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Disruption to Pedestrian Access: Measuring Impacts and Equity in Mitigation

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Pedestrian Disruptions

WHEN PUBLIC SPACES CLOSE,
NOT EVERYONE LOSES
EQUALLY

Pre-COVID

84 Pedestrian Plazas

During COVID

129 Open Streets were added

2024

232 total Open Streets

Open Streets Program

Pre-COVID

129 Open Streets were added

2024

84 Pedestrian Plazas

During COVID

232 total Open Streets

- Streets closed to cars, opened to people
- Rapid expansion during COVID-19
- Designed to mitigate park closures

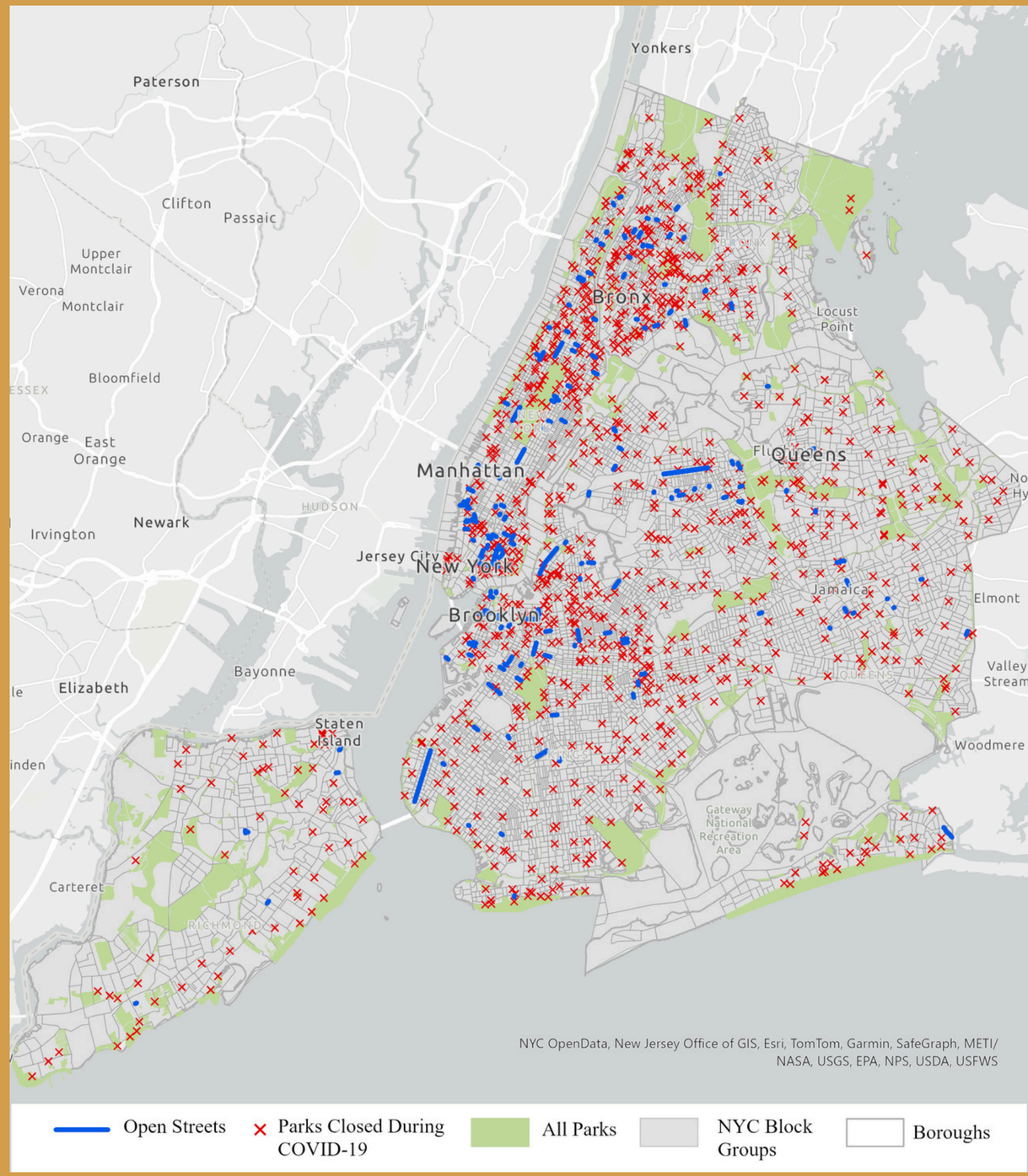
Open Streets Program

Research Goal

- Our goal is to quantify whether, and in what ways, the Open Streets Program mitigated the loss of access to parks in New York City during the COVID-19 pandemic

