

Determining the Impact of Historical Redlining on Present Day Air Quality in New York City

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“Redlining” describes a lending practice from the 1930s where the Home Owners Loan Corporation (HOLC) rated neighborhoods by various grades: A or green for “best”, B or blue for “still desirable”, C or yellow for “definitely declining”, and D or red for “hazardous” based on “detrimental influences” which often resulted in discriminatory practices towards and the withholding of financial services from neighborhoods with larger populations of minority communities. Redlining has contributed to lasting systemic income and environmental inequalities for minority groups. Though there is a growing body of literature analyzing environmental burdens in redlined areas, there is a gap in research comparing air quality to HOLC grades. This study seeks to address this research gap by investigating whether there is a correlation between fine particulate matter (PM_{2.5} in

µg/m³) and historical HOLC grades and in doing so further the current understanding of environmental justice concerns in historically redlined areas. New York City Community Air Survey (NYCCAS) data from 155 reference-grade ground monitor locations in NYC were mapped to historical HOLC grade. The maximum, median, and quartile concentrations of PM_{2.5} for each HOLC grade as well as average rate of change for PM_{2.5} concentration, from 2009 to 2016 was determined. We found that Grade D has higher mean, median, and 75th percentile PM_{2.5} concentrations than all other grades. There is a statistically significant difference of 0.85 µg/m³ between mean concentrations for Grade A and Grade D. The rate of decrease for average annual concentrations by grade is slowest for Grade D (.28 µg/m³/yr) and the most rapid for Grade B (.57 µg/m³/yr). These results provide compelling evidence of existing disparities in exposure to worse air quality and once again demonstrate on-going effects of redlining policies implemented nearly a century ago. This pilot analysis on NYC can be scaled to other urban regions within the United States. This study furthers current understanding on historical policy and current cumulative impacts on marginalized populations, which is valuable to incorporate in modern policy discussion.