

Kathryn Bernard

Lab 2

I chose to investigate the city of Detroit, MI and the surrounding neighborhoods for this exploratory analysis. First, I explored the relationship between the percent of Detroit's population whose income is below the poverty line and the average summer temperature. There was a moderate positive correlation ($r^2 = 0.28$) between the percentage of inhabitants in poverty and temperature, such that a higher percentage of poverty was associated with higher average summer temperatures.

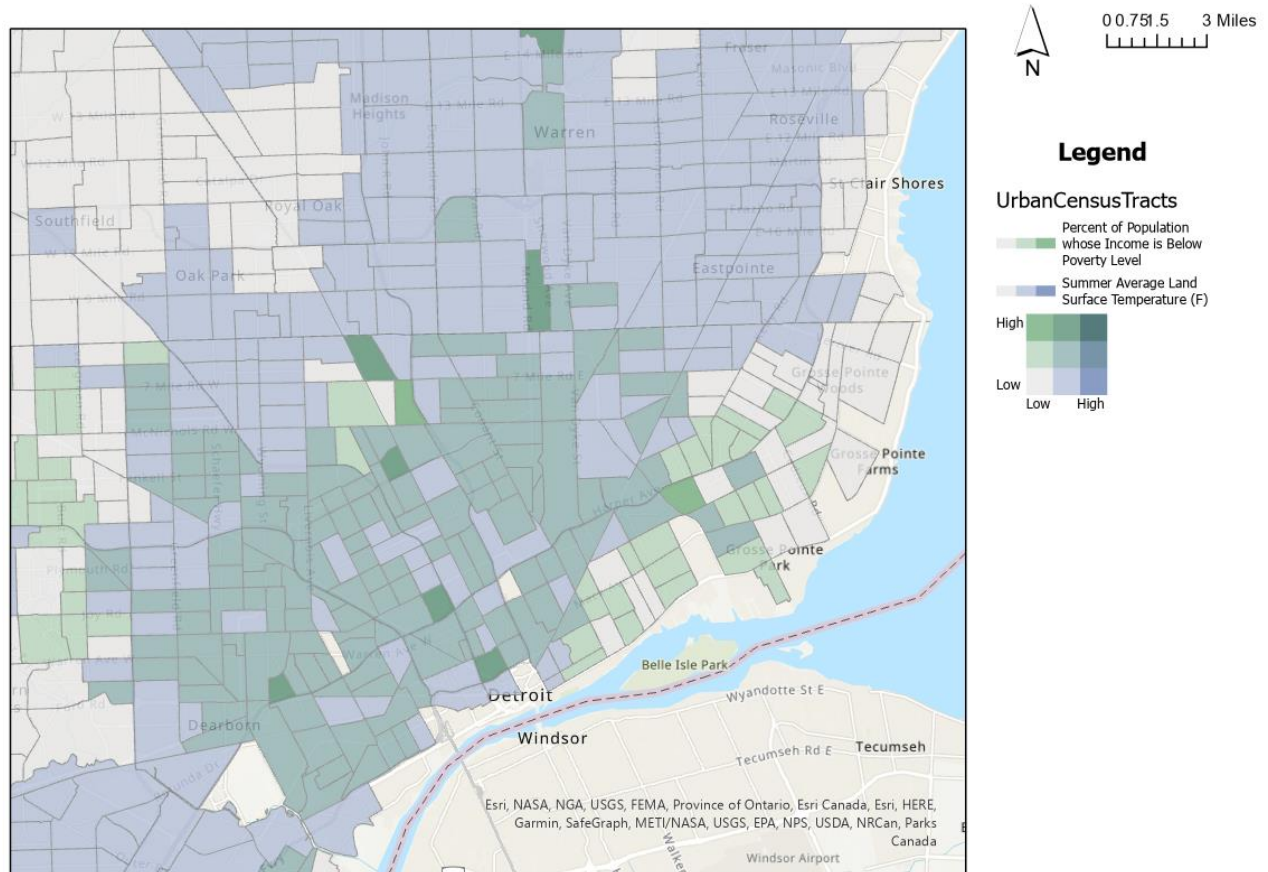


Figure 1. A map of Detroit, MI and the surrounding area showing the percent of the population whose income is below the poverty level and the average summer land surface temperature. Higher poverty levels and higher summer temperatures are concentrated in the center of the city.