Borough	Population	Median Income	Percent White	Percent Nonwhite	Area (miles squared)
Bronx	1427056	41895	21.48	78.52	42.58
Brooklyn	2576771	63973	42.81	57.19	69.38
Manhattan	1629153	89812	55.17	44.83	22.83
Queens	2270976	72028	35.86	64.14	109.1
Staten Island	475596	85381	71.58	28.42	58.24

Study Area



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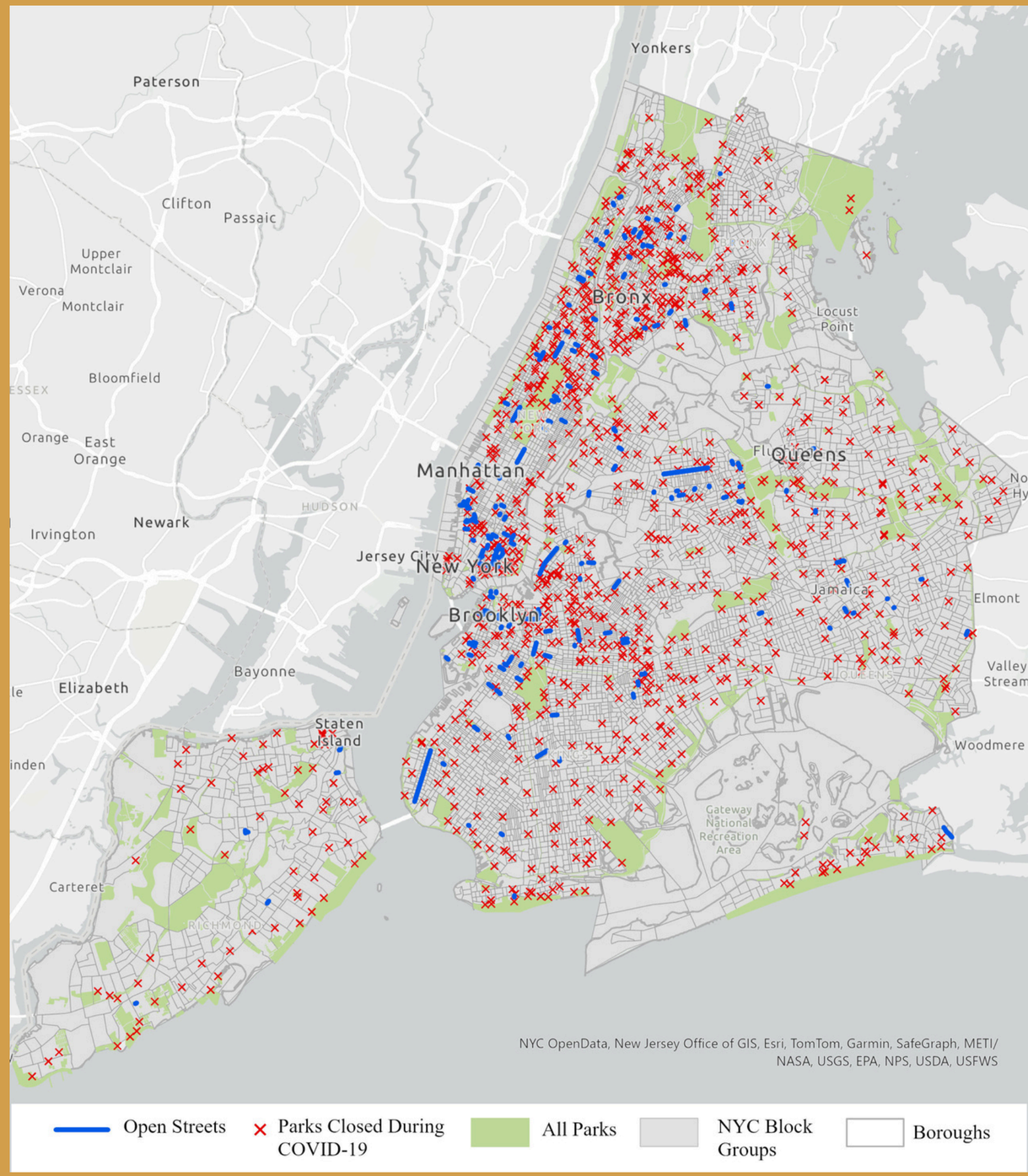

