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10 August 2024

Redlining and Pollution: A 2019-2021 Study of LA County's Latino Residents

As of 2019, air pollution has been identified as the world's 4th leading risk factor for premature death, while ambient particulate matter, such as PM2.5, was identified as the world's 6th leading risk factor for premature death (State of Global Air, 2020). On a state-wide scale, California's Latino population is exposed to 15% higher levels of PM2.5 concentrations, as of 2014, than the average Californian (Union of Concerned Scientists, 2019). This study observes LA County's most immediate pollution burdens from a historical lens, analyzing a possible relationship between historical redlining practices of the 1930s and their role in dictating the environmental vulnerability of Latinos from 2019-2021. This observation begins by broadly asking whether or not historical redlining still impacts the living standards of California's modern Latino population. Focusing on the issue of environmental vulnerabilities, is pollution burden higher among Latinos living in historically redlined neighborhoods than Latinos residing in previously green-lined neighborhoods within LA County? To answer this question, I observed the presence of air pollutants in 28 of LA County's 88 cities where Latinos reside between the years 2019 and 2021. I find that historical redlining did not have a significant impact on pollution burden differences across Latinos in different cities, and I conclude with a discussion of what this finding implies for future studies concerning the environmental disparities faced by Latino-identifying groups.

I. Context and Significance

The federal practice of redlining was introduced by the Federal Housing Administration (FHA) in the 1930s and is defined by its intention to prevent racial minorities from receiving housing loan assistance after the Great Depression (Rose, Jonathan, 2023). The Home Owners' Loan Corporation (HOLC) was a federal agency tasked to interpret what areas were too risky to grant financial assistance to, which inevitably led to their role in creating redlining maps to segregate the risky areas (Mitchell, Bruce, et. al, 2018). Looking specifically at LA County's redlining map descriptions from the 1930s, I observed that race was the driving factor in dictating a neighborhood's grade. However, it is also important to note that some neighborhoods with steady populations of white residents were at times redlined for low resident income averages and the presence of construction hazards ([6]Robert K. Nelson, et al., 2023). Different grades used by the HOLC include red ("Hazardous"), green ("Best"), yellow ("Definitely Declining"), and blue ("Still Desirable") ([6]Robert K. Nelson, et al., 2023). For example, Alhambra's neighborhood "Area D39" was redlined after having a recorded 70% Mexican-national population in 1939 ([6]Robert K. Nelson, et al., 2023). This grade identified "Area D39" as inferior in comparison to a green-lined neighborhood with a 100% white population, preventing the population from receiving housing loan assistance. A description of "Area D39" from 1939 reads, "The rapid encroachment of industry during the past 10 years indicates that in time this will be considered in no sense a residential section" ([6]Robert K. Nelson, et al., 2023). "Area D39" is one of the many historically redlined neighborhoods in LA County that identified Latino-majorities in the 1930s.

Despite being outlawed by the Fair Housing Act of 1968, redlining left minorities with almost four decades of living disadvantages in comparison to white populations. This long period of financial neglect in neighborhoods left lasting consequences that remain today (Rose,

Jonathan, 2023). As previously mentioned, Latinos in California are exposed to higher levels of air pollutants than the average Californian; however, white Californians are instead exposed to 17% lower levels of PM2.5 concentrations than the average Californian (Union of Concerned Scientists, 2019). This modern disparity is important not only in understanding the disadvantages that modern Latinos face in their everyday lives but also in determining whether the trend is a consequence of a larger historical event. Discovering the root cause or causes of disparities in pollution burden across racial minorities in California is imperative if we aim to propose solutions that address them.

II. Literature Review

There is a lot of research that needs to be done for us to understand the effects of redlining that come up in the modern world. However, there are contemporary studies out there that have already analyzed effects such as pollution burden and its connection to racial inequalities, redlining, and mortality. With some of the information we already know, we can begin to form connections between the aftermath of redlining and modern pollution burden disparities among Latinos, while also accounting for gaps that future research could work to fill.

In her 1996 journal article[1], Rachel Pinderhughes grapples with the relationship between race and environmental quality. This article reaches a little farther back in time, but it is important to highlight the early stages of research that analyzes environmental inequalities to understand the context of modern research on the same topic. Pinderhughes focuses on environmental statistics that consider race, class, and the distribution of environmental hazards among these categories. She emphasizes the reality that even in 1996, pollution burdens were not equitably faced. Instead, low-income racial minorities were the group found to be the most

[1] Pinderhughes, Raquel. "The Impact of Race on Environmental Quality: An Empirical and Theoretical Discussion."

vulnerable to toxic chemicals dumped by industries (Pinderhughes, 1996). Not only does redlining have a deep history of segregation practices meant to depress minorities' land values and limit their access to loan assistance, preventing them from escaping their situations, but Pinderhughes makes a significant point about how race factors into environmental burden inequalities. She found that race is the main causal factor of inequality, rather than factors such as class or income (Pinderhughes, 1996). In other words, we can apply her findings to affirm our understanding that Latinos are more pollution-burdened than white groups because of racial preferences.