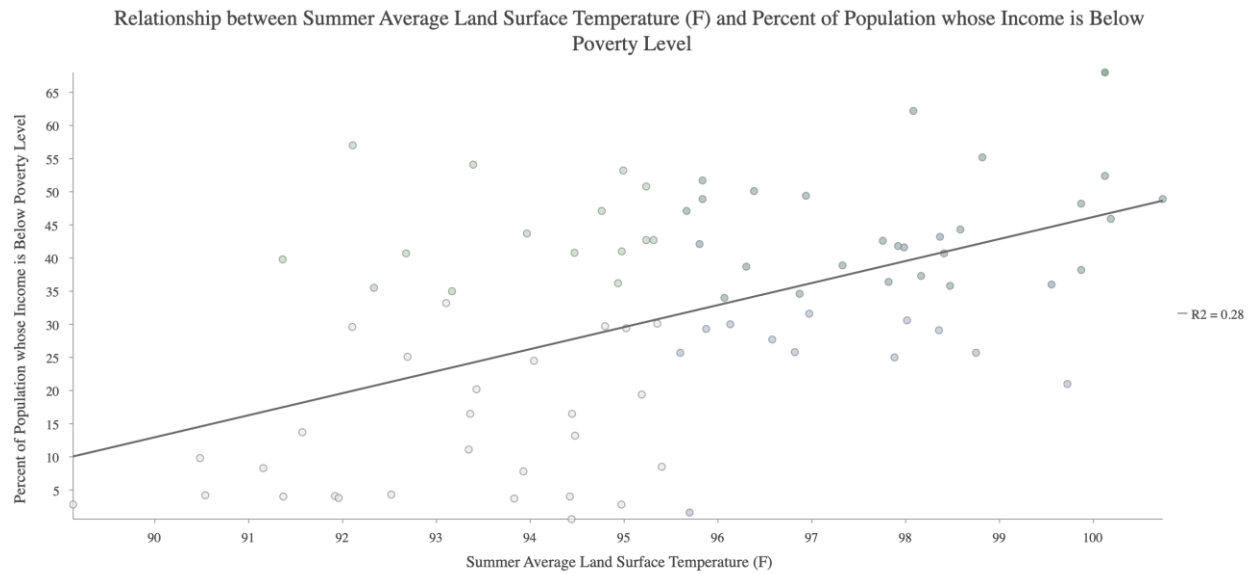


Figure 2. A scatterplot depicting the relationship between percentage of inhabitants below the poverty level and average summer temperatures in Detroit, $r^2 = 0.28$.

Next, I overlaid a map of the districts that were redlined by the Home Owners Loan Corporation (HOLC) during the 1930s. Redlining was the practice of denoting certain neighborhoods as “unfavorable” areas for lending money and resulted in many people being denied homeownership loans in those areas. Most of the redlined neighborhoods were majority-Black areas, and many of these areas are still suffering the consequences of redlining today. In Detroit, historically redlined neighborhoods appear to have a substantial overlap with the areas of high poverty and high average temperatures (shown in Figure 3), potentially indicating a similar urban heat island effect to the one [described](#) by the University of Richmond’s Digital Scholarship Lab. Neighborhoods that were redlined tend to have lower tree cover and more paved surfaces than neighborhoods that weren’t redlined, which leads to higher average temperature in those areas due to the lack of shade.

