Analysis on the Persisting Effects of **Redlining** in Chicago Neighborhoods

as it relates to Green Infrastructure

SPEAKER INTRO
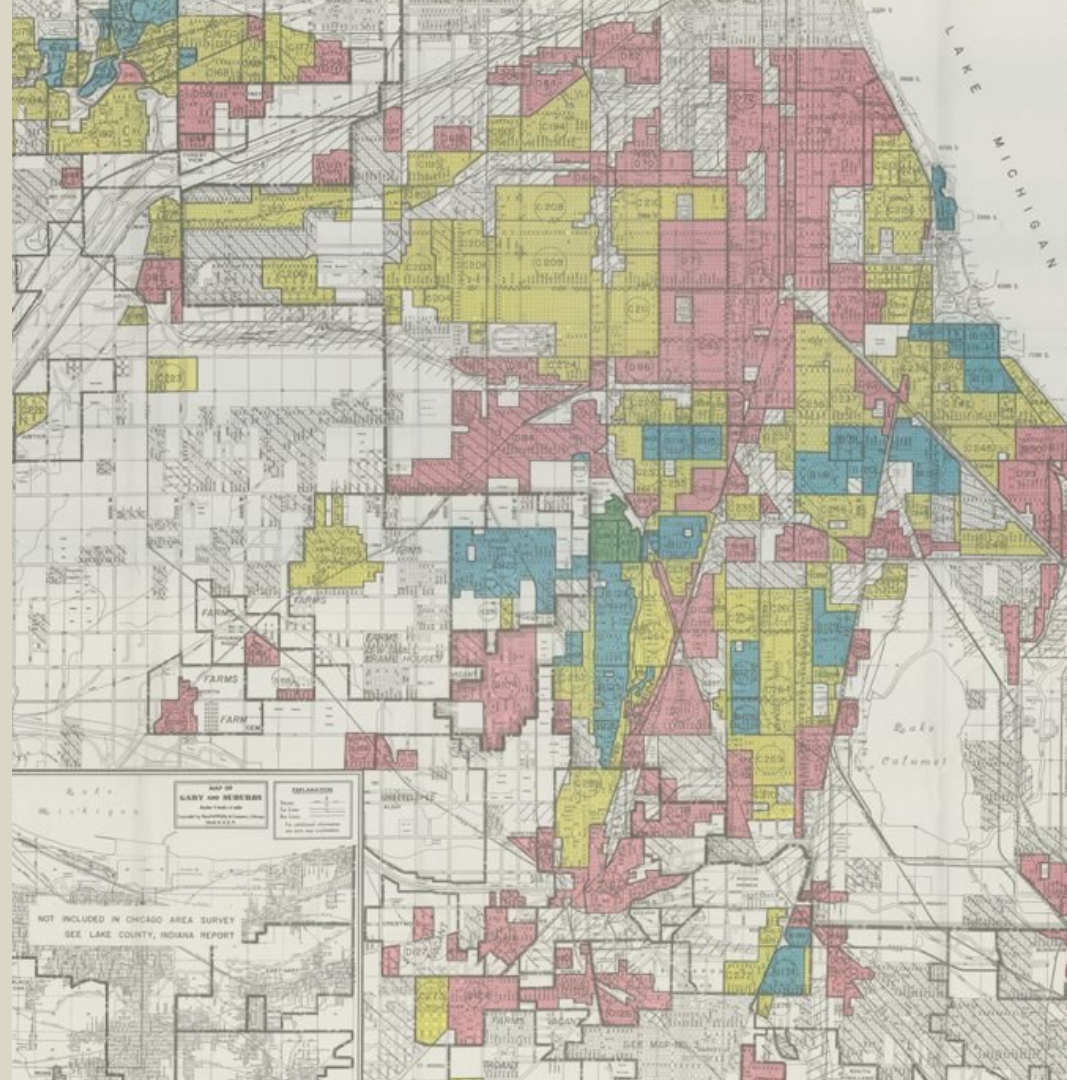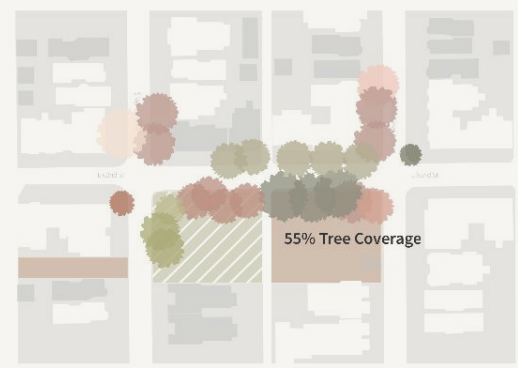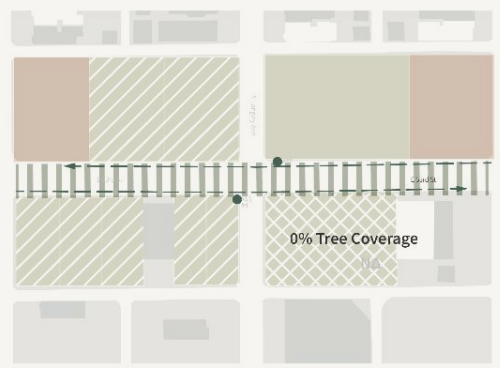
Joel Meyer (he/him/his)
5th Year - B.Arch.
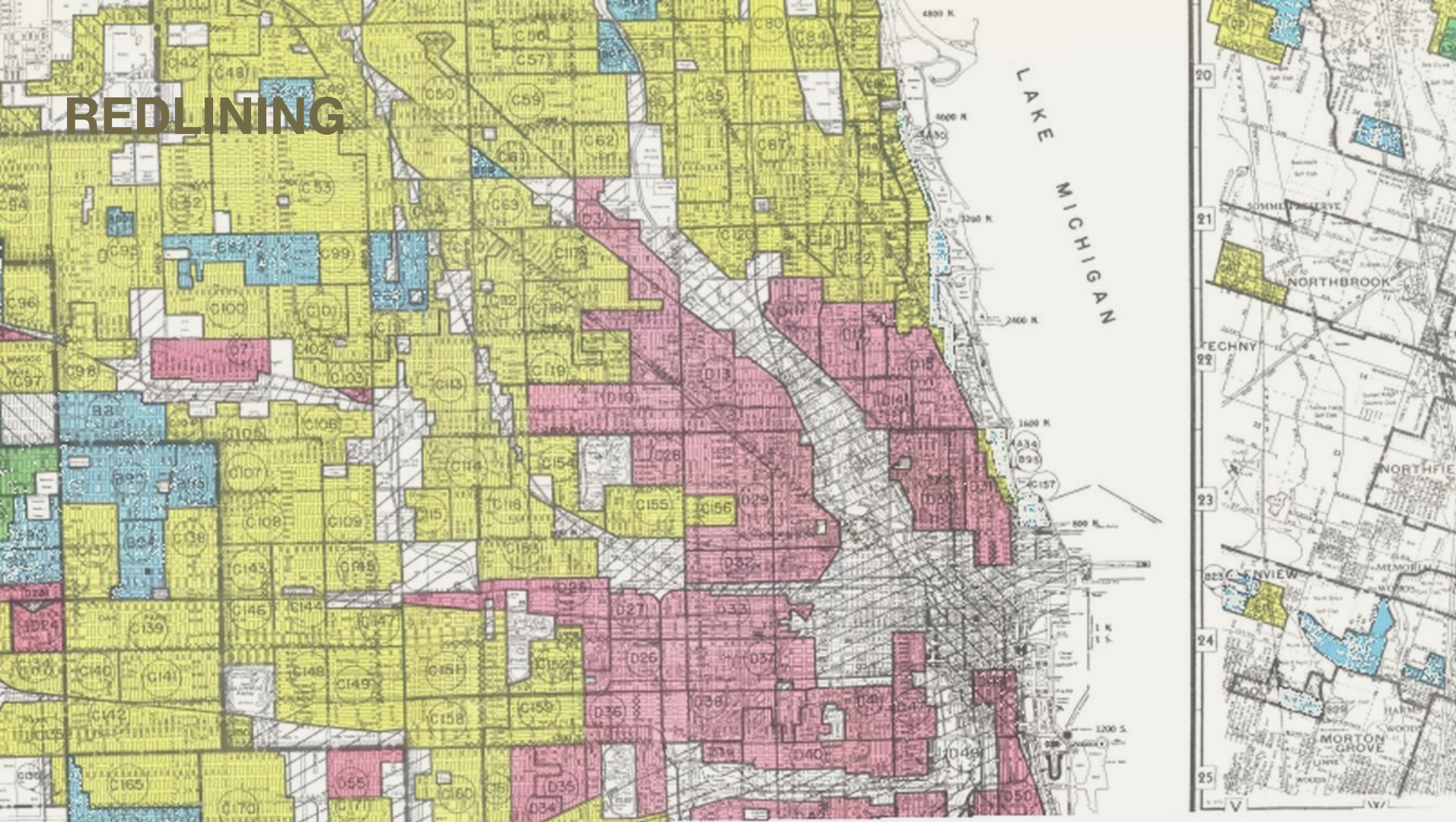Specialization: History & Theory
Minor: Policy & Ethics

