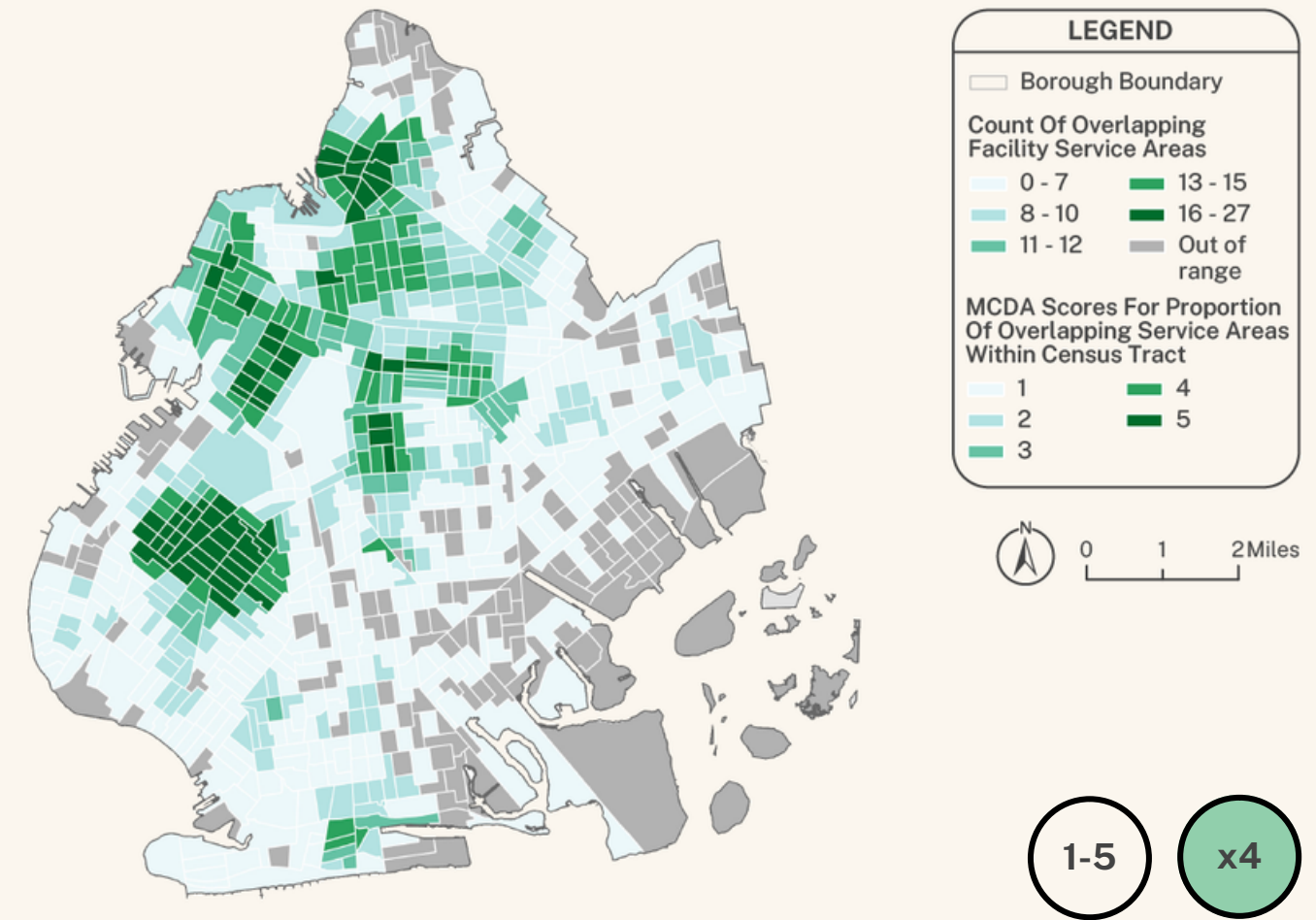

Proportion Of Child Care Facility Service Areas By Census Tract
The number of highest childcare service area overlapping values in each census tract is shown in the map above. For the weighted decision calculation, this map was reclassified to have scores of 1-5 (5 being a high number of overlapping childcare facility service areas).