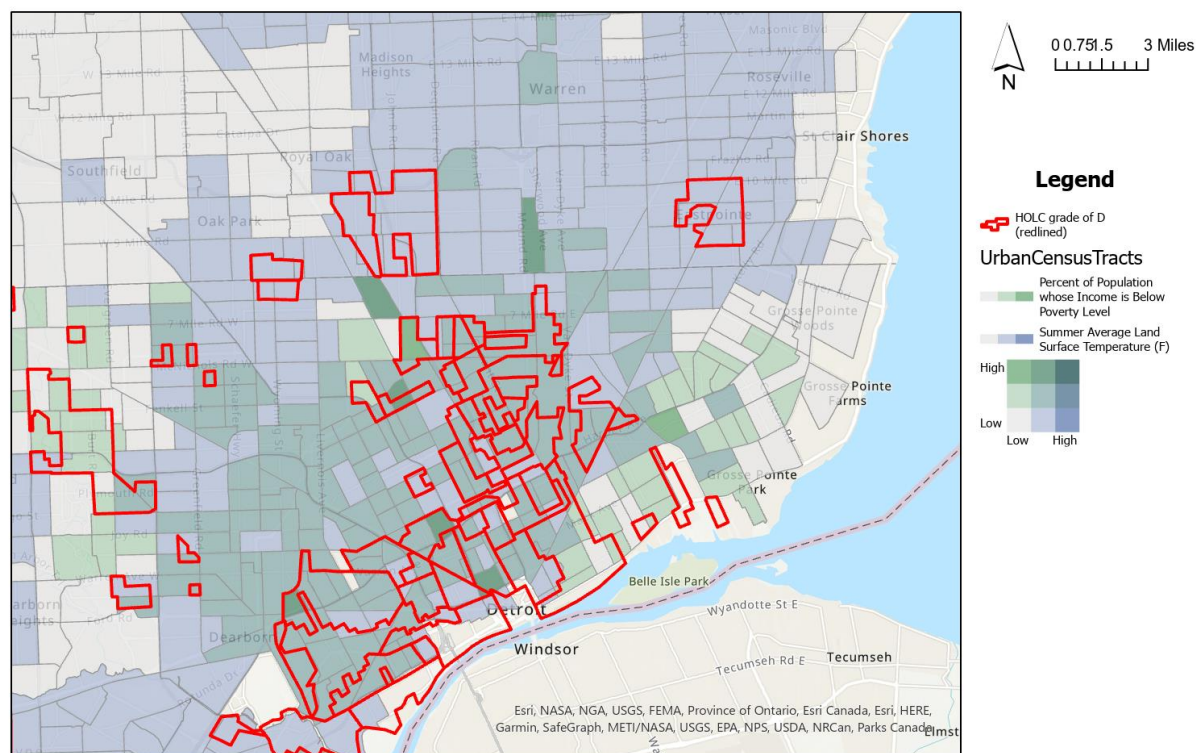


Figure 3. A map of Detroit, MI and the surrounding area showing historically redlined neighborhoods overlaid on top of the percent of the population whose income is below the poverty level and the average summer land surface temperature. Higher poverty levels and higher summer temperatures seem to align with neighborhoods that were redlined.

Finally, I investigated the relationship between facilities emitting carcinogenic waste and historically redlined neighborhoods. The Toxics Release Inventory provides information about the locations of facilities that emit pollutants and the types of waste that they emit. Research suggests that people living in redlined neighborhoods are exposed to more air pollution due to the proximity of these types of facilities, and that holds true in Detroit. As shown in Figure 5, facilities that emit carcinogenic waste are more likely to be built in neighborhoods that received a HOLC rating of C (“Declining”) and D (“Hazardous,” which became the redlined neighborhoods) than in neighborhoods with a rating of A (“Best”) or B (“Desirable”).