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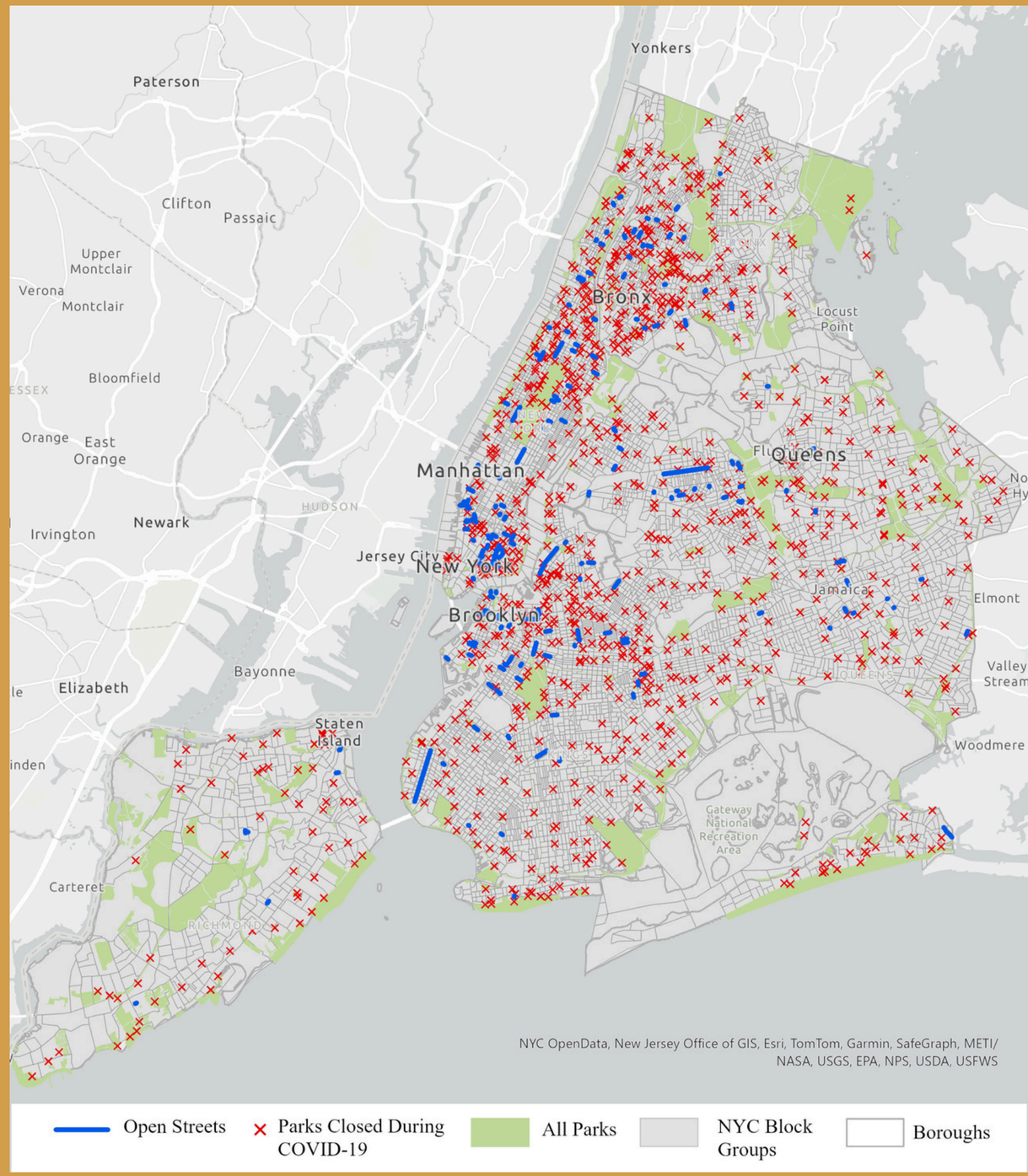