Analysis & Discussion

Decision Layers
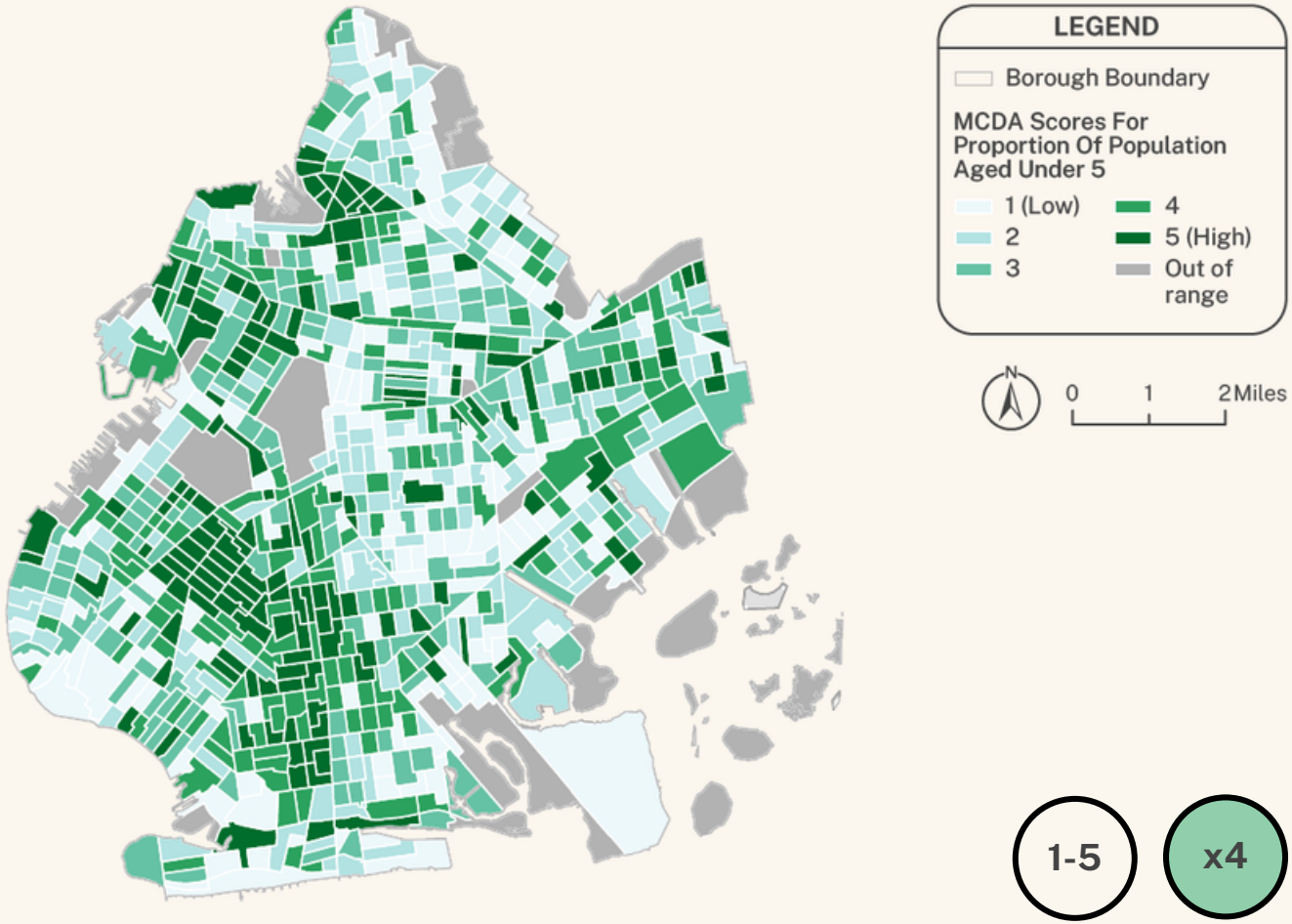
Proportion Of Children Under 5 Years Old

