Environments at Risk for Obesity in Washington, D.C.: A Vulnerability Analysis

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Introduction

Research suggests that a number of environmental risk factors—inactivity, unhealthy diet and eating habits, and low income levels—contribute to obesity. The goal of this project is to better understand which areas in Washington, D.C. place its residents at highest risk for obesity. Specifically, it looks at areas with high rates of traditionally vulnerable populations (elderly individuals living alone; female-headed households, children, and low income populations) and these areas' accessibility to environments that contribute to good health, specifically: healthy food outlets, parks, recreation centers, and fitness centers.

Methods

To address this, I created "accessibility" and "vulnerability" maps of Washington, D.C. Accessibility is judged by proximity by census tract to services and public goods that contribute to physical health; namely: healthy food outlets, parks, recreation centers, and fitness centers. Individual accessibility maps were created for each of these services and goods by using spatial analysis tools to define five categories, each within identified distances from each service or good. A score from one to five was then assigned to each to these areas (five being the closest and one being the furthest from each service or good). This was used to create each of the four accessibility maps below. These maps were then overlaid to create an overall accessibility map, where accessibility scores were summed together to create aggregate accessibility scores per census tract.

Vulnerable populations are judged by the following characteristics: children and youth age 14 and younger, seniors age 75 and older, single-parent households headed by females, and low-income households. Individual vulnerability maps were created for each of these populations by joining census data on median household income and on the defined vulnerable populations, and then calculating the percentage of each population per census tract. These polygons were converted to raster files, which were then reclassified to define five defined categories, each indicating the level of "vulnerability" per tract (five being least vulnerable, and one being most vulnerable). These maps were overlaid to create a composite vulnerability map (right).
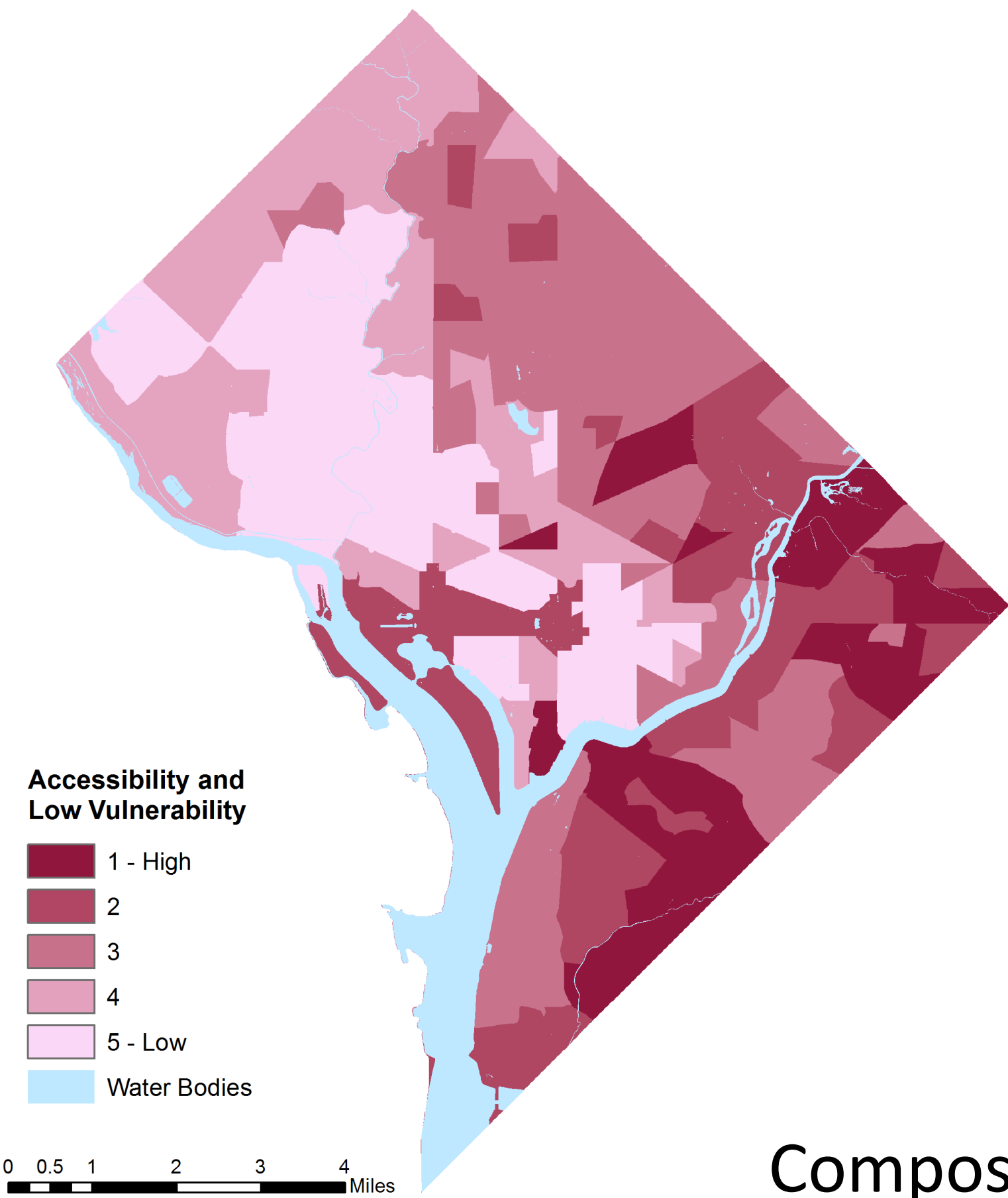
Composite Accessibility and Vulnerability