Data

Park Properties

Open Street Locations

Park Closures

Socio-economic Data

Closures and Mitigation

Borough	Total Parks	Total Parks Closed	Percent of Parks Closed	Number of Open Streets	Length of Open Streets (m)
Bronx	402	130	32.34%	23	3210.22
Brooklyn	630	237	37.62%	138	13550.76
Manhattan	395	113	28.61%	126	13623.03
Staten Island	163	38	23.31%	7	789.48
Queens	478	178	37.24%	97	9005.97

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Scenarios + Methods

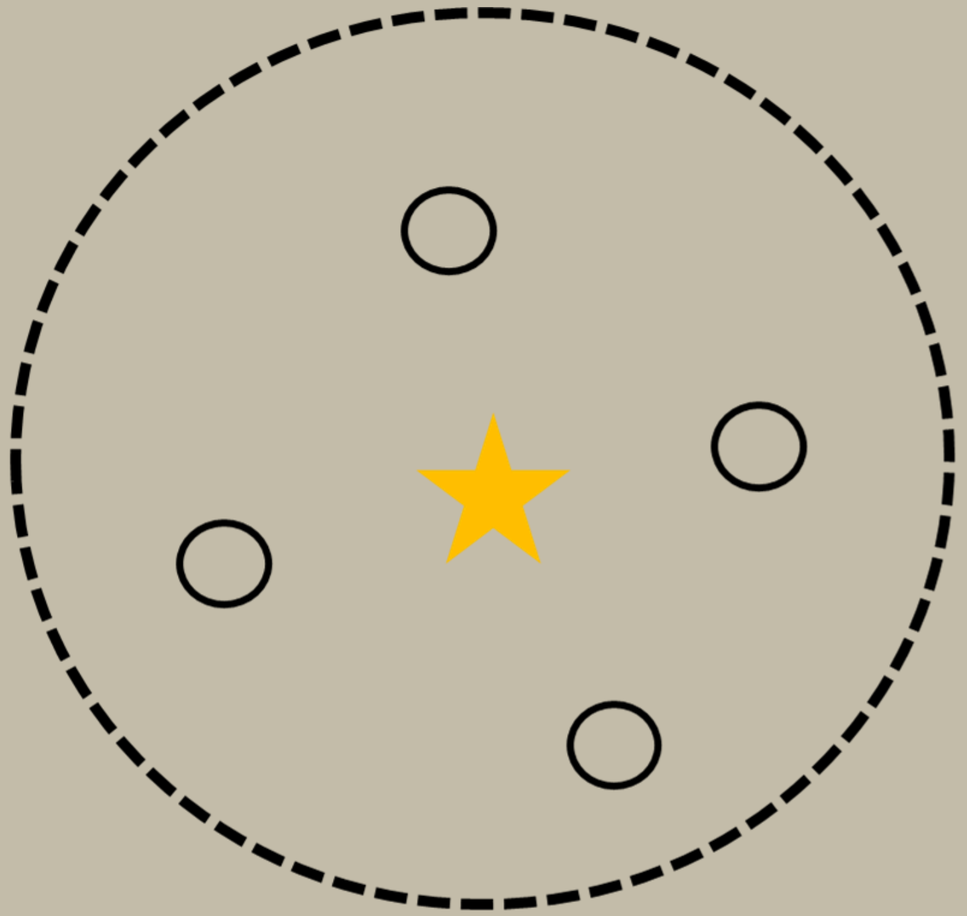
Pre-COVID

During COVID

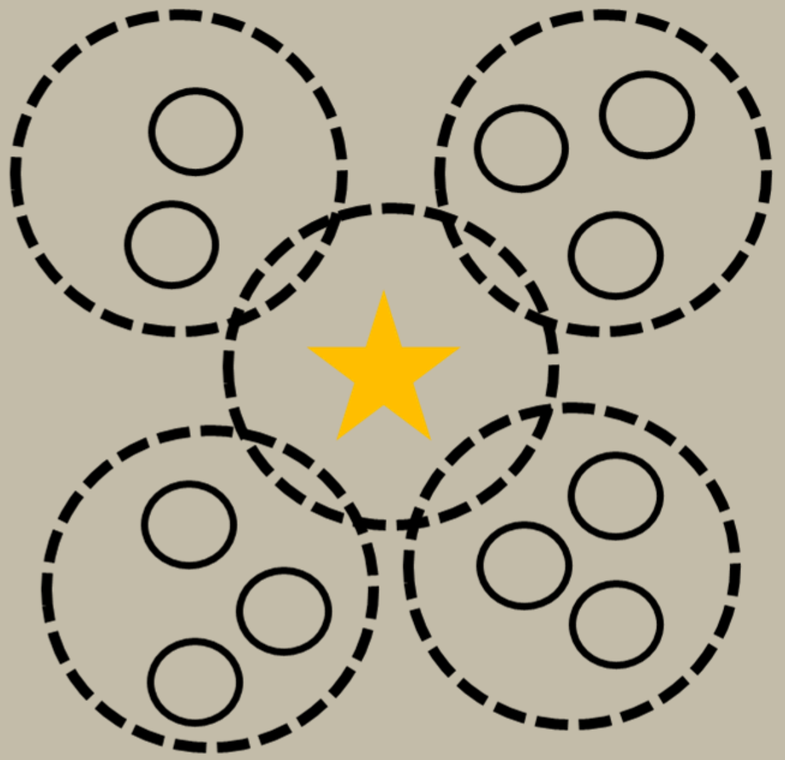
During COVID + Mitigation

- 2SFCA method with distance decay
- 15-min walk buffer (1200m) per park
- Weighted by distance: 1.0 (0–400m), 0.5 (400–800m), 0.2 (800–1200m)

We tested differences across quintiles + flagged disadvantaged block groups



Step 1: Calculate the supply to demand ratio within the catchment of each supply location



Step 2: Sum the supply to demand ratios of the relevant supply location for each demand location