However, information is lacking here in terms of the source of these racial preferences and whether they are related to historical redlining or other modern factors. Similarly to Pinderhughes's journal article, Cesar O. Estien, et. al's study[2] explores pollution burden disparities faced by racial minorities; however, his main focus is on historical redlining as a potential cause of modern environmental disparities. His research controls for all redlining grades; red ("hazardous"), green ("best"), yellow ("definitely declining"), and blue ("still desirable") and concludes that not only do previously redlined neighborhoods in California cities have greater pollution burdens than neighborhoods of other grades, but that these redlined neighborhoods experience higher noise burdens, less vegetation, and elevated temperatures (Estien, et al. 2024). However, in terms of differences in PM2.5 specific burdens, it was found that "Redlined and nonredlined neighborhoods showed no significant differences in PM2.5 and toxic releases, but did show significant differences in lead risk, groundwater threats, hazardous waste facilities, cleanup sites, and diesel PM (Estien, et al. 2024). My study mostly observes particulate matter concentrations across cities in Los Angeles County; however, this large-scale

[2] Estien, Cesar O et al. "Historical Redlining Is Associated with Disparities in Environmental Quality across California."

California study provides a good context for the possible gaps in my study where studying lead risk, groundwater contamination, etc. could impact my results.

Further, Estien, et. al's research is not only integral in providing very recent 2024 findings, but it provides a peer-reviewed verification of a relationship between redlining and pollution burden disparities among different racial groups. With this confirmation that pollution burdens are not equitably shared among racial groups by Pinderhughes' journal article, as well as through Estien, et. al's redlining-specific connections, we can further these findings by observing whether pollution burdens differ across a single group. In other words, we need to observe whether Latinos' residences across LA County cities affect the level of pollution burden they experience, while also controlling for historical redlining.

Thankfully, there is peer-reviewed information specific to the Latino population and their experiences with pollution burden. Yuliang Jiang, et. al explores the environmental disadvantages of the Latinx community residing in the greater Los Angeles area in her 2022 journal article, focused on the *Impacts of Spatial and Ethnic Factors on Residents' Socioeconomic and Health Status*[3]. Highlighting the disadvantages the Latinx community faces against white communities, as acknowledged by the studies above, Jiang et. al argues for green space's importance in determining differences in pollution burdens among groups. Jiang et. al found that white populations tended to reside in areas closer to green space, which privileges them in comparison to Latinx populations who reside in compact areas with less green space and higher pollution presence due to industry (Jiang, et. al 2022). However, Jiang also found that groups living closer to green space experienced "higher housing stability, financial security, and more education attainment" (Jiang, et al. 2022). The importance of this finding is that not all

[3] Jiang, Yuliang, and Yufeng Yang. "Environmental Justice in Greater Los Angeles: Impacts of Spatial and Ethnic Factors on Residents' Socioeconomic and Health Status."

environmental determinants are created equal. For example, green space may be a more significant determinant of pollution burden differences than PM2.5, as was observed in Estien, et. al's study. Once again, a gap in these findings that needs to be observed further is the impact of differing environmental factors on the relationship between race and pollution burden. For example, if proximity to green space shows stronger evidence of burden disparities across racial groups than particulate matter does, then we need to understand which of these effects are due to historical redlining or alternative modern determinants.

Furthermore, the above studies provide significant context to comprehend the existence of pollution burden disparities across racial groups and how historical redlining may have played a role in this result. However, what are the complexities behind the pollutants and environmental factors themselves that constitute a burden? Yuliang Jiang, et. al's study touched a little bit on how different types of environmental burdens are more significant than others in understanding the relationship between the level of burden faced by populations and race. However, one of the biggest burdens to consider is mortality.