Native

Silver Maple (23) · Red Maple (4) · Honey Locust (4) · American Elm (3) · Shingle Oak (3) · Pin Oak (2)

Tulip Tree (1) · Green Ash (1) · American Linden (1) · Eastern Cottonwood (1) · Eastern Red Cedar (1)

North-American Non-Regional

Southern Catalpa (2) · Northern White Cedar (1)

Non-Native Passive

Littleleaf Linden (1) · Cherry Plum (1)

Non-Native Invasive

Norway Maple (6) · White Mulberry (6) · Siberian Elm (2) · Tree of Heaven (1)

Group · Individual · County · City · Foreclosure · City via County

0% Tree Coverage

55% Tree Coverage

14.6% Tree Coverage

REDLINING

REDLINING

"The term "redlining" … comes from the development by the New Deal, by the federal government of maps of every metropolitan area in the country. And those maps were color-coded by first the Home Owners Loan Corp. and then the Federal Housing Administration and then adopted by the Veterans Administration, and these color codes were designed to indicate where it was safe to insure mortgages. And **anywhere where African-Americans lived**, *anywhere where African-Americans lived nearby* **were colored red to indicate to appraisers that these neighborhoods were too risky to insure mortgages.***"*

Rothstein, Richard. Interview by Terry Gross. "A 'Forgotten History' Of How The U.S. Government Segregated America," *Fresh Air*. NPR, May 3, 2017.

GREEN INFRASTRUCTURE

GREEN INFRASTRUCTURE

*"Green infrastructure elements can be woven into a community at several scales. Examples at the urban scale could include a rain barrel up against a house, a **row of trees along a major city street**, or greening an alleyway. Neighborhood scale green infrastructure could include **acres of open park space** outside a city center, planting rain gardens or constructing a wetland near a residential housing complex.... When green infrastructure systems are installed throughout a community, city or across a regional watershed, they can **provide cleaner air and water** as well as **significant value for the community** with flood protection, diverse habitat, and beautiful green spaces."*

Environmental Protection Agency. "What is Green Infrastructure." Last Updated December 28, 2021. https://www.epa.gov/green-infrastructure/what-green-infrastructure

% Tree Canopy Cover
(NLCD 2011)