Census tracts in Borough Park, Williamsburg, and Ocean Parkway South have a higher proportion of children under five years old. Meanwhile, census tracts within East Flatbush-Farragut and Prospect Lefferts Gardens-Wingate neighborhoods show a less notable proportion of children under five years old.
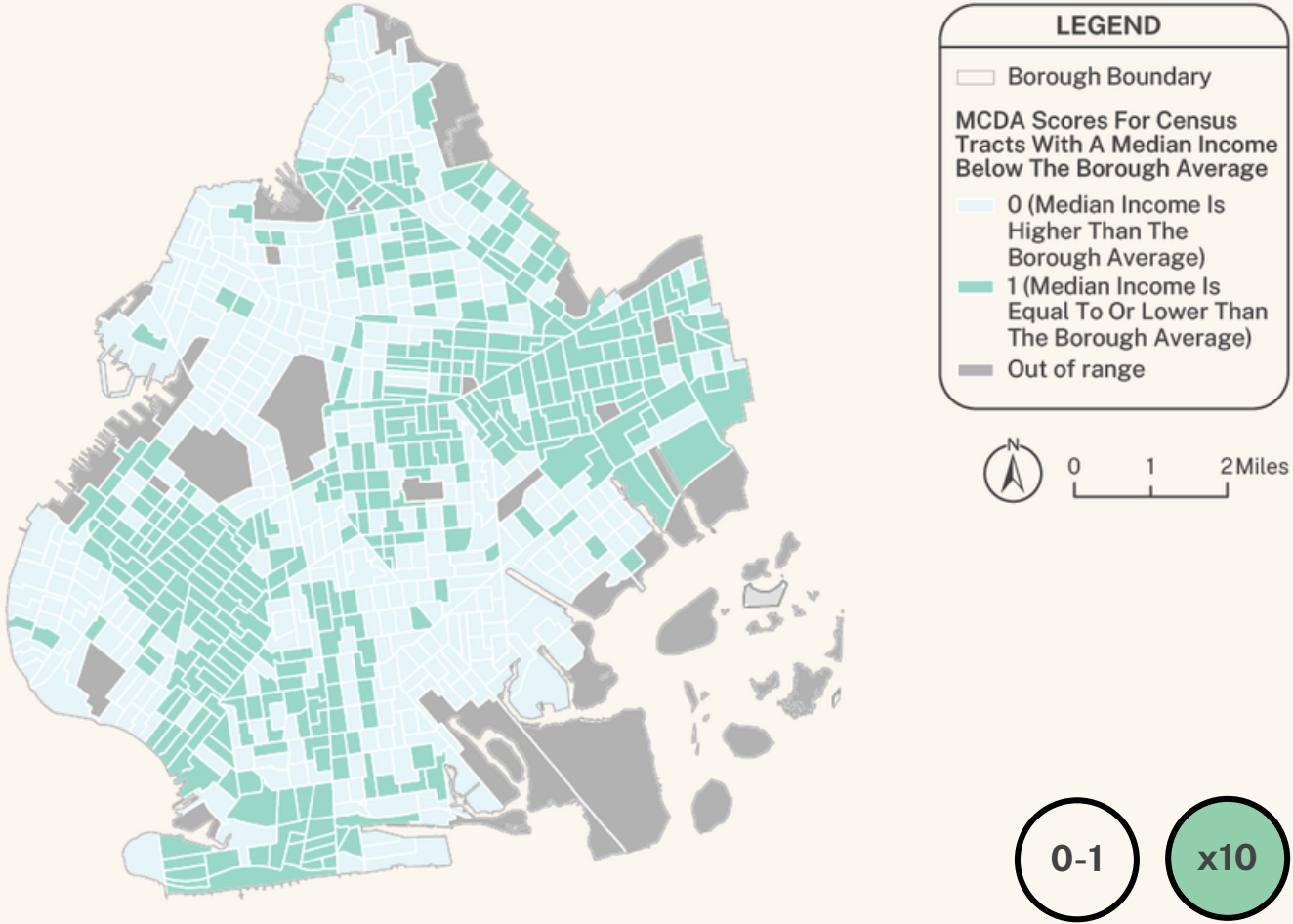
Proportion Of Households Below Median Income

The map indicates that households that earning below Brooklyn's median income are concentrated on the east side (East New York, Brownsville, and Canarsie) and the south-to-west side (Brighton Beach and Sunset Park). This map also conveys that some census tracts that are labeled out of range contains no estimated value due to data suppression.