In their journal article, Bart Ostro, et al.[4] discuss the relationship between fine pollutant air particles and mortality rates within 9 counties in California. Los Angeles County is one of the counties considered in this study where air pollutants such as carbon monoxide, nitrogen dioxide, etc. were measured and compared with mortality rates per county, age, and race. Even though this paper considers a study of pollution and mortality from the years 1999-2002, this paper has integral information concerning records of pollutants (mentioned above) in Los Angeles County and their effect on the mortality of racial subgroups. Similarly, Tianyang Wang, et. al's 2019 journal article[5] studies the mortality rates of Californians who suffered from respiratory and

[4] Ostro, Bart, et al. "Fine Particulate Air Pollution and Mortality in Nine California Counties: Results from CALFINE."
[5] Wang, Tianyang et al. "Mortality burdens in California due to air pollution attributable to local and nonlocal emissions."

cardiovascular diseases caused by PM2.5 and O3 in 2012 (Wang, et. al, 2019). PM2.5 is described as one of the major killers because of its fine particles, as well as its disastrous effects on the lungs (Wang, et. al, 2019). This paper is highly important in understanding the severity of particulate matter because Wang goes into detail about how PM2.5 dominates mortality burden and health cost estimates nationally and globally (Wang, et. al, 2019).

Given that death is the ultimate burden on a human being, the dangers of particulate matter must be understood for me to better evaluate the findings of my study, which collects particulate matter concentration data from 2019 and interprets pollution burdens among Latinos. Both Bart Ostro, et. al and Wang, et. thoroughly analyze the danger behind the presence of mortality rates caused by pollution; however, there are still very few sources out there that account for cardiovascular health and mortality rates in LA County for the years 2019-2021. My study works to fill this gap by presenting pollution concentrations that could be interpreted to understand the danger in LA County, but further research is still yet to be done to connect Latino's pollution burdens with their death rates. It is also important to note that undocumented residents may not be properly factored in health surveys.

III. Theory, Hypothesis, and Causal Mechanism

My theory is that historical redlining practices are likely to have been the catalyst for inequalities in pollution burdens among Latinos in LA County, based on differences in each city's environmental investments over time and the presence of industrial facilities. Conceptually, I hypothesize that historically redlined neighborhoods in LA County will see higher pollution levels than historically green-lined neighborhoods. Operationally, I hypothesize that historically redlined cities in LA county with a 50% Latino population or higher will have experienced a higher level of pollution burden than historically greenlined cities with a Latino

population of less than 50%. The causal mechanism of my research is neighborhood investment. Given that redlining was meant to "cherry-pick" what neighborhoods would receive financial assistance over others, the level of investment in a neighborhood correlates with the level of emissions concentrations in the neighborhood. For example, cities with a higher percentage of green-lined neighborhoods may see fewer industrial facilities than cities with a higher percentage of redlined neighborhoods. By observing the presence of industrial facilities and the types of pollutants they emit, I can suspect that the level of pollution burden will be less in greenlined areas that were financially aided after the Great Depression in the form of credit, than in redlined areas whose residents were forced to pay high interests rates on homes they could no longer afford (Mendez-Carbajo, 2021).

IV. Research Design and Methods

The independent variable in my study is historical redlining. I measured this variable in my study by observing the number of neighborhoods in each of LA County's 88 cities and how many of these neighborhoods were red or green-lined. I chose to solely focus on red and green-lined areas and not include the yellow and blue-lined neighborhoods in my study to analyze a more drastic relationship between the probably least advantaged and the most advantaged Latino populations in LA County. I obtained data for this variable from [6]Robert K. Nelson, et al.'s study, *Mapping Inequality* Study.

The dependent variable in my study is the pollution burden of Latinos. I measured this variable in my study by first collecting population data from the 2020 census that gives the percentage of Latinos in each LA County city. Next, I used the California Air Resources Board's

[6] Nelson, Robert K., LaDale Winling, et al. "Mapping Inequality: Redlining in New Deal America."

Pollution Mapping Tool (V2.6) to collect data on all the emissions facilities present in each city, as well as the types of pollutants released by these facilities. I found 17 different types of pollutants that were released, particulate matter (PM2.5 and PM10) and total GreenHouse Gasses (CO2e) were among the most major pollutants. However, only 12 cities of relevance to my study had pollution-emitting facilities present. For this reason, other cities without previous red or greenlining history were excluded from my study. Looking only at emissions records from 2019-2021, I chose to record the concentrations of major pollutants from facilities in each relevant city. My purpose is to visualize what cities recorded high concentrations of toxic pollutants over others that had not, as well as see if previously redlined areas were met with higher levels of pollution concentrations than greenlined areas.