60

0
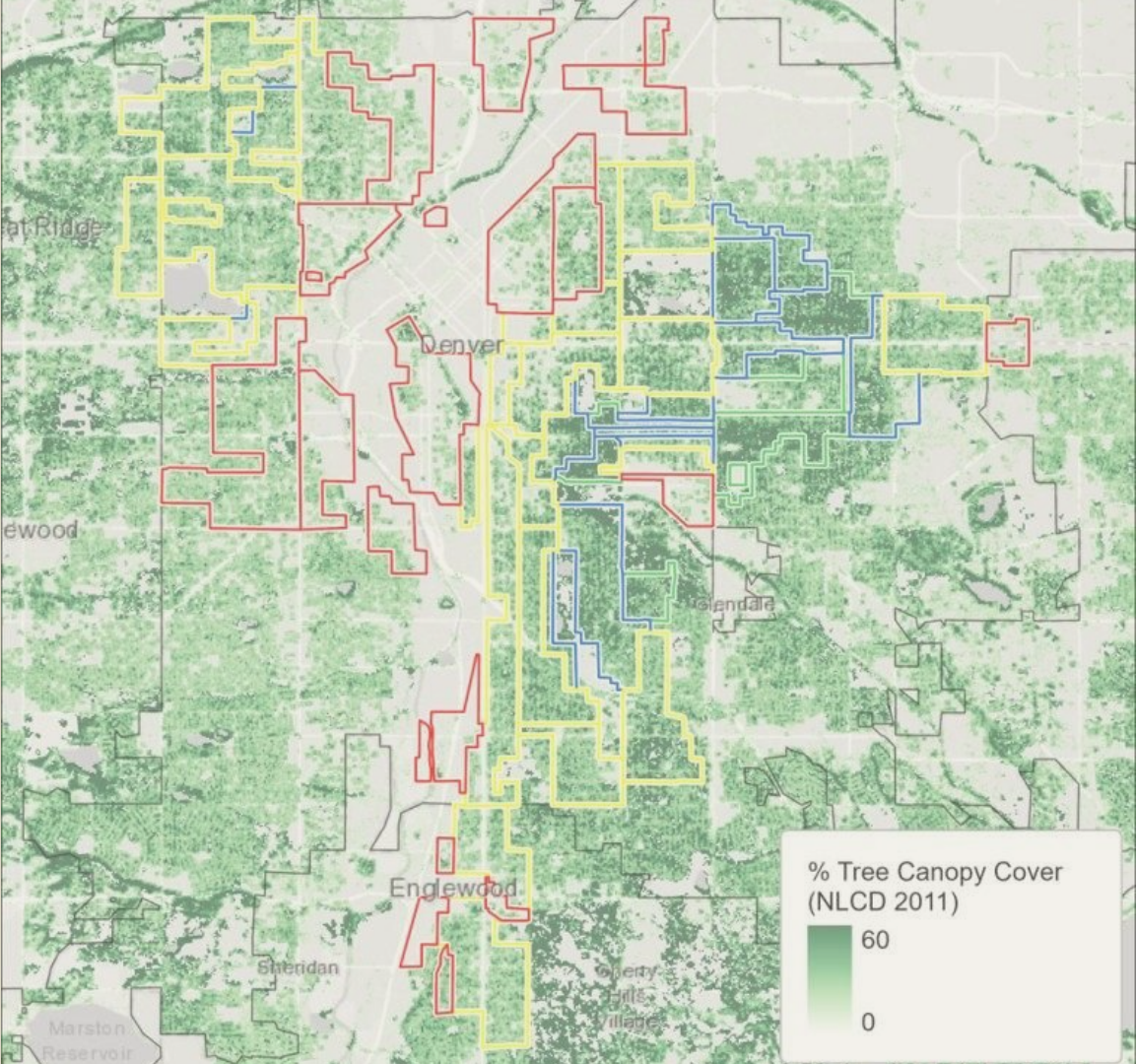
CONNECTION

"Redlining, while it did not create segregation, codified practices of segregation and created economic disincentives for people to invest in those neighborhoods that were formerly redlined.

That means that a city, which relies heavily on property taxes, is not going to be funneling resources – things like parks, things like trees, things like improved sewer infrastructure – into those neighborhoods that are considered "declined" or "declining," which was the designation of those redlined neighborhoods. And so now, 90-plus years later, we're still seeing that **those areas that were formerly redlined are hotter, are wetter, and have poorer air quality.**"

Mingoya, Cate. Interview by Sarah Kennedy. "The Link Between Racist Housing Policies of the Past and the Climate Risks of Today." Yale Climate Connections, March 18, 2021.

CONNECTION

"Research by Jeremy Hoffman and Vivek Shandas shows the degree to which that's the case – that on average, **it's about 4.7 degrees Fahrenheit hotter** *in the same city,* **on the same day***, between neighborhoods that are redlined and [non-redlined areas]. But that* **can be as an extreme as [almost] 20 degrees Fahrenheit***.* **That's the difference between turning on your air conditioner and not***.* **That's the difference between a $150 bill and a $250 bill at the end of July for your electricity.** *And that's the difference between spending some time hanging out on the front porch with your family in the summer and ending up in the hospital for heat stroke, or for an exacerbated condition, like asthma, for example."*

Mingoya, Cate. Interview by Sarah Kennedy. "The Link Between Racist Housing Policies of the Past and the Climate Risks of Today." Yale Climate Connections, March 18, 2021.

STAKEHOLDERS

Chicago Region Trees Initiative (CRTI)

"We will ensure that trees are healthier, more abundant, more diverse, and more equitably distributed to provide needed benefits to all people and communities that live in the Chicago region."

Outcomes of Interest:

☐ Improved Urban Forest Policy

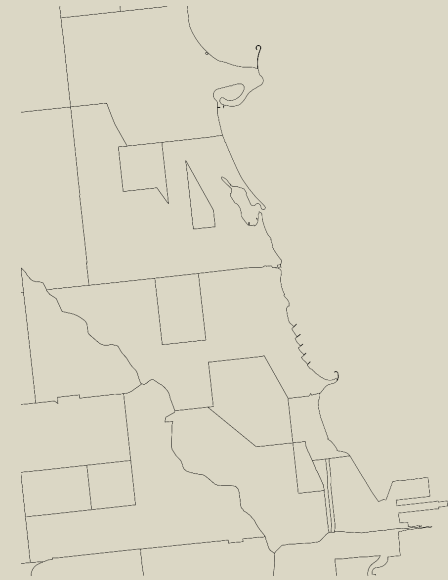☐ Increased Funding for Urban Forestry

GOALS // METHOD

Calculate the % of redlining in each neighborhood
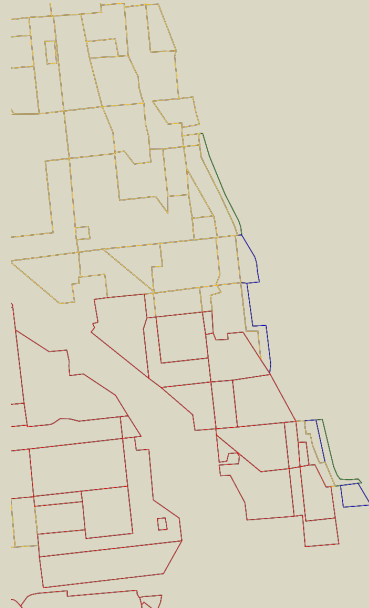
Calculate the % canopy for each neighborhood

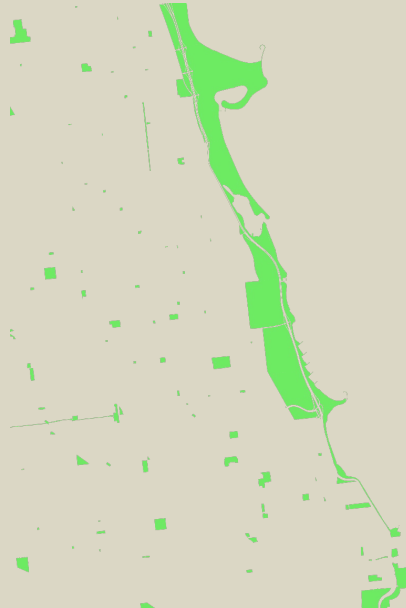Calculate the % public park coverage for each neighborhood
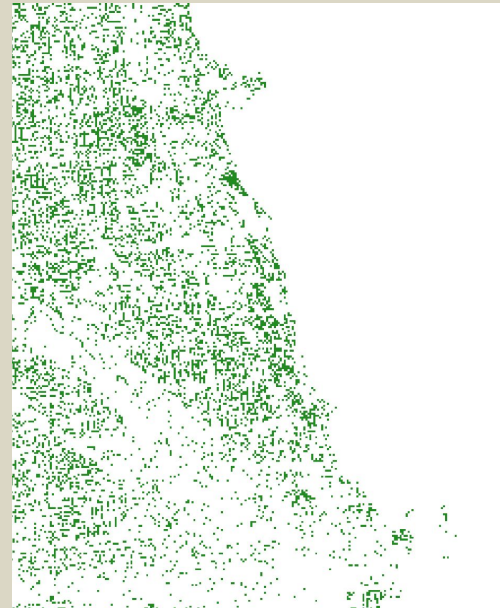
GOALS // METHOD