Analysis & Discussion

Decision Layers
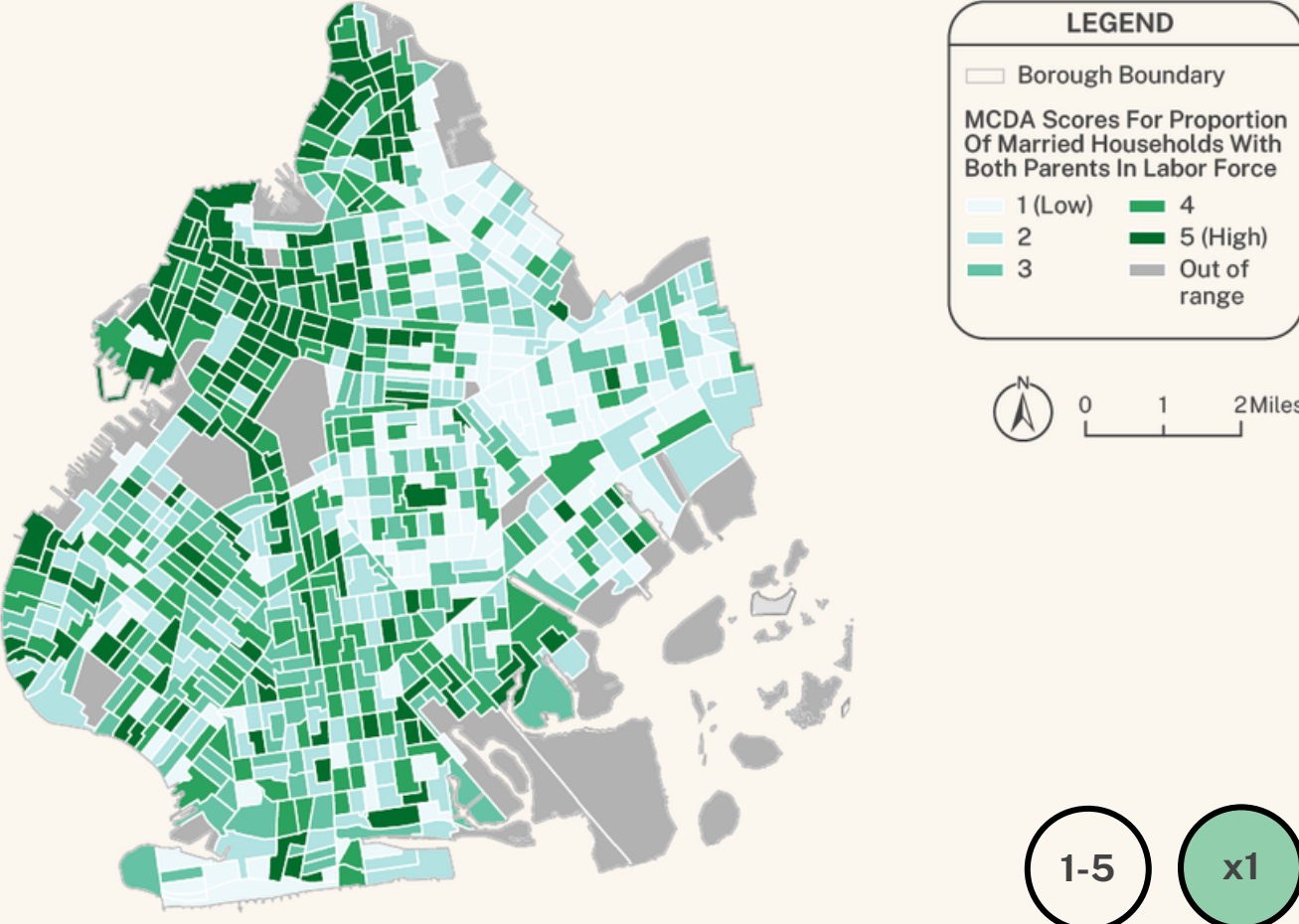
Proportion Of Married Households With Both Parents in The Labor Force
The neighborhoods in the North-West side, such as Carroll Gardens-Cobble Hill-Gowanus-Red Hook, Brooklyn Heights, and Downtown Brooklyn, indicate a higher proportion of married households with both parents in the labor force. In contrast, Brownsville and Bushwick North presented a low ratio of the criterion.
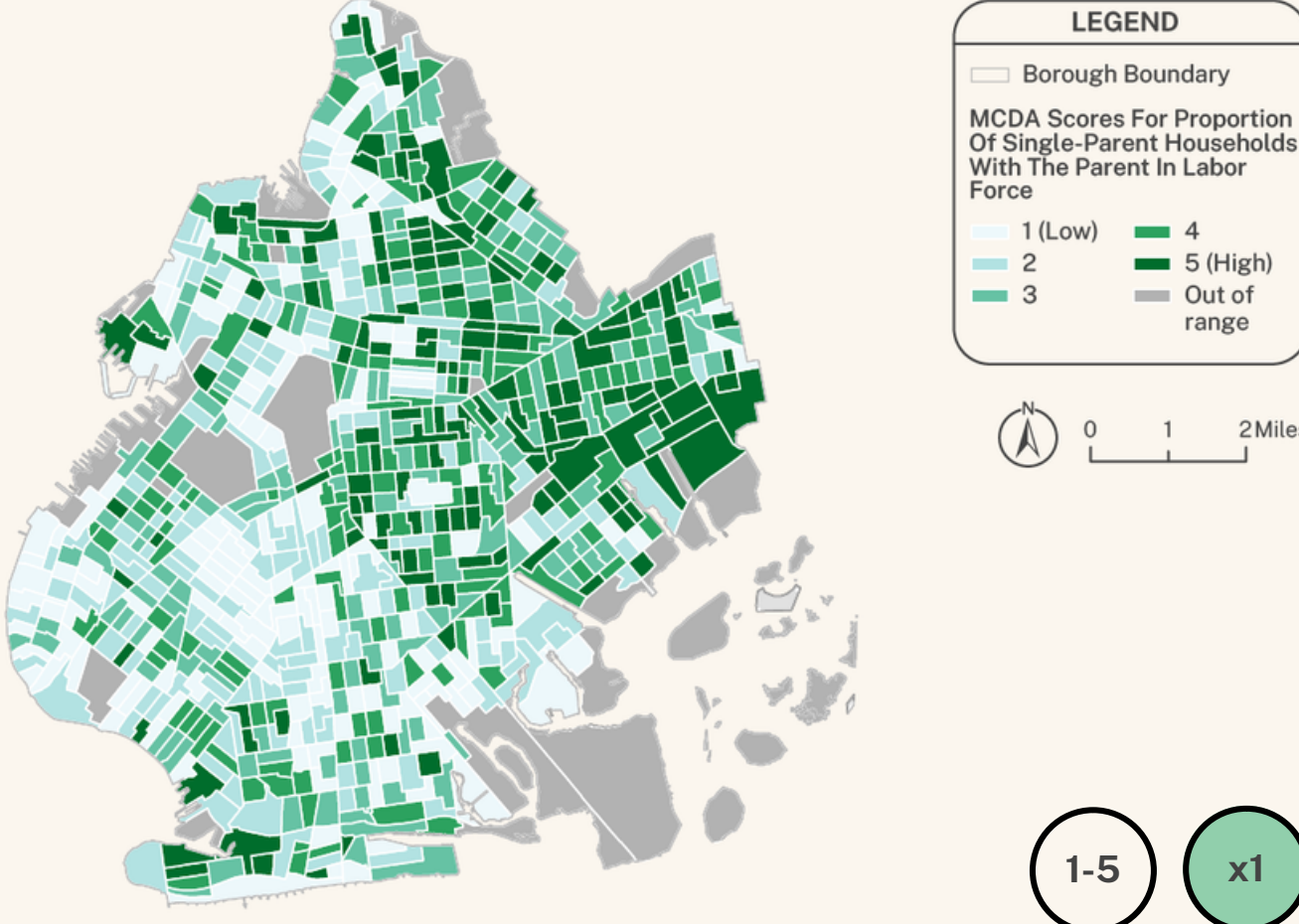
Proportion Of Single-Parent Households With The Parent in The Labor Force
The higher proportion of single-parent households with the parent in the labor force is largely situated in East New York, East Flatbush, and Bedford-Stuyvesant. On the contrary, Borough Park, Williamsburg, and Bay Ridge indicate a lower proportion of single parents in the labor force.