One of my control variables controls for the different grades of redlining ([6]Robert K. Nelson, et. al, 2023) when interpreting the relationship between my independent and dependent variables. The blue and yellow-graded neighborhoods represent the areas that are in between the red and green grades. For example, a blue grade was considered when a neighborhood was not the best but "still desirable", while a yellow grade was considered when a neighborhood was not the worst, but still considered to be "definitely declining" ([6]Robert K. Nelson, et. al, 2023). By collecting data on red and green-lined areas only, I was able to observe the effects on the most historically vulnerable populations versus the least and apply it to modern times. I measured this variable by collecting data on each red and green-lined neighborhood in LA County, using Robert K. Nelson, et. al's *Mapping Inequality* study.

My second control variable is the race of a population. By controlling for race, I was able to find that green-lined communities in the '30s housed fewer Latinos, according to Robert K.

Nelson, et. al's *Mapping Inequality* study. In the 2020 Census data, I found that fewer Latinos live in previously green-lined neighborhoods than in previously redlined neighborhoods.

Controlling for race influenced the relationship between my independent and dependent variables, despite my focus on Latinos. I found that historically graded cities with primarily white populations as of the 2020 decennial census, such as Beverly Hills, had fewer or no presence of industrial facilities that released GHGs and PM. Beverly Hills was previously green-lined and has a total population of 32,701 people, with about 78 percent of the population identifying as white and 7 percent of the population identifying as Latino ([7]U.S Census Bureau 2020, [6]Robert K. Nelson, et. al, 2023). Accounting for white populations in a given city plays a large role in understanding why Latinos in greenlined areas may suffer less of a pollution burden than Latinos in red-lined areas because they may benefit from the advantages of white populations that live around less industry, despite their small presences in greenlined areas.

My study observes data within LA County and its 88 cities. As for the demographic being studied, I looked at the total percentage of Latinos, as of 2020, in each LA County city that was home to previously red and green-lined neighborhoods in 1939. All of my redlining data is sourced from 1939. Cities home to yellow and blue-lined neighborhoods were not included in this study. Limiting my observations to red and green-lined neighborhoods narrowed my study down to 28 cities because certain cities did not have either green or redlined neighborhoods. After observing data from all types of pollution-emitting facilities in each of the 28 cities, I only found that 12 of the 28 cities had pollution-emitting facilities within their city limits. The 16 cities without the presence of any pollution-emitting facilities were deducted from this study.

[7] United States Census Bureau. "United States Census Bureau Los Angeles County."

The specific pollutants measured in this study include Greenhouse Gas emissions (CO2e) and Particulate Matter of less than or equal to 2.5 and 10 micrometers (PM2.5 and PM10). These pollutants were measured based on their presence in the 28 cities between the years 2019-2021. Therefore, my final results are representative of 12 LA County cities in total, which include Artesia, Burbank, Compton, Gardena, Glendale, Long Beach, Los Angeles, Pasadena, Redondo Beach, San Fernando, San Gabriel, and Torrance. My final results are also representative of the total percent of the Latino population in each of these 12 cities, as of 2020. I did not run a regression analysis for my study, as my sample was below 30 observations.

V. Results

The following is a brief walk-through of the steps I took to obtain my final results.

