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Using GIS to Examine Local Sustainability and the Effects of Redlining In Pittsburgh

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Research increasingly links the HOLC neighborhood rankings of the 1930s (a process colloquially known as redlining) with continued inequality and uneven patterns of disinvestment that negatively impact communities of color in many U.S. cities. Less research has examined how the HOLC neighborhood rankings might affect neighborhood level variations in sustainability across individual cities. This research seeks to address this deficiency by examining if there is a correlation between the HOLC's neighborhood rankings for Pittsburgh neighborhoods and the distribution of variables that measure two of the three pillars of sustainability, environmental and social equity.

The research was conducted using ArcGIS Pro version 2.9.1 (2021). Data on tree equity scores, tree canopy and parks were used to measure environmental equity. Data on bike lanes were used to measure social equity. ArcGIS software was used to overlay this data on the HOLC rankings for Pittsburgh city neighborhoods, calculate spatial statistics, perform buffer analyses, and process raster layers.

The results of the analysis show that environmental and social equity are positively correlated with HOLC grade. However, the relationship is nuanced. Neighborhoods ranked as 'best' (A) and still desirable' (B) had higher tree equity scores and more extensive tree canopy than neighborhoods ranked as declining (C) and hazardous (D). Concomitantly, this suggests that residents of neighborhoods ranked A and B enjoy lower levels of air pollution and improved mental health than residents of neighborhoods once ranked C or D. However, neighborhoods ranked declining (C) and hazardous (D) had more access to parks and bike lanes.

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