Supply Location

Demand Location

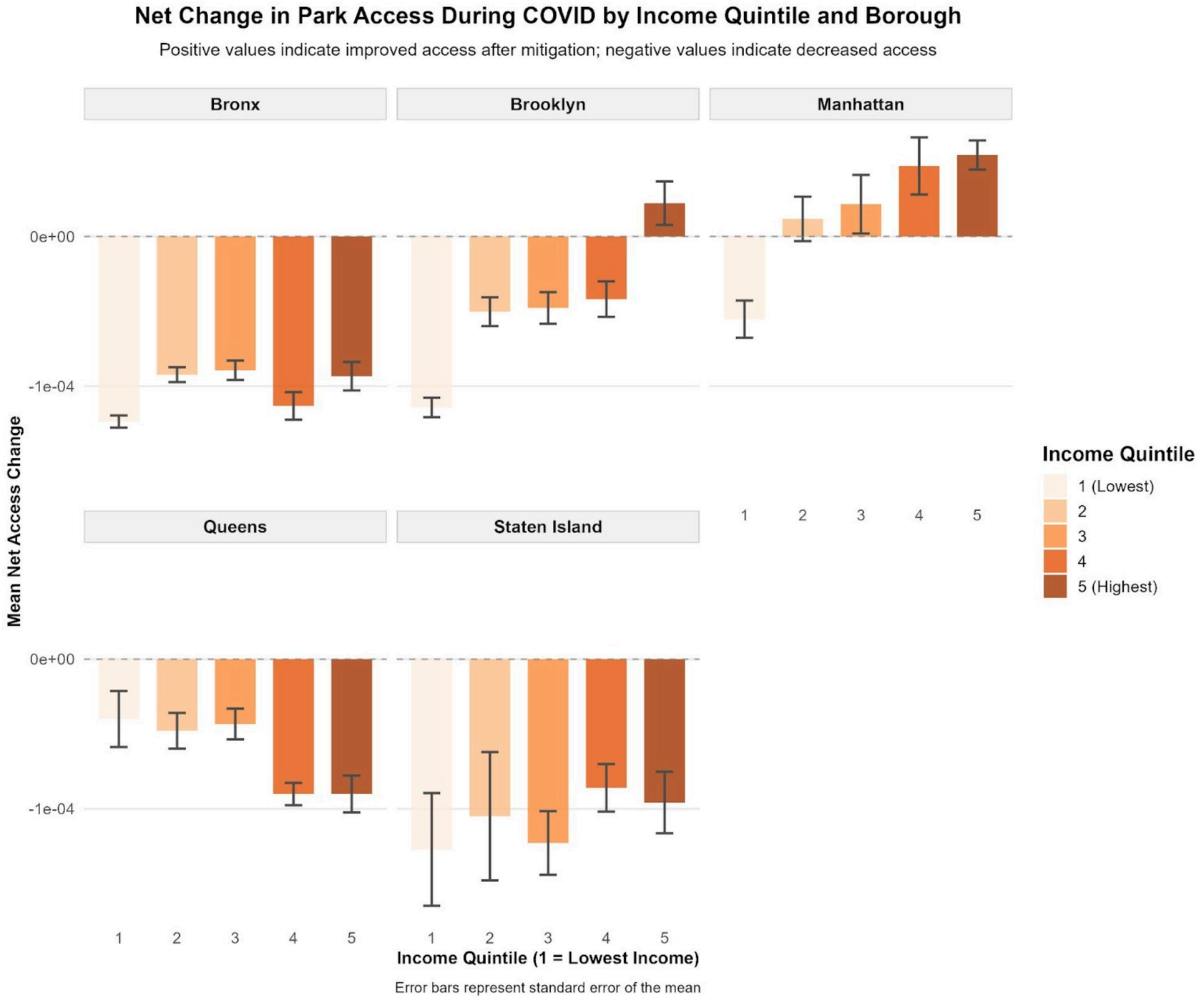

Net Change in Park Access During COVID by Income Quintile and Borough
Positive values indicate improved access after mitigation; negative values indicate decreased access
Bronx
Brooklyn
Manhattan
Queens
Staten Island
0e+00
-1e-04
Mean Net Access Change
1
2
3
4
5
Income Quintile (1 = Lowest Income)
Income Quintile
1 (Lowest)
2
3
4
5 (Highest)
Error bars represent standard error of the mean

Table 4: Disadvantaged Blocks with Minimal Recovery by Boroughs

Borough	Total Number of Block Groups in Borough	Low % White, Poor Mitigation (Number of Block Groups)	Low % White, Poor Mitigation (Percentage of Block Groups)	Low Income, Poor Mitigation (Number of Block Groups)	Low Income, Poor Mitigation (Percentage of Block Groups)	Total Number of Block Groups Flagged	Percentage of Block Groups Flagged
Bronx	1169	7	0.6	28	2.4	35	2.99
Brooklyn	2170	38	1.75	25	1.15	63	2.9
Manhattan	1274	0	0	6	0.47	6	0.47
Queens	1832	24	1.31	5	0.27	29	1.58
Staten Island	324	0	0	2	0.62	2	0.62