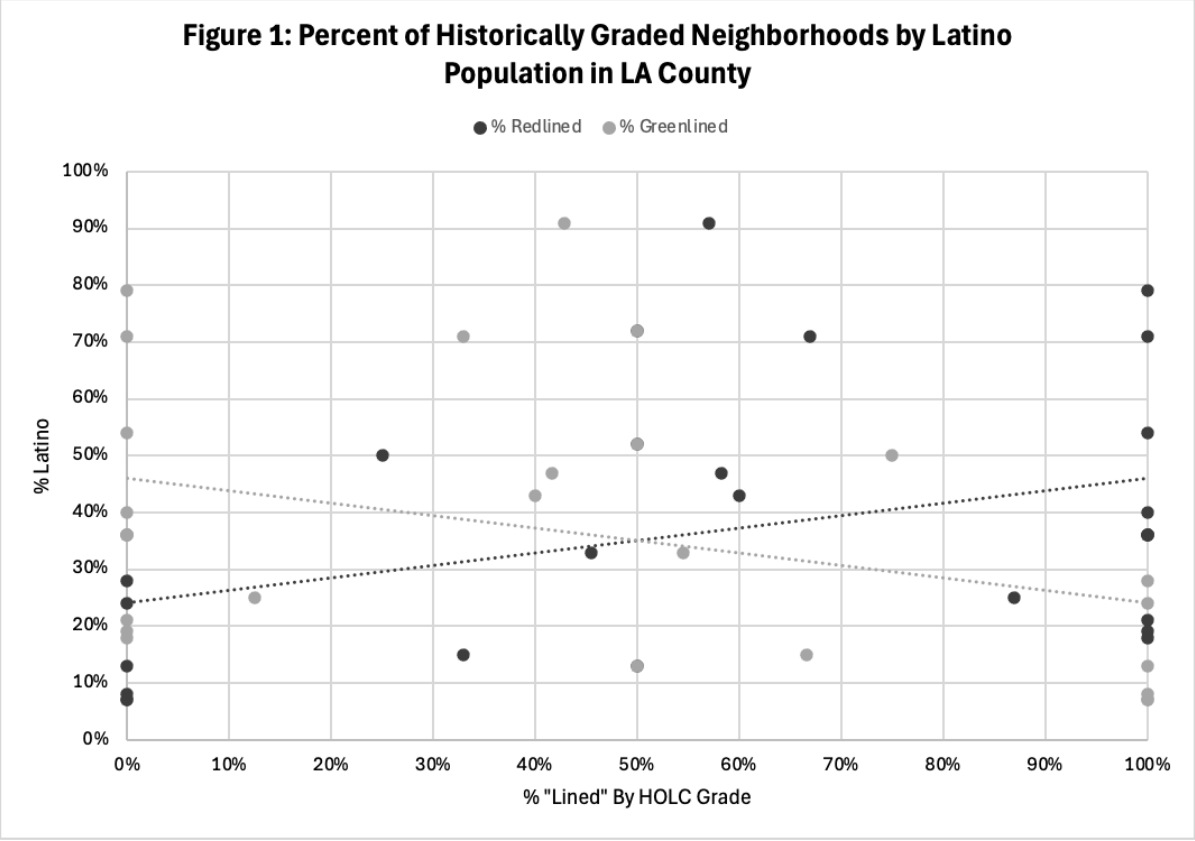

Figure 1, Data Source: [7]U.S Census Bureau 2020, [6]Robert K. Nelson, et. al, 2023.

This first figure represents the total percentage of red and green-lined neighborhoods by the percentage of Latino residents in each of the 28 LA County cities initially studied. It is also important to note that this figure does not include the consideration of grades other than red and green. Here, I found that generally, less than 35% percent of Latinos (2020) reside in cities where there was a higher percentage of green-lined neighborhoods than red-lined neighborhoods, except for a few outliers; Glendale (75% green-lined neighborhoods, 25% red-lined neighborhoods, and 50% Latino population), Pomona (50% green-lined neighborhoods, 50% red-lined neighborhoods, 72% Latino population), and West Hollywood (50% green-lined neighborhoods, 50% red-lined neighborhoods, 13% Latino population). I also found that generally more than 35% of Latinos (2020) reside in cities where there was a higher percentage of red-lined neighborhoods than green-lined neighborhoods, except for a few outliers; Culver City (100% red-lined, 0% green-lined, 21% Latino population), Redondo Beach (100% red-lined, 0% green lined, 18% Latino population), and Torrance (100% red-lined, 0% green-lined, 19% Latino population). This figure is meant to visualize the relationship between historical redlining in LA County cities and the total percentage of Latino residents in each city, relative to the 2020 decennial census.