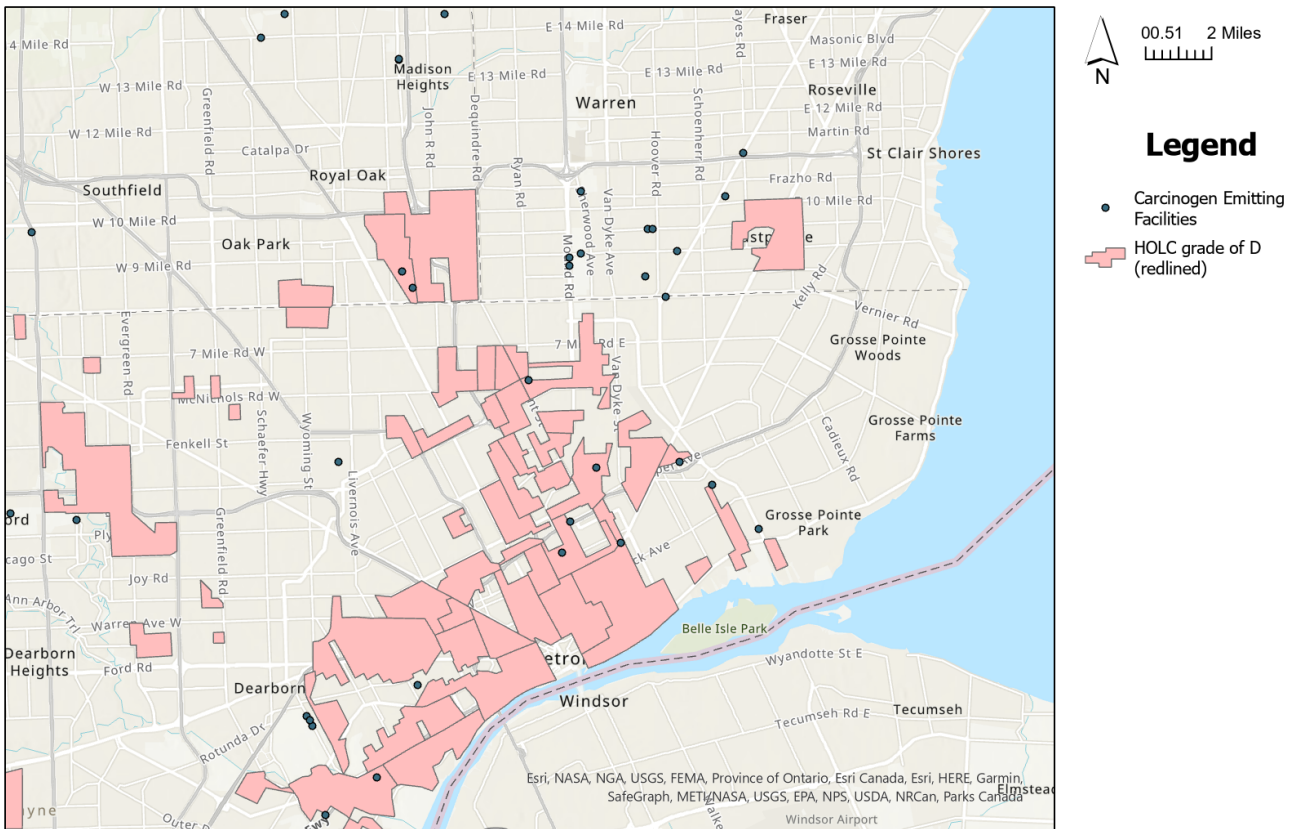


Figure 4. A map of Detroit, MI and the surrounding area showing historically redlined neighborhoods and their proximity to facilities that emit carcinogenic waste.

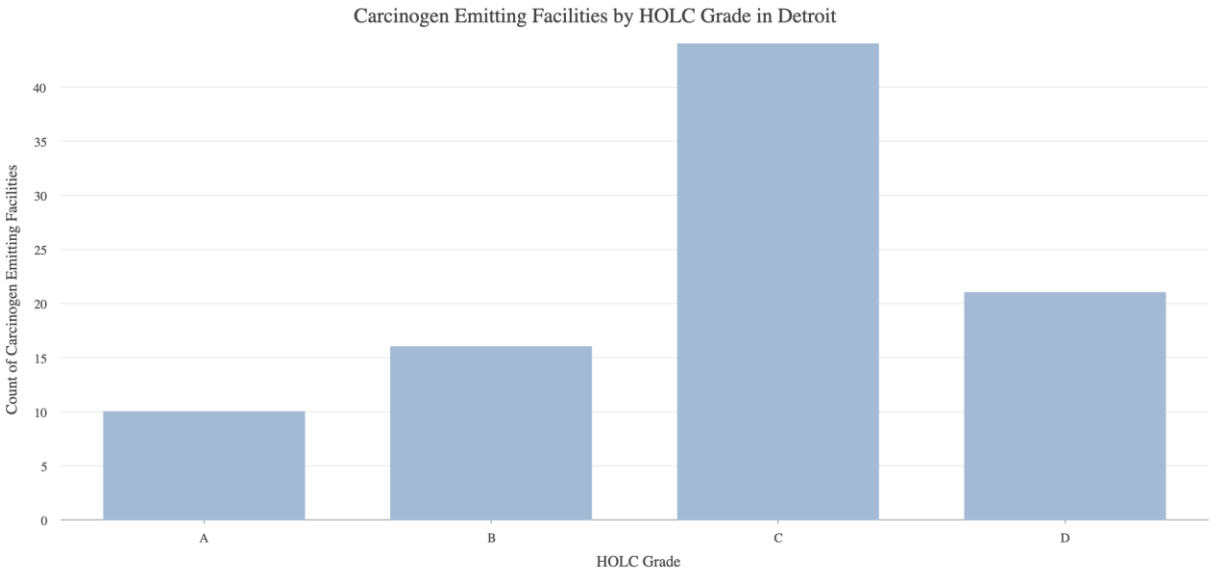


Figure 5. A bar graph depicting the number of facilities that emit carcinogenic waste in neighborhoods with each of the four HOLC grades. Neighborhoods with a grade of C or D have more factories emitting toxic waste than neighborhoods with a grade of A or B.