Analysis & Discussion

Multi-Criteria Decision Analysis

Reclassification is a vital step prior to the final weighted calculation to ensure all variables are on par compared to each other.

For the weighted scores, the authors have decided to weigh the proportion of children under 5 years old higher as the need for childcare facilities should be determined based on where the greatest number of children are located.

The second most significant criterion of population demographics is tracts with a median income below the borough median. This binary feature class is multiplied by ten to ensure that it is equally as significant as other population demographic variables.

The proportion of married households with both parents in the labor force and the proportion of single-parent households with the parent in the labor force are both weighed equally and only multiplied by one each.

After adding together all of the demographic variables, the summed score was subtracted by the proportion of available childcare facilities in proximity to the census tract. This childcare facilities' value was weighed equally to the population of children under 5 years old.

With these calculations, the decision scores have a range of -14 to 36.

Scoring Matrix For The Weighted Decision Map

Decision Layer	Reclassified Scores	Map Weighting	New Maximum & Minimum
Proportion Of Childcare Facility Service Areas (Childcare_Facilities)	1-5	x4	4 - 20
Proportion Of Children Under 5 Years Old (Children_Under5)	1-5	x4	4 - 20
Proportion Of Households Below The Median Income (Below_Med_Income)	0 - 1	x10	0 - 10
Proportion Of Married Households With Both Parents in The Labor Force (Married_Labor)	1-5	x1	1 - 5
Proportion Of Single-Parent Households With The Parent in The Labor Force (Single_Labor)	1-5	x1	1 - 5

Map Algebra For The Weighted Decision Map

$$\text{Children\_Under5} + \text{Below\_Med\_Income} + \text{Married\_Labor} + \text{Single\_Labor} - \text{Childcare\_Facilities}$$
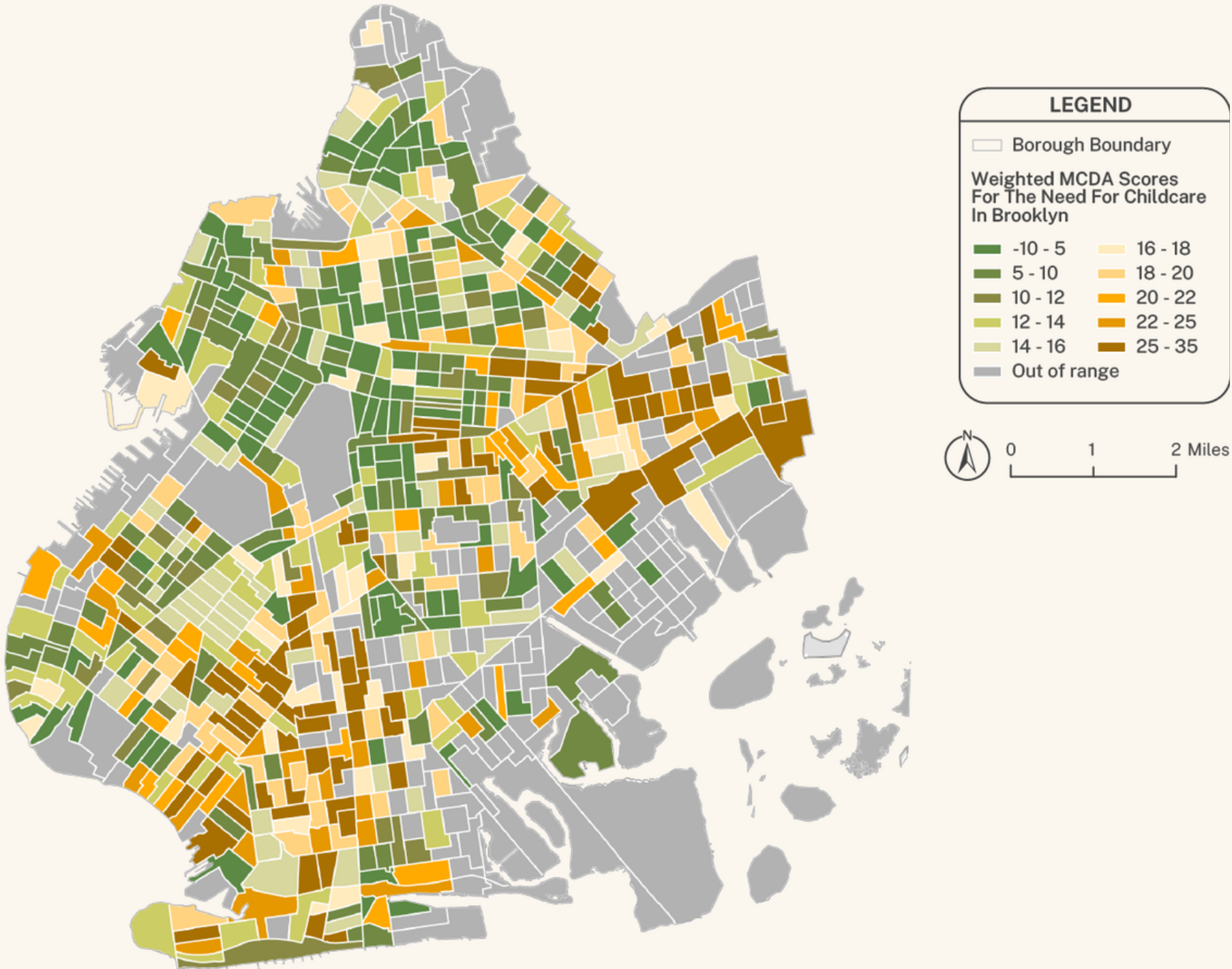
Analysis & Discussion