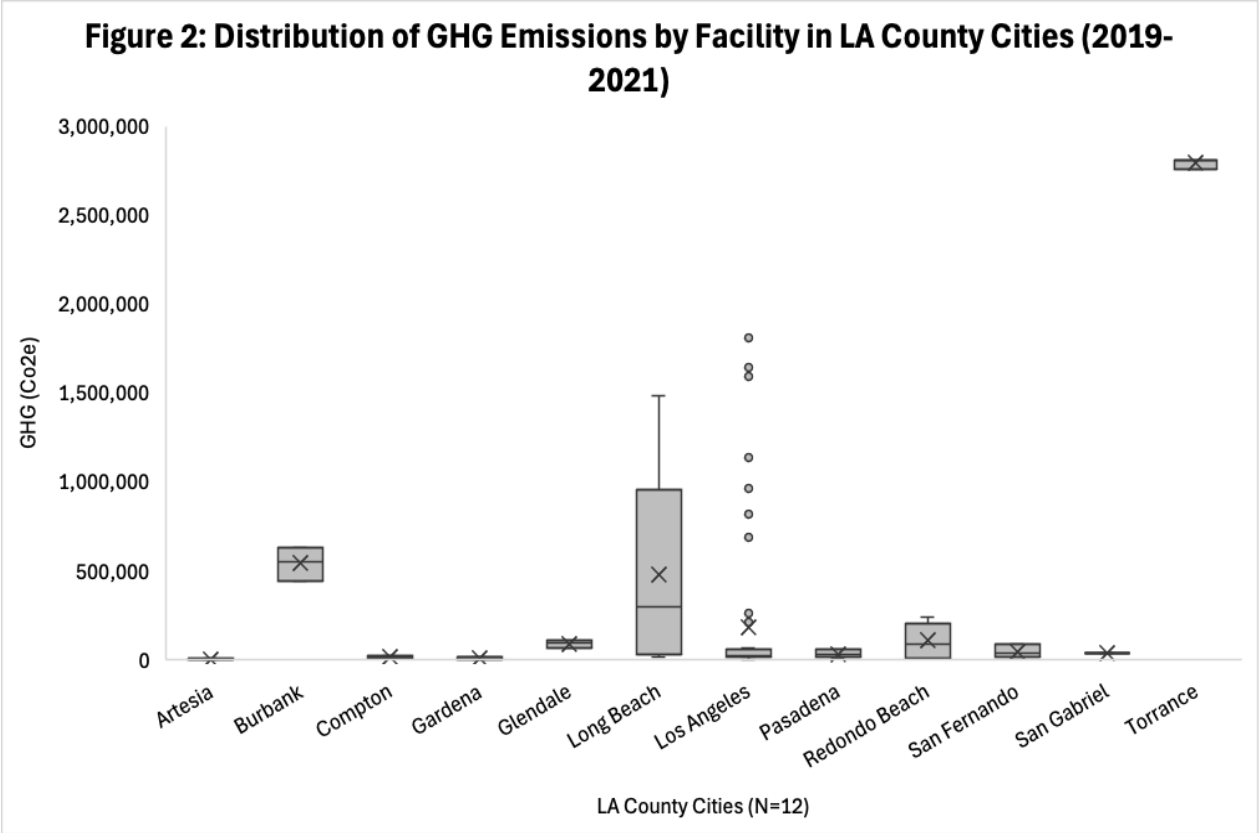

Figure 2, Data Source: [8]California Air Resources Board (2024).

This figure represents the distribution of greenhouse gas emissions (CO2e) emitted by facilities between 2019-2021 in 12 LA County cities. At this point, the unit of cities studied was narrowed from 28 to 12 cities. Torrance has the highest distribution of GHG emissions, acting as the outlier of this data set. However, it is important to note that these emissions are recorded from only one facility over the span of three years, "Torrance Refinery." Instead, Long Beach's distribution is not as high as Torrances, but we see that it has the most spread out data with most of its emissions lying within its distribution (~10,000 CO2e to ~1,500,000 Co2e). On the other hand, the city of Los Angeles has many outliers outside of its distribution (~150,000 to ~1,800,000), as well as the highest total observations out of all the other cities. However, this high number of emissions and facilities in the city of LA is likely due to its high population size

[8] California Air Resources Board. CARB. *Carb Pollution Mapping Tool.*

of 3,895,848 ([7]U.S Census Bureau 2020). Overall, concentrations of GHGs don't reach above 500,000 CO2e across the 12 cities, excluding the outliers mentioned above where the GHG burden seems higher. Generally, I found a weak relationship between historical redlining and Latinos' pollution burden of greenhouse gas emissions.