Neighborhoods   Redlining   Parks   Tree Canopy

GOALS // METHOD

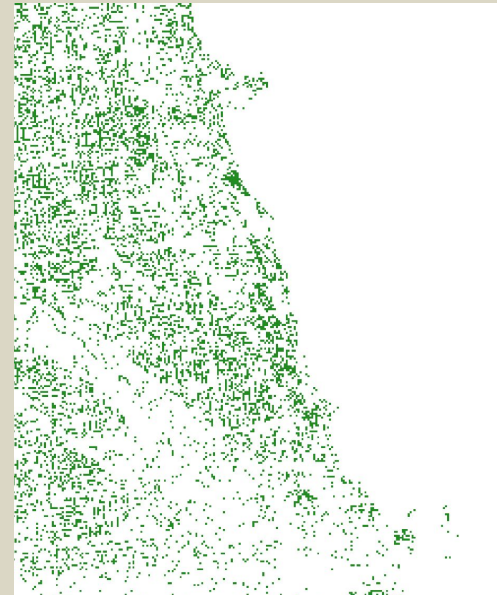Neighborhoods   Redlining   Parks   Tree Canopy
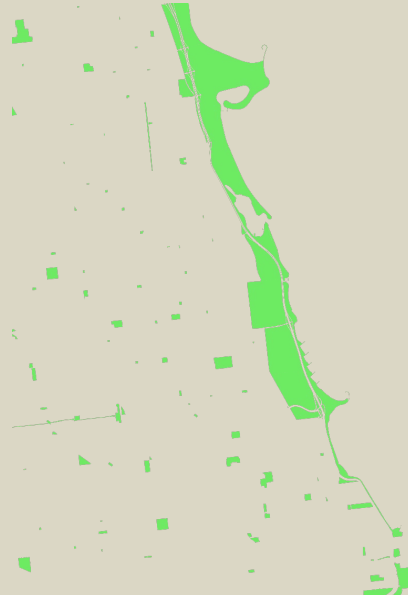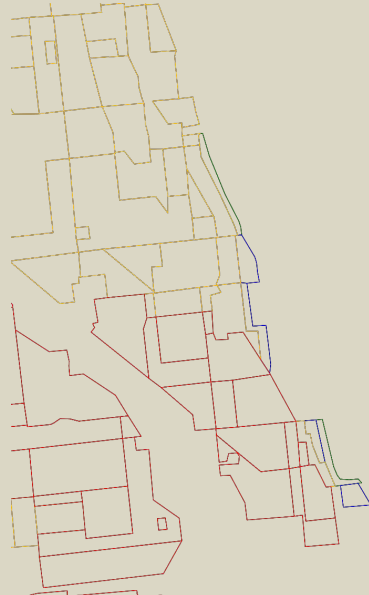