Multi-Criteria Decision Analysis

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The resulting weighted decision map shows decision scores with a range from -10 to 35. The negative values represent census tracts where more childcare facilities are available for higher-income populations, fewer children under 5 years old, and fewer working parents (both for married households and single-parent households).

The map also shows census tracts with "out of range" scores indicating missing values of one or more of the aforementioned criteria due to data suppression in its spatial resolution.

In supporting the New York City government grant program that aids the financing of childcare facilities in locations with childcare scarcity, providers could utilize this map in future proposals to strengthen their argument for the need for additional childcare facilities in specific locations of their choosing.

LEGEND

Borough Boundary

Weighted MCDA Scores For The Need For Childcare In Brooklyn

-10 - 5   16 - 18
5 - 10   18 - 20
10 - 12   20 - 22
12 - 14   22 - 25
14 - 16   25 - 35
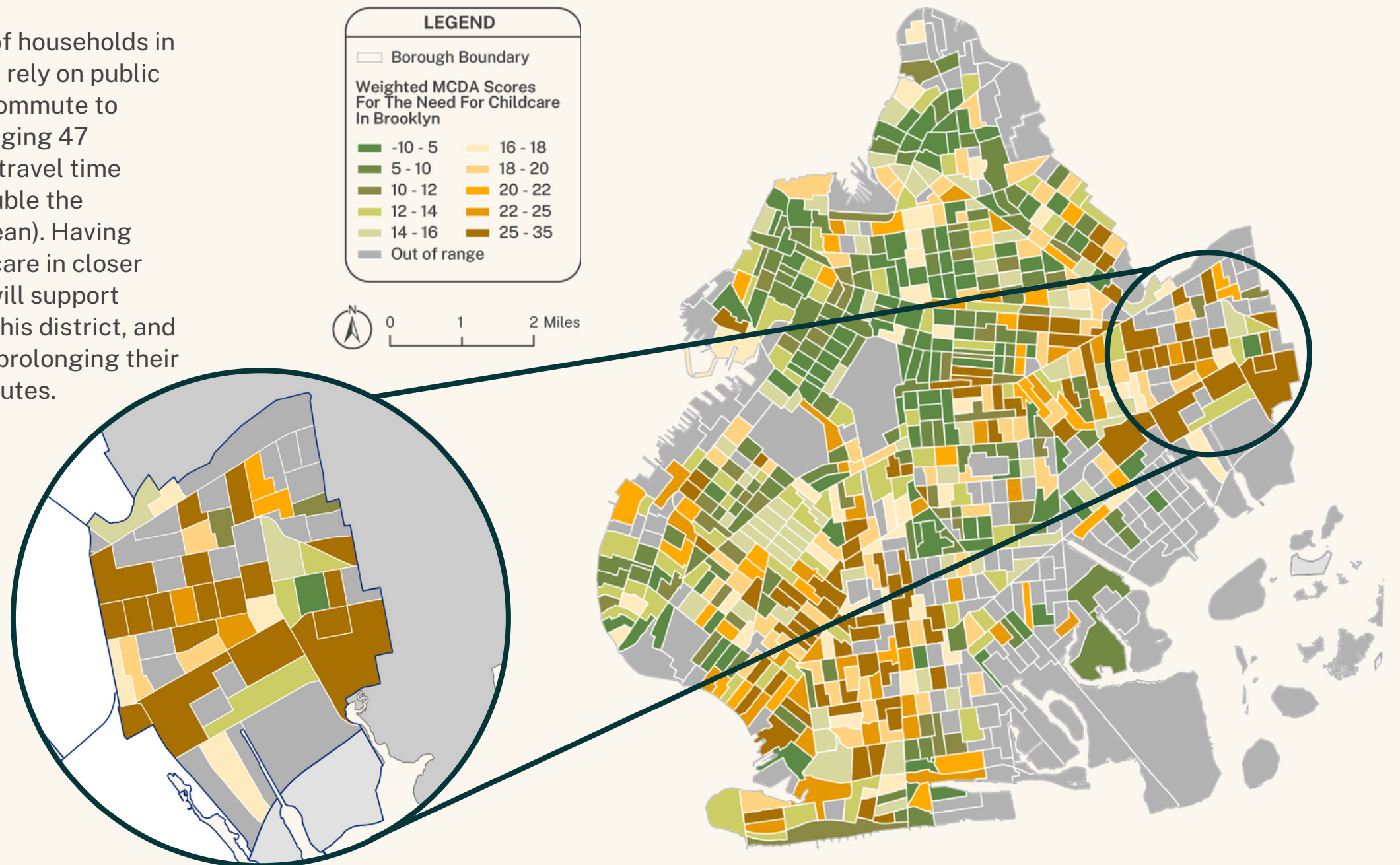Out of range