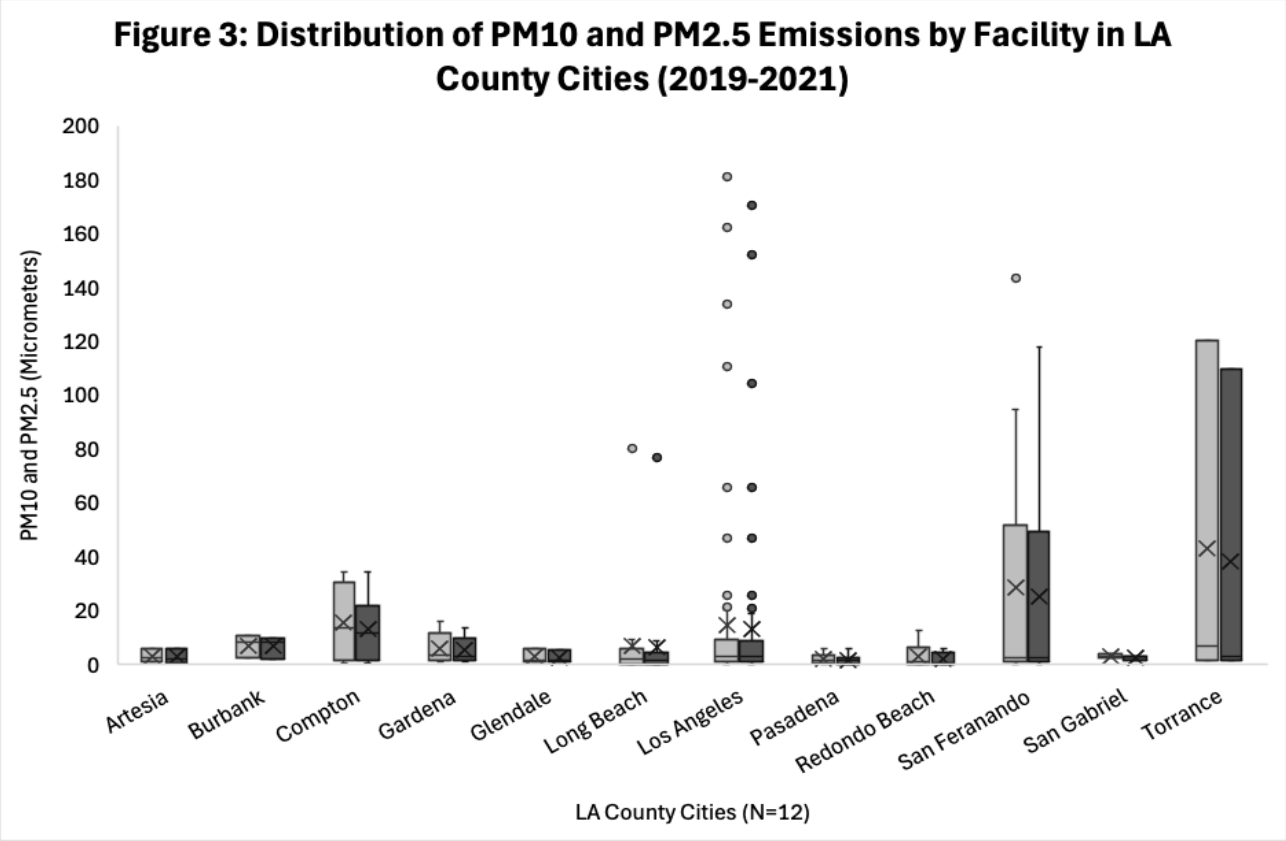

Figure 3, Data Source: [8]California Air Resources Board (2024).

This figure represents the distribution of particulate matter (measured in less than or equal to 2.5 and 10 micrometers) emitted by facilities between 2019-2021 in 12 LA County cities. At this point, the unit of cities studied was narrowed from 28 to 12 cities. Torrance has the most spread out (widest) distribution of all the cities in this data, due to outlying maximums of PM2.5 (109.4) and PM10 (120.4) in 2020 and lower minimums of PM2.5 (1.7) and PM10 (1.7). Once again it is important to note that these emissions are recorded from only one facility over

the span of three years, "Torrance Refinery." San Fernando also has a wide distribution with an outlier of ~143.6 PM10 emissions concentration from 2020. Long Beach also has a few outliers of PM10 (~80.4) and PM2.5 (~76.8). Once again, the city of Los Angeles has the highest number of outliers, with the highest outliers of PM10 (~181.2) and PM2.5 (~170.3). These high emissions and facility outliers in the city of LA are also likely due to its high population size of 3,895,848 ([7]U.S Census Bureau 2020). Overall, there are lower concentrations of particulate matter present in these 12 cities, excluding the outliers mentioned above where PM burden seems higher. Generally, I found a weak relationship between historical redlining and Latinos' pollution burden of Particulate Matter (less than or equal to 2.5 and 10 micrometers).

VI. Discussion and Research Implications

The following is a brief discussion of my final results and implications regarding my research question: Is pollution burden higher among Latinos living in historically red-lined neighborhoods than Latinos residing in historically green-lined neighborhoods in LA County?

To reiterate, I found an overall weak relationship between historical redlining and pollution burden among Latinos in 2019-2021. I hypothesized that LA County cities with higher percentages of historically redlined neighborhoods than green-lined neighborhoods would see higher levels of air pollution concentrations. Given the weak relationship between my independent and dependent variables, my hypothesis was wrong. After comparing the data I collected on historical redlining and population with the air pollution data I collected, I found very few differences in Latinos' pollution burdens based on whether or not they lived in previously red-lined cities.