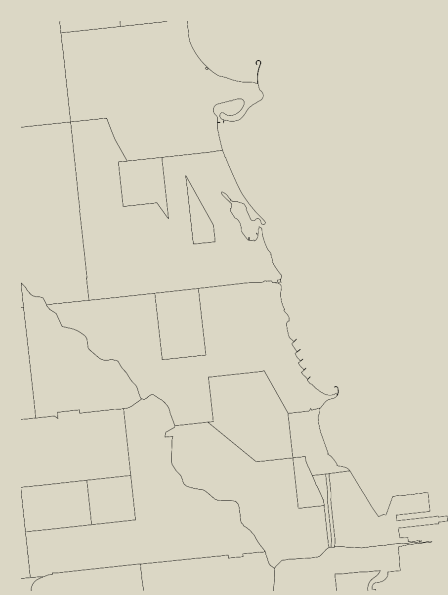
REDLINING
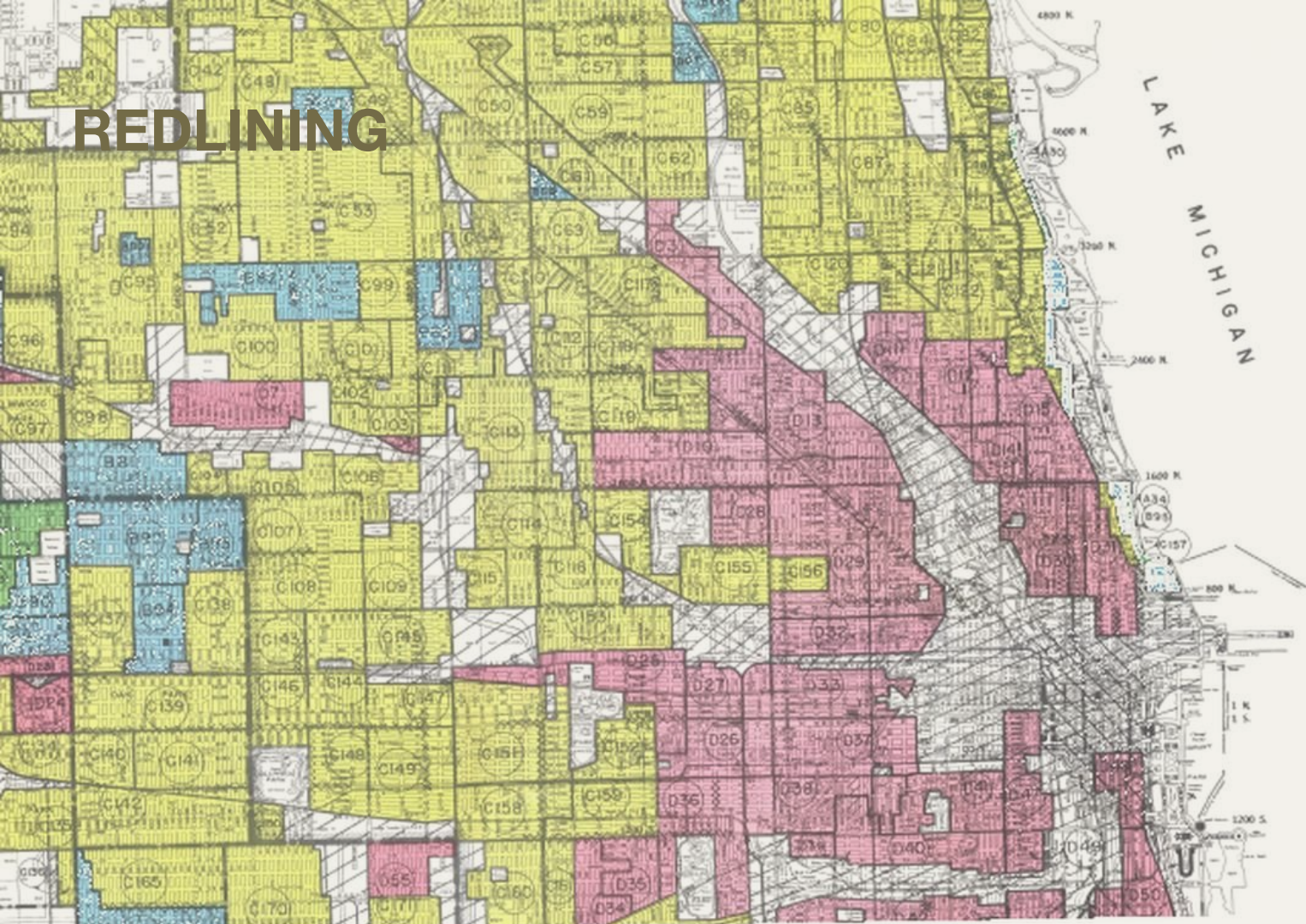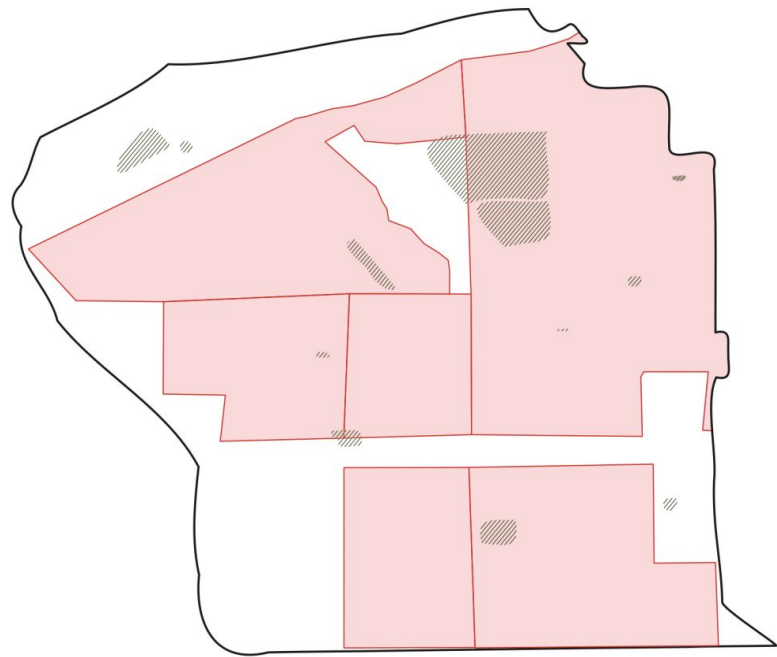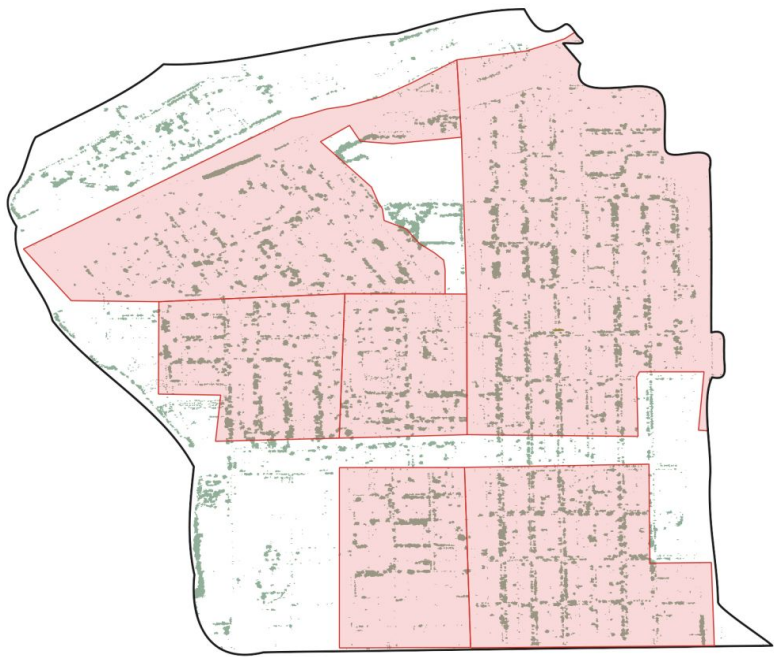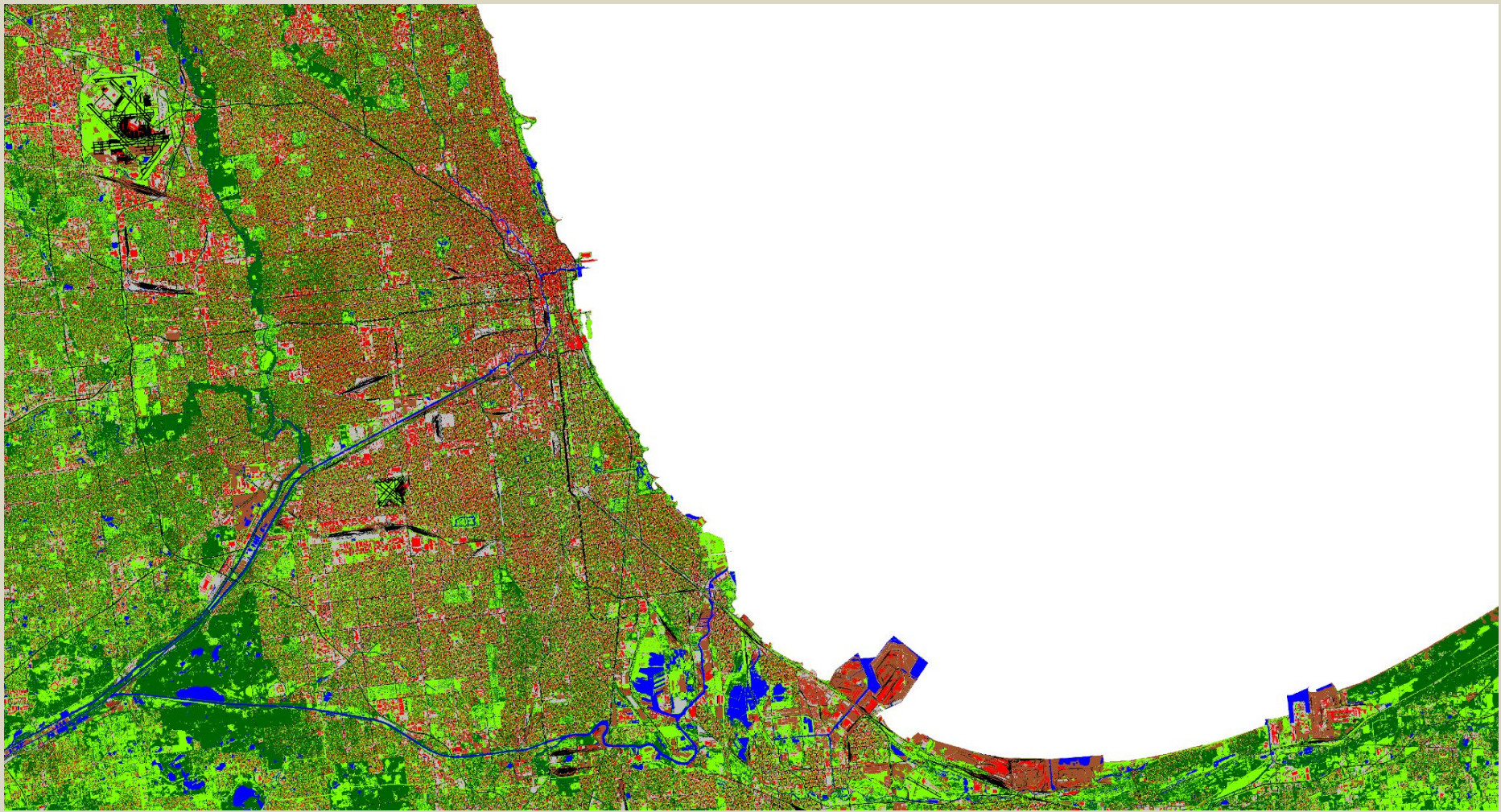
GOALS // METHOD