N   0   1   2 Miles

Analysis & Discussion

Multi-Criteria Decision Analysis

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Community District 5: East New York, Cypress Hills, Highland Park, New Lots, City Line, and Starrett City

There are a number of census tracts in this district that indicate an urgent need for more childcare facilities based on achieving the highest scoring class.

Based on ACS 2021 - 1 year data, 47% of households in this district are living with a median household income under $50,000, with 77% of children living in poverty. This eastern portion of Brooklyn also has more single-parent households with the individual parent part of the labor force, compared to other parts of Brooklyn (refer to the figure on page 11 for comparison).

Over 48% of households in this district rely on public transit to commute to work, averaging 47 minutes of travel time (almost double the national mean). Having more childcare in closer proximity will support parents in this district, and help in not prolonging their daily commutes.

LEGEND

Borough Boundary

Weighted MCDA Scores For The Need For Childcare In Brooklyn

- -10 - 5
- 5 - 10
- 10 - 12
- 12 - 14
- 14 - 16
- 16 - 18
- 18 - 20
- 20 - 22
- 22 - 25
- 25 - 35
- Out of range

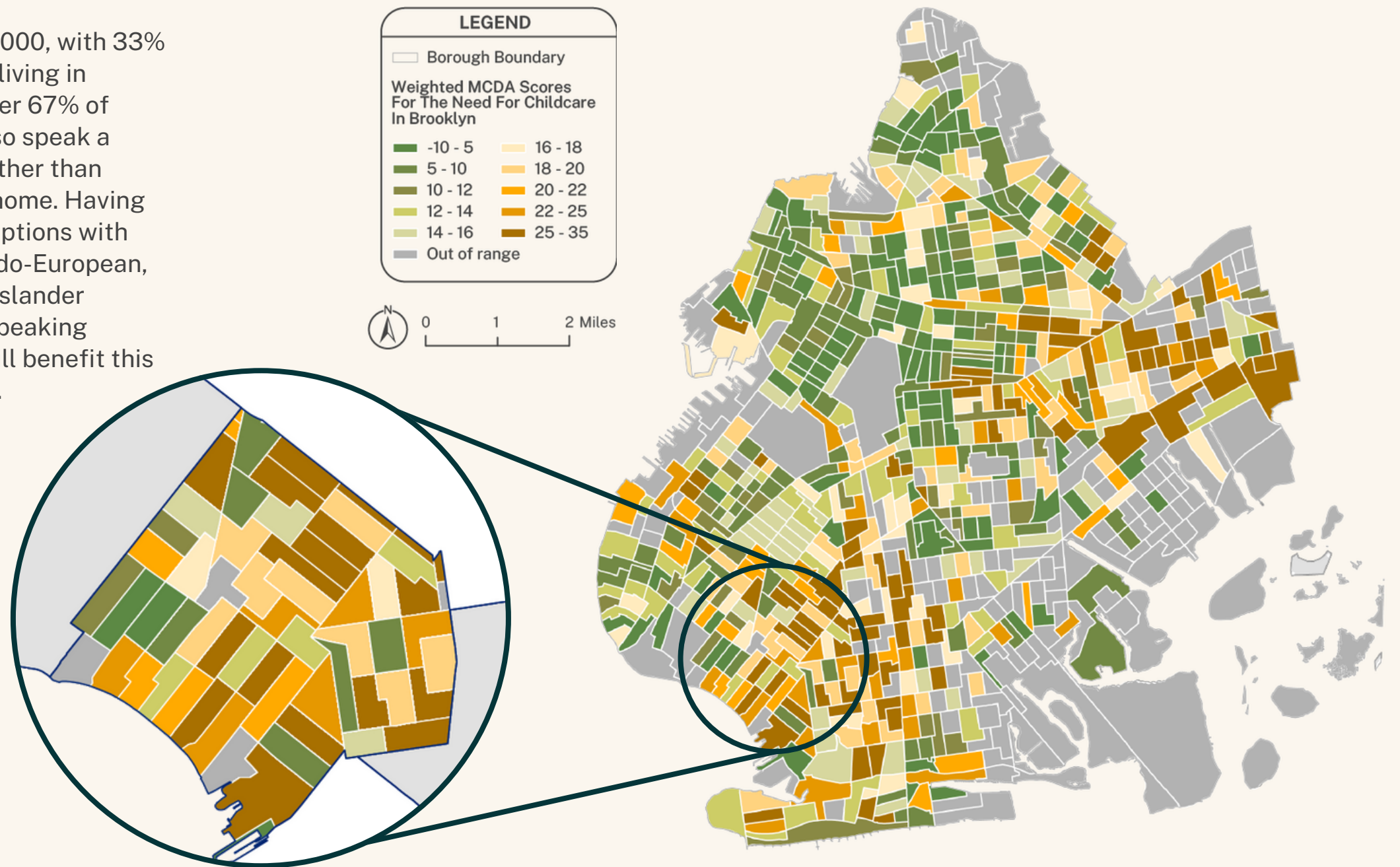0 1 2 Miles

Analysis & Discussion

Multi-Criteria Decision Analysis

Community District 11: Bath Beach, Gravesend, Mapleton, and Bensonhurst

Though a handful of tracts in this community district are already in proximity to childcare facilities, there are significantly more census tracts in this area with limited proximity. The tracts also have a significant proportion of low-income households and married households with both parents in the labor force, and a mid-to-high proportion of children under 5 years old. This creates demand for additional childcare facilities in this community district.

Based on ACS 2021 - 1 year data, 43% of households in this district are living with a median household income

under $50,000, with 33% of children living in poverty. Over 67% of children also speak a language other than English at home. Having childcare options with Spanish, Indo-European, and Asian-Islander language speaking teachers will benefit this community.

LEGEND

☐ Borough Boundary

Weighted MCDA Scores
For The Need For Childcare
In Brooklyn

■ -10 - 5   ☐ 16 - 18
■ 5 - 10   ☐ 18 - 20
■ 10 - 12   ■ 20 - 22
■ 12 - 14   ■ 22 - 25
■ 14 - 16   ■ 25 - 35
■ Out of range

N   0   1   2 Miles

Conclusion

Summary

As a vital urban amenity, childcare facilities enable parents to enter the workforce to provide for their family's livelihood. These facilities play a more significant role for low-income households residing in NYC.

Referring to the objective stated in the research question, the authors have identified a number of tracts in low-income neighborhoods such as East New York and Bensonhurst to be in high need of more childcare facilities to support the working parents living in the neighborhoods.

