

US EPA ARCHIVE DOCUMENT

## **Mapping of Human Vulnerability to Climate Change at the County Level Across the United States**

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**Background and Objectives:** Many disadvantaged populations of color, particularly poor African Americans, may be at higher risks of experiencing the negative effects of climate change due to their geographic location and underlying vulnerabilities. The objective of this study is to explore the use of Geographic Information Systems (GIS) to assess areas that may be vulnerable to climate change.

**Methods:** The mean vulnerability score for each county in the United States was derived from 39 variables. Data for population density, poverty level, and race/ethnicity were obtained from the U.S. Census Bureau. Several health status and risk factor variables were used, including heat-related mortality rate, primary care physician rate, and cardiovascular disease mortality. Data on air pollution levels, toxic facility distribution, and elevation were used. ArcGIS 9.3 was employed to map the vulnerability scores, and Moran's I was used to assess statistically significant clusters.

**Results:** The results of spatial analysis showed that 15 of the 25 highest vulnerability scores, including the 7 highest vulnerability scores, were in counties/parishes in the South region. Despite having 15 counties at the top of the vulnerability score scale, the South region did not have the highest overall regional score. The Northeast Region had the highest mean score of 3.25, followed by the South (3.04), the West (2.79), and the Midwest (2.75).

**Conclusions:** The study shows the utility of using GIS spatial analysis to assess human vulnerability to climate change at the county level. Additional mapping is needed to assess vulnerability at census tract and census block group levels.