East Side   Hegewisch   Pullman   Riverdale   South Deering

GOALS // METHOD

Python Scripting

Counting Alpha Pixels 0 // 1

Count Black Pixels

Calculate % Canopy

Recreate Image
(check resolution resolution)

Original PNG made
from GIS data

Python Created
Image to check

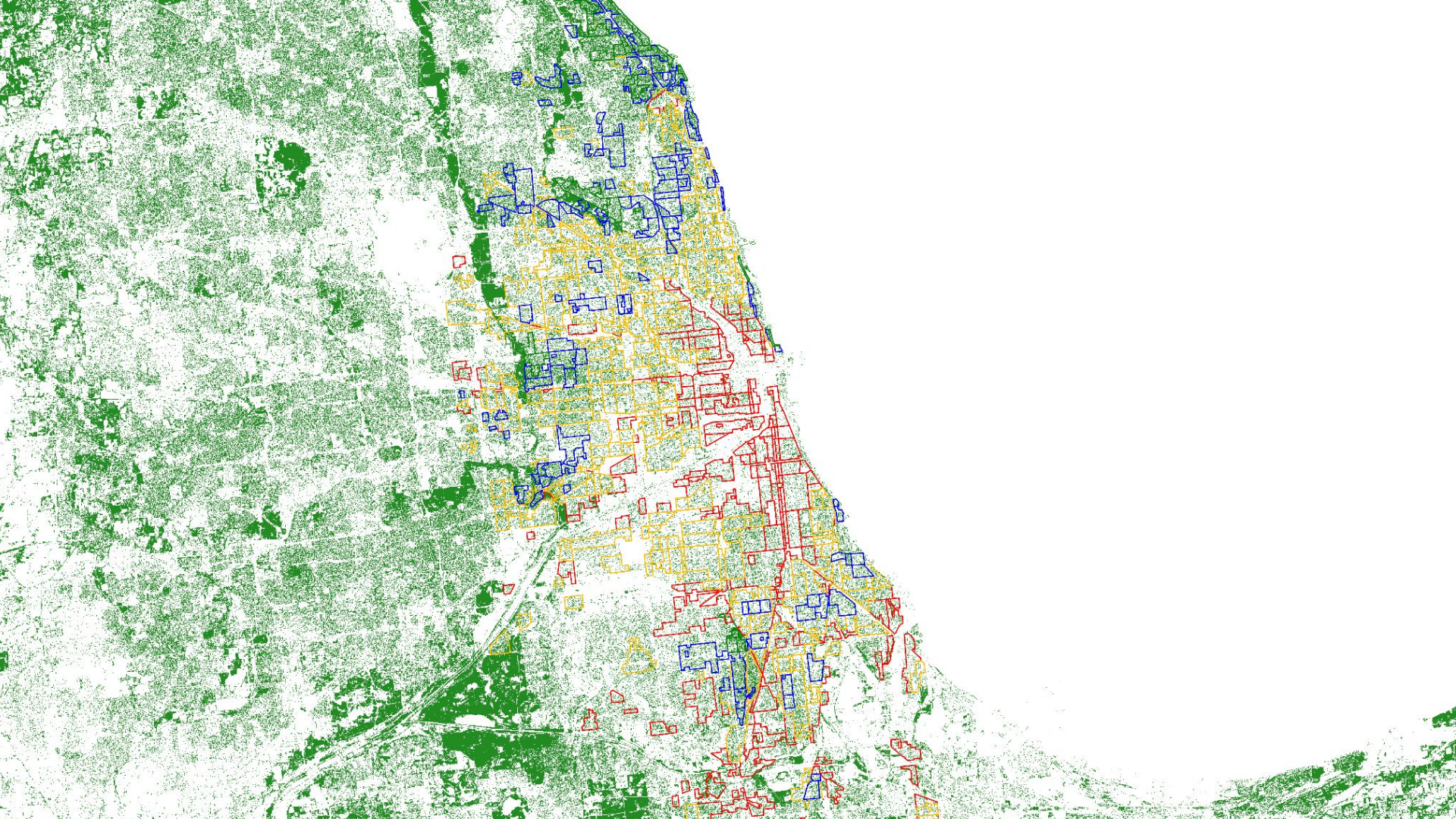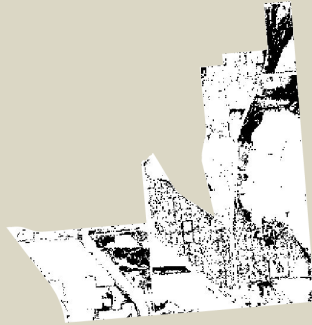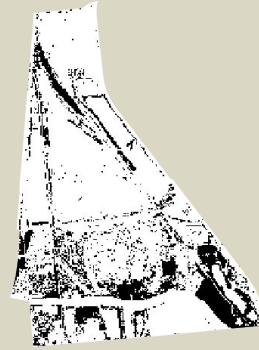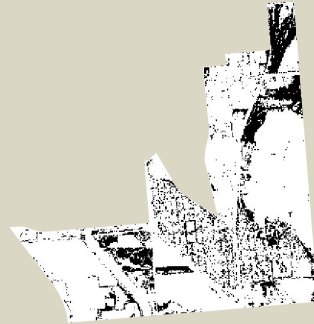| Neighborhood	% Redlined	% Yellowlined	% Bluelined	% Greenlined	% Unlined	Score'	% Park	% Canopy
Andersonville	0.00%	100.00%	0.00%	0.00%	0.00%	0.25	0.39%	24.47%
Archer Heights	10.28%	28.47%	0.00%	0.00%	61.25%	0.68	1.88%	7.60%
Armour Square	68.05%	0.00%	0.00%	0.00%	31.95%	0.32	2.93%	8.72%
Ashburn	57.99%	0.00%	0.00%	0.54%	41.47%	0.42	2.00%	16.33%
Auburn Gresham	21.25%	44.37%	15.45%	0.00%	18.94%	0.38	2.76%	18.74%
Austin	0.00%	78.21%	0.00%	0.00%	21.79%	0.41	4.77%	20.21%
Avalon Park	0.00%	4.63%	59.33%	0.00%	36.05%	0.67	3.57%	21.04%
Avondale	19.62%	56.92%	0.00%	0.00%	23.46%	0.38	0.76%	14.10%
Belmont Cragin	12.69%	49.12%	19.24%	0.00%	18.94%	0.41	2.72%	15.26%
Beverly	3.58%	29.47%	29.17%	16.78%	20.99%	0.56	2.22%	44.15%
Boystown	0.00%	100.00%	0.00%	0.00%	0.00%	0.25	0.22%	17.15%
Bridgeport	55.74%	0.00%	0.00%	0.00%	44.26%	0.44	3.33%	9.67%
Brighton Park	28.12%	39.26%	0.00%	0.00%	32.62%	0.42	1.49%	11.63%
Bucktown	61.29%	0.00%	0.00%	0.00%	38.71%	0.39	1.61%	13.35%
Burnside	46.22%	0.00%	0.00%	0.00%	53.78%	0.54	2.26%	21.47%
Calumet Heights	7.12%	39.18%	0.00%	0.00%	53.70%	0.63	1.92%	19.07%
Chatham	5.80%	37.18%	35.60%	0.00%	21.43%	0.49	2.60%	20.39%
Chicago Lawn	13.12%	65.48%	0.00%	0.00%	21.40%	0.38	14.02%	18.59%
Chinatown	65.50%	0.00%	0.00%	0.00%	34.50%	0.34	3.57%	7.28%
Clearing	0.00%	31.04%	0.00%	0.00%	68.96%	0.77	2.23%	9.15%
Douglas	73.05%	0.00%	0.00%	0.00%	26.95%	0.27	18.87%	19.42%
Dunning	0.00%	65.85%	1.80%	0.00%	32.35%	0.50	2.06%	20.59%
East Side	28.48%	15.05%	0.00%	0.00%	56.47%	0.60	11.15%	15.06%
East Village	99.76%	0.00%	0.00%	0.00%	0.24%	0.00	1.04%	14.30%
Edgewater	0.00%	85.97%	4.87%	0.00%	9.16%	0.33	9.19%	18.89%
Edison Park	0.00%	0.00%	100.00%	0.00%	0.00%	0.50	2.95%	28.00%
Englewood	71.09%	22.37%	0.00%	0.00%	6.54%	0.12	3.34%	24.48%
Fuller Park	66.38%	0.00%	0.00%	0.00%	33.62%	0.34	2.65%	10.90%