Measuring the levels of need for childcare based on the weighted calculation in the census tract spatial resolution also provides an intriguing insight: there are some tracts with more childcare available such as in Park Slope that don't necessarily cater to low-income working parents living in Brooklyn.

In relation to the U.S. Childcare Desert Map (2020), which shows the relationship between childcare demand and poverty levels, the authors of this report believe this method could better integrate those variables into a decision map for government authorities, childcare providers, and community advocates.

Recommendations To Readers

The authors of this report recognize that there is a profound need for childcare facility development in Brooklyn. Unfortunately, quite a few parents and caregivers are faced with adversities in sending their children to such facilities. In line with this concern, the authors explored the pain points and opportunities for facilitating better access for parents, particularly low-income households whose parent(s) is part of the labor force. Affordability is a quintessential component for these targeted households. In line with this, working parents need to be able to streamline their mobility between caring for their children

and performing their professional duties. Given this context, future childcare facilities should be situated in areas that respond to the previously mentioned challenges. With the findings of this research, the authors suggest strong collaboration from all actors in New York City to kickstart an equitable pathway for early childhood development.

Datasets

Other

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References

Appendix
Detailed Operational Diagram

Data Preparation

| Census Tract Boundaries | ACS - B01001 Sex By Age | ACS - S2503 Financial Characteristics | ACS -B23008 Age of Own Children <18 | Child Care Regulated Programs API | Community Facilities | LION - File Geodatabase |

Clean data & calculate percentages (proportion of children <5, proportion of low-income households, and proportion of working parent households)

Select by attributes the appropriate facilities

Select by attributes pedestrian accessible streets

Table join

Merge datasets & export feature class

Netowrk Analysis & Decision Layers

Solve Network Distance within 0.5 miles

Use count overlap feature to calculate overlapping service areas

Spatial join

Classify data using Phyton

Classify data using Phyton

Multi-Criteron Decision Analysis

| % Under 5 (1-5) | Below Median Income (0-1) | % Single Parent Working Household (1-5) | % Married Working Parents (1-5) | Count Overlap of Childcare Service Areas (1-5) |

Perform calculations for decision scores

Create weighted decision map representing levels of need for childcare facilities from low-income working parents

Childcare
In Brooklyn

Geographic Information Systems
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Lab Instructors Alanna Browdy & Daniel Froehlich

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Master of Urban Planning Candidates at Columbia University