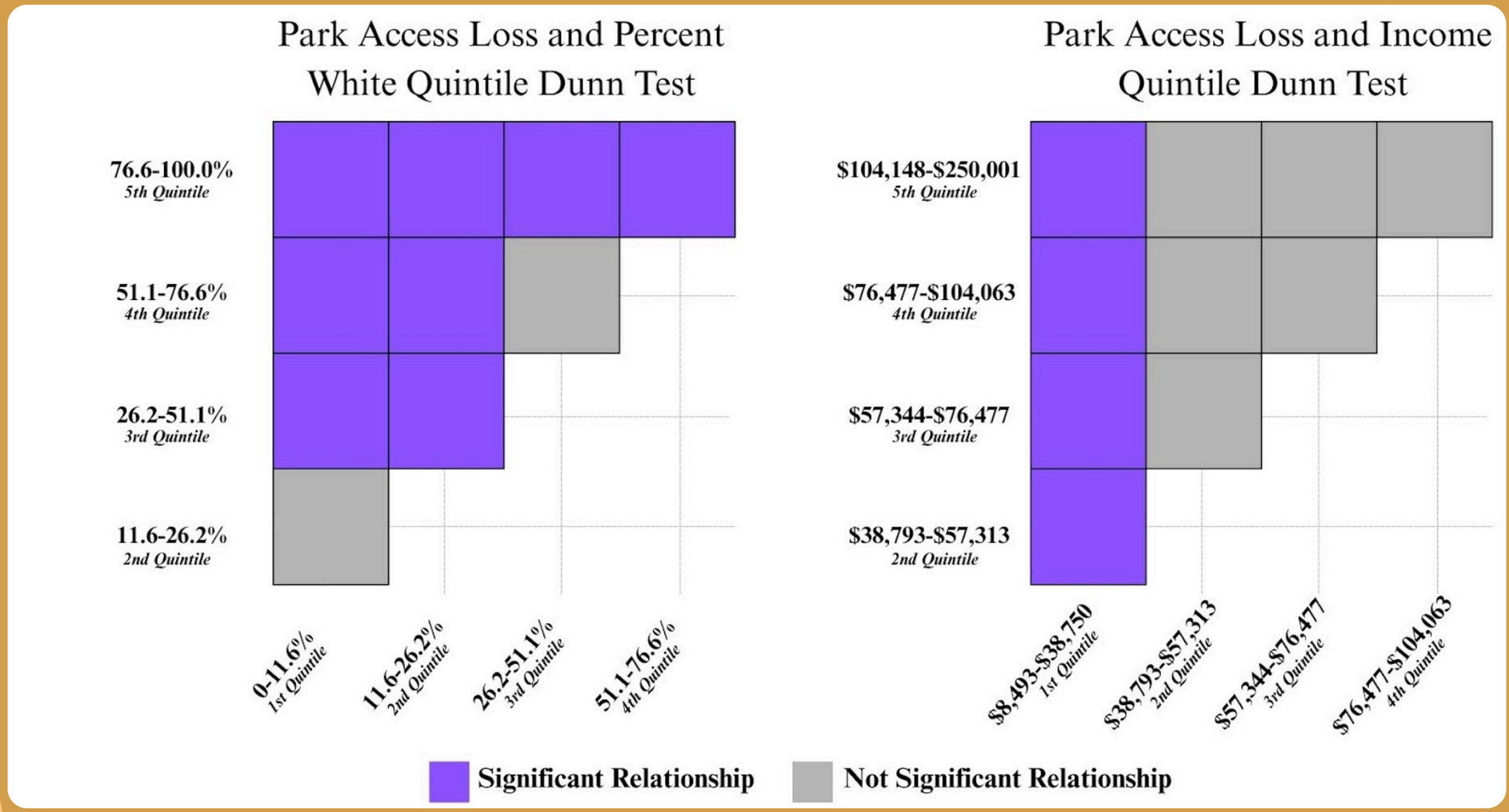


Figure 3: Dunn's Test Results Regarding Park Access for Percentage White Quintiles and Income Quintiles

Mitigation?

- Open Streets ≠ substitute for parks
- Recovery was uneven → concentrated in wealthier areas
- Mitigation can deepen inequities without design for inclusion

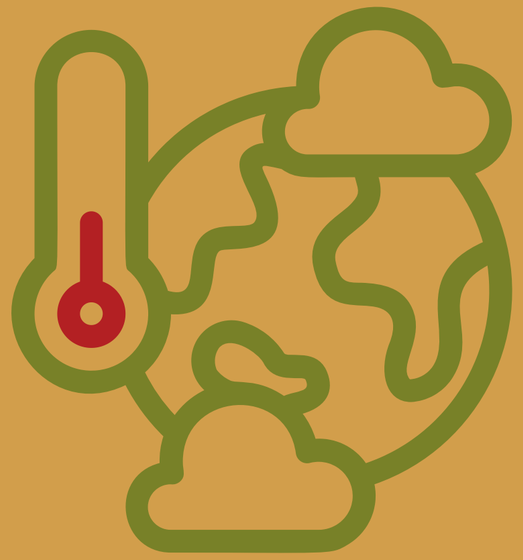
Wealthier, Whiter areas had less disruption in park use

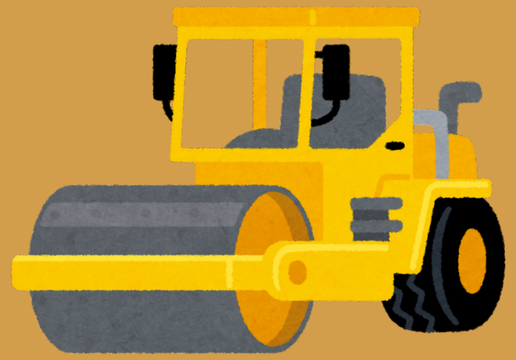
Extension of literature by not just measuring accessibility and whether mitigation redistributed access equitable

Policy Implications

- Plan for equitable distruption response
- Expand access beyond high-income neighborhoods
- Support community partners in implementation

Future Direction





Pedestrian equity must be at the center of how we design, manage, and mitigate our public spaces

Disruptions reshape access, but recovery doesn't have to widen inequities

Our findings show that Open Streets mitigated losses, but not equitably

thank you

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