

A collection of fresh vegetables including red tomatoes, orange carrots, green parsley, yellow and green bell peppers, and a green chili pepper, arranged along the left and bottom edges of a light-colored wooden background.

The Food Environment of Vulnerable Populations in Southwestern Idaho

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Food Deserts

Food insecurity is not limited to those living in famine-stricken countries. Even for a person living in an urban area, if they do not have reliable transportation, their food options can be restricted to a small geographical area.

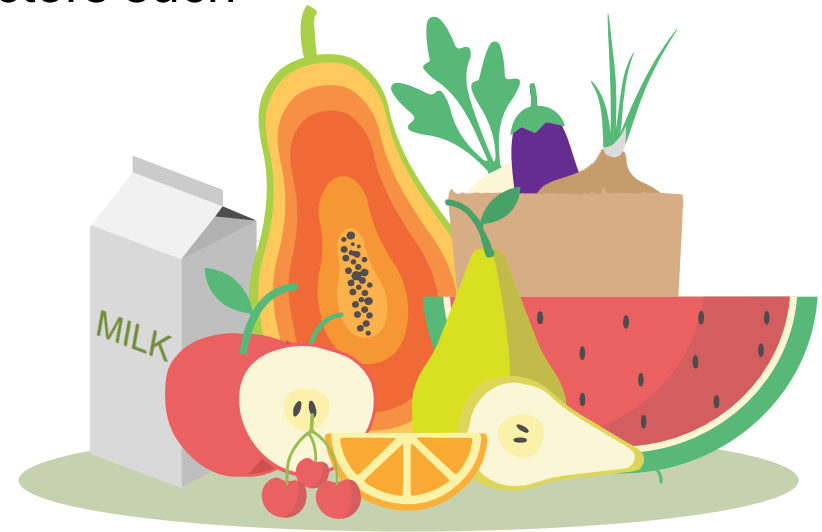
They might not have access to nutritious food, and their only options may be nutrient-poor, calorie-dense food available at convenience stores.



Hypothesis

A 2018 study by Yingru Li, et al. examined food environments around elementary schools across the United States. They found that the proportion of convenience stores was much higher than that of grocery stores within a half a mile of elementary schools, compared to the wider area. They also found that the quality of the food environment around schools was associated with factors such as income and percentage of minority populations.

I decided to further investigate if there was any correlation between the demographics of a census block group and the quality of their food environment.