For example, I noted in the results section of this paper that the city of Torrance experienced wide distributions of both GHG and particulate matter (less than or equal to 2.5 and

10 micrometers) emissions concentrations compared to the rest of the cities. After noting this observation I compared my redlining and population data to find that 100 percent of neighborhoods were redlined and 0 percent of neighborhoods were green-lined in Torrance. While this finding seemed promising, I found that the percentage of red and green-lined neighborhoods in Torrance differ by only 1 unit (neighborhoods red-lined; 1, neighborhoods green-lined; 0). Torrance also had a Latino population of 19% in 2020 ([7]U.S Census Bureau 2020). It is important to note that Torrance is considered an outlier in my analysis in Figure 1 where I found that generally more than 35% of Latinos (2020) reside in cities where there is a higher percentage of red-lined neighborhoods than green-lined neighborhoods. Given the above factors, Torrance's wide emissions distributions are likelier due to modern environmental factors, not historical redlining.

Further, I found that the city of Pasadena has lower concentration distributions of both greenhouse gas emissions and particulate matter. Pasadena has a higher percentage of neighborhoods that were previously green-lined than red-lined. Approximately 55% of neighborhoods were greenlined and approximately 45% of neighborhoods were red-lined. However, I found a similar situation when observing Pasadena's results as I saw Torrance's results. The percentage of red and green-lined neighborhoods in Pasadena differ by only 1 unit (neighborhoods green-lined; 6, neighborhoods red-lined; 5). Pasadena had a Latino population of 33% in 2020 ([7]U.S Census Bureau 2020). Given the above factors, Pasadena's wide emissions distributions are also likelier due to modern environmental factors, not historical redlining.

Overall, I found possible indicators of a relationship between historical redlining and pollution burden differences among Latinos but I saw stronger indicators of a relationship between pollution burden differences among Latinos and modern environmental factors. In other

words, what are some possible implications that can be made from my findings? Referring back to Yuliang [3]Jiang, et. al's journal article which found that racial groups living closer to green space experienced "higher housing stability, financial security, and more education attainment", it can be implied that researching LA County cities' proximities to green space may provide a stronger link to pollution burden differences among Latinos than historical redlining (Jiang, et al. 2022). Further, it may also be beneficial to study how income factors into pollution burden disparities. Studying income gaps among Latinos across cities may also allow researchers to form a solution to close the gaps, which could reduce pollution burden disparities between Latinos that are most and least financially disadvantaged.

VII. Research Limitations and Extensions

After having summed up my results, I discovered multiple areas of my research in which I may have fallen short, especially when it came to my unit of analysis. My research was limited to only two types of pollution burdens, GHGs and Particulate matter, as well as only one trusted, but probably limited emissions data source. Originally, I had planned to also factor in cardiovascular health diagnoses of LA County's Latino population to find a correlation between the emissions data and diagnoses. However, I unfortunately had to pivot due to a lack of relevant Latino-specific health data. After pivoting to a sole focus on air pollution data, I could have likely benefited from adding other pollutants to my study, such as diesel PM, formaldehyde, methane (CH4), nitrous oxide (N2O), etc. I also could have benefited by considering temperature and city proximity to green space, as these burdens have been studied by peer-reviewed sources ([3]Jiang, et. al, [2]Estien, et al.).

In the future, I would like to further investigate my study with a new research focus that shifts my independent variable from historical redlining, to possibly income or modern city investment. The issue with redlining is that the population sample from [6]Robert K. Nelson, et. al's *Mapping Inequality* study was very limited. In other words, I was able to access the percentage of each racial group by neighborhood in LA County, but not the total that each percentage was taken from. Some descriptions also resembled the format, "few %", which did not seem very representative without the total population (Robert K. Nelson, et. al, 2023). After changing my independent variable in a future study, I would additionally like to expand the elements of my dependent variable to include way more than two factors, maybe between five to eight.

VIII. Conclusion

Once again, my research observes LA County's most immediate air pollution burdens from 2019-2021 to analyze the possibility of a relationship between historical redlining practices of the 1930s and disparities in the environmental vulnerability of Latino populations by city. My observations began by asking whether or not historical redlining still impacts the living standards of California's modern Latino population.

After controlling for all the variables in my study, my findings are not significant enough to imply a relationship between historical redlining and differences in the pollution burdens of Latinos across LA County cities. There were implications of a relationship when observing the pollution emissions in the cities of Torrance and Pasadena; however, the nature of their cause correlated best with modern environmental factors not included in this study. However, after considering the implications of my findings with a discussion of other modern factors that may play a role in Latinos' environmental disparities, I was able to propose beneficial changes to my

research design that might allow me to uncover a stronger relationship between variables in my future research.

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