	Neighborhood	% Redlined	% Yellowlined	% Bluelined	% Greenlined	% Unlined	Score'	% Park	% Canopy
3	Andersonville	0.00%	100.00%	0.00%	0.00%	0.00%	0.25	0.39%	24.47%
4	Archer Heights	10.28%	28.47%	0.00%	0.00%	61.25%	0.68	1.88%	7.60%
5	Armour Square	68.05%	0.00%	0.00%	0.00%	31.95%	0.32	2.93%	8.72%
6	Ashburn	57.99%	0.00%	0.00%	0.54%	41.47%	0.42	2.00%	16.33%
7	Auburn Gresham	21.25%	44.37%	15.45%	0.00%	18.94%	0.38	2.76%	18.74%
8	Austin	0.00%	78.21%	0.00%	0.00%	21.79%	0.41	4.77%	20.21%
9	Avalon Park	0.00%	4.63%	59.33%	0.00%	36.05%	0.67	3.57%	21.04%
10	Avondale	19.62%	56.92%	0.00%	0.00%	23.46%	0.38	0.76%	14.10%
11	Belmont Cragin	12.69%	49.12%	19.24%	0.00%	18.94%	0.41	2.72%	15.26%
12	Beverly	3.58%	29.47%	29.17%	16.78%	20.99%	0.56	2.22%	44.15%
13	Boystown	0.00%	100.00%	0.00%	0.00%	0.00%	0.25	0.22%	17.15%
14	Bridgeport	55.74%	0.00%	0.00%	0.00%	44.26%	0.44	3.33%	9.67%
15	Brighton Park	28.12%	39.26%	0.00%	0.00%	32.62%	0.42	1.49%	11.63%
16	Bucktown	61.29%	0.00%	0.00%	0.00%	38.71%	0.39	1.61%	13.35%
17	Burnside	46.22%	0.00%	0.00%	0.00%	53.78%	0.54	2.26%	21.47%
18	Calumet Heights	7.12%	39.18%	0.00%	0.00%	53.70%	0.63	1.92%	19.07%
19	Chatham	5.80%	37.18%	35.60%	0.00%	21.43%	0.49	2.60%	20.39%
20	Chicago Lawn	13.12%	65.48%	0.00%	0.00%	21.40%	0.38	14.02%	18.59%
21	Chinatown	65.50%	0.00%	0.00%	0.00%	34.50%	0.34	3.57%	7.28%
22	Clearing	0.00%	31.04%	0.00%	0.00%	68.96%	0.77	2.23%	9.15%
23	Douglas	73.05%	0.00%	0.00%	0.00%	26.95%	0.27	18.87%	19.42%
24	Dunning	0.00%	65.85%	1.80%	0.00%	32.35%	0.50	2.06%	20.59%
25	East Side	28.48%	15.05%	0.00%	0.00%	56.47%	0.60	11.15%	15.06%
26	East Village	99.76%	0.00%	0.00%	0.00%	0.24%	0.00	1.04%	14.30%
27	Edgewater	0.00%	85.97%	4.87%	0.00%	9.16%	0.33	9.19%	18.89%
28	Edison Park	0.00%	0.00%	100.00%	0.00%	0.00%	0.50	2.95%	28.00%
29	Englewood	71.09%	22.37%	0.00%	0.00%	6.54%	0.12	3.34%	24.48%
30	Fuller Park	66.38%	0.00%	0.00%	0.00%	33.62%	0.34	2.65%	10.90%

DATA ANALYSIS

Create a 'score' for each neighborhood based on redlining information

- Allows for comparison between two variables, the 'score' and then the green infrastructure metric
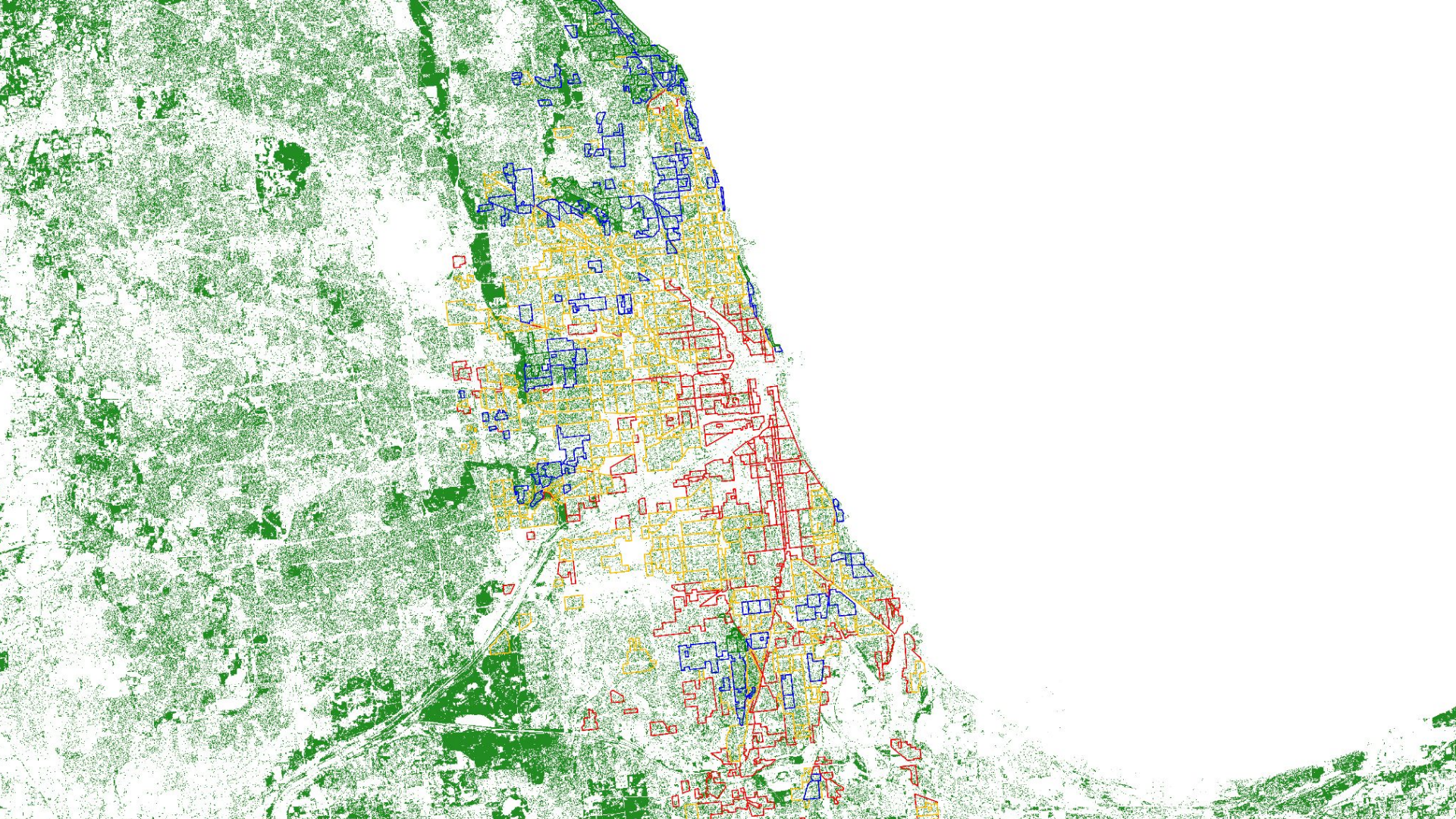
'score'

Dependent Variable
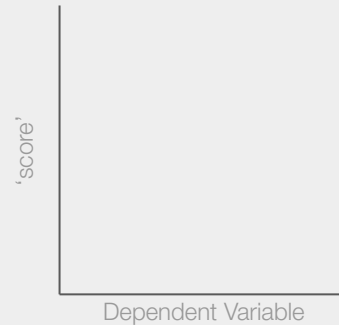
DATA ANALYSIS

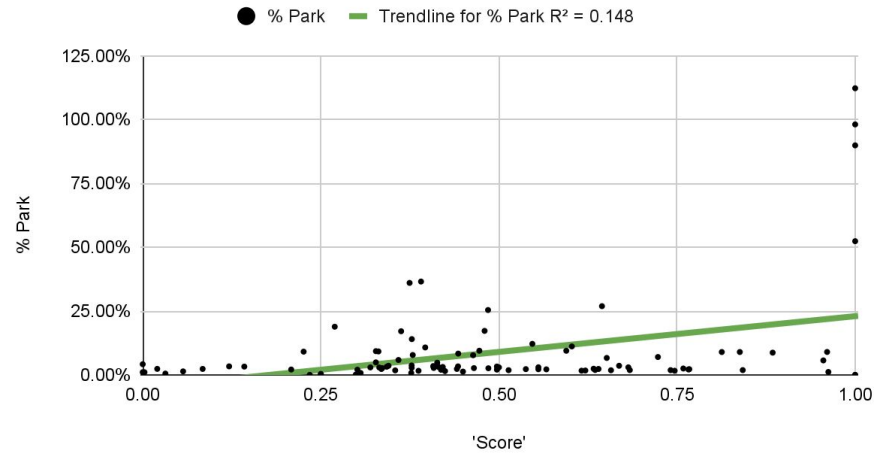Create a 'score' for each neighborhood based on redlining information

- Allows for comparison between two variables, the 'score' and then the green infrastructure metric

$$(\textbf{RL\%}(1) + \textbf{YL\%}(1.25) + \textbf{BL\%}(1.5) + \textbf{GL\%}(1.75) + \textbf{UL\%}(2)) -1 = \text{'score'}$$
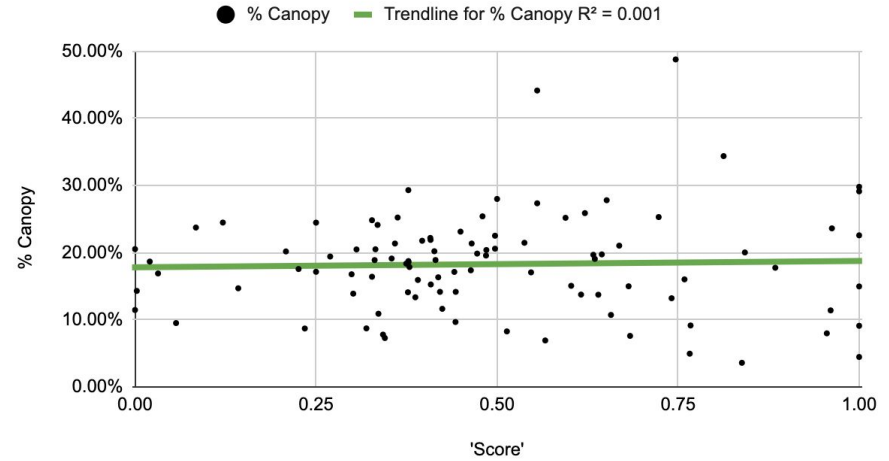
'score'

Dependent Variable

% Park vs. 'Score'

- ● % Park
- ━ Trendline for % Park R² = 0.148

% Canopy vs. 'Score'

- ● % Canopy
- ━ Trendline for % Canopy R² = 0.001

Neighborhood	% Redlined	% Yellowlined	% Bluelined	% Greenlined	% Unlined	Score'	% Park	% Canopy
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Fuller Park	66.38%	0.00%	0.00%	0.00%	33.62%	0.34	2.65%	10.90%

GOALS // METHOD

Calculate 'Score' for each Neighborhood

that is able to account for Historical Transitions