Accessibility and Low Vulnerability
- High
- Low

Water Bodies
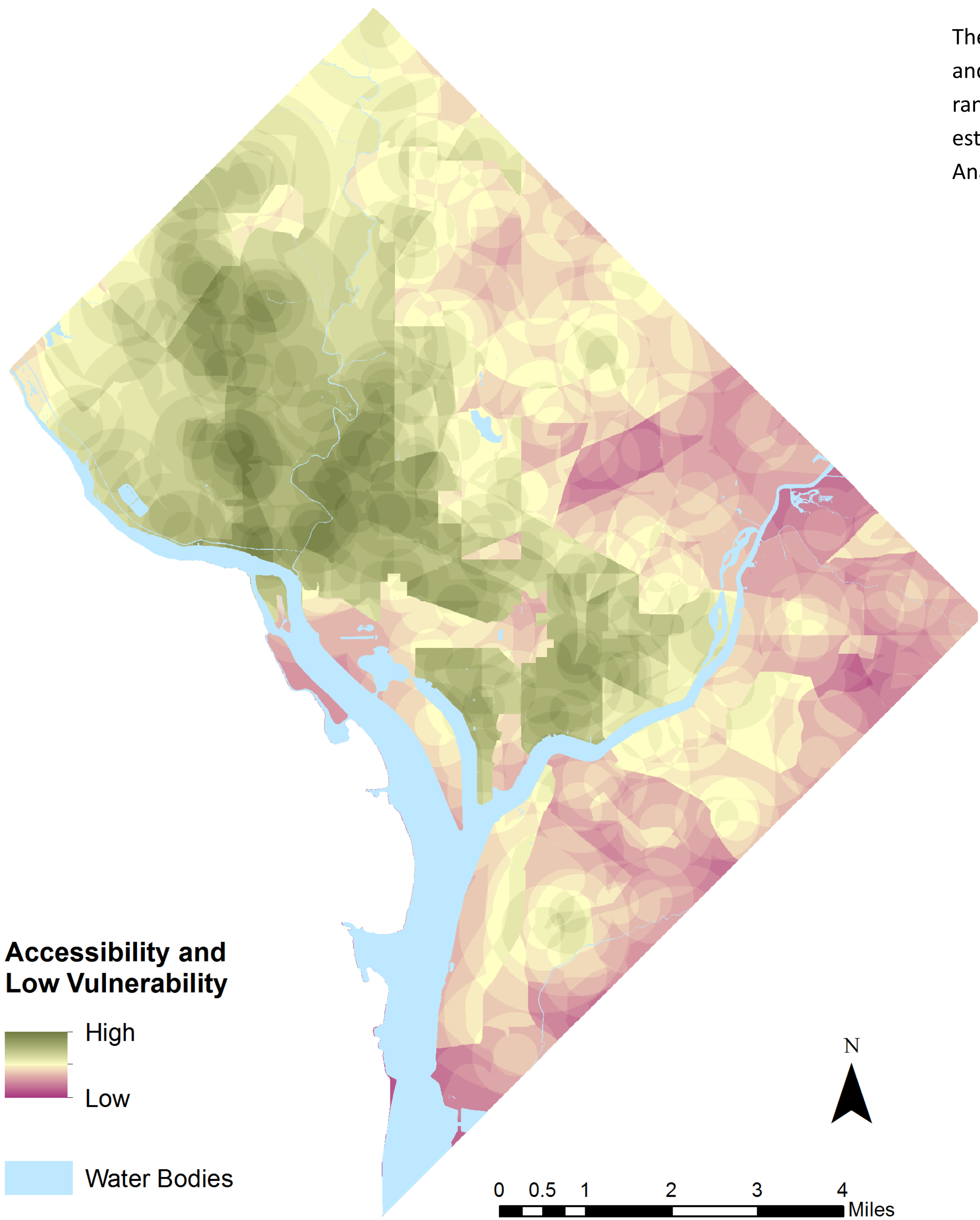
Findings

The Northwest quadrant is the area with the highest accessibility and least vulnerability. Both the Southeast and Northeast quadrants rank low in accessibility and high in vulnerability; however, it is interesting to note that in the Southeast quadrant, the area south of the Anacostia River ranks low in vulnerability and accessibility.

Composite Vulnerability

Accessibility and Low Vulnerability
- 1 - High
- 2
- 3
- 4
- 5 - Low
- Water Bodies

Accessibility Scores

Distance	Score
0-400 meters	5
400-800	4
800-1600	3
1600-3200	2
3200 +	1

Composite Accessibility

Accessibility
- 5 - High
- 4
- 3
- 2
- 1 - Low
- Water Bodies

Public Recreation Centers Accessibility
- 5 - High
- 4
- 3
- 2
- 1 - Low
- Water Bodies

Fitness Centers Accessibility
- 5 - High
- 4
- 3
- 2
- 1 - Low
- Water Bodies

Parks Accessibility
- High : 5
- Low : 1
- Parks
- Water Bodies

Fitness Centers Accessibility
- 5 - High
- 4
- 3
- 2
- 1 - Low
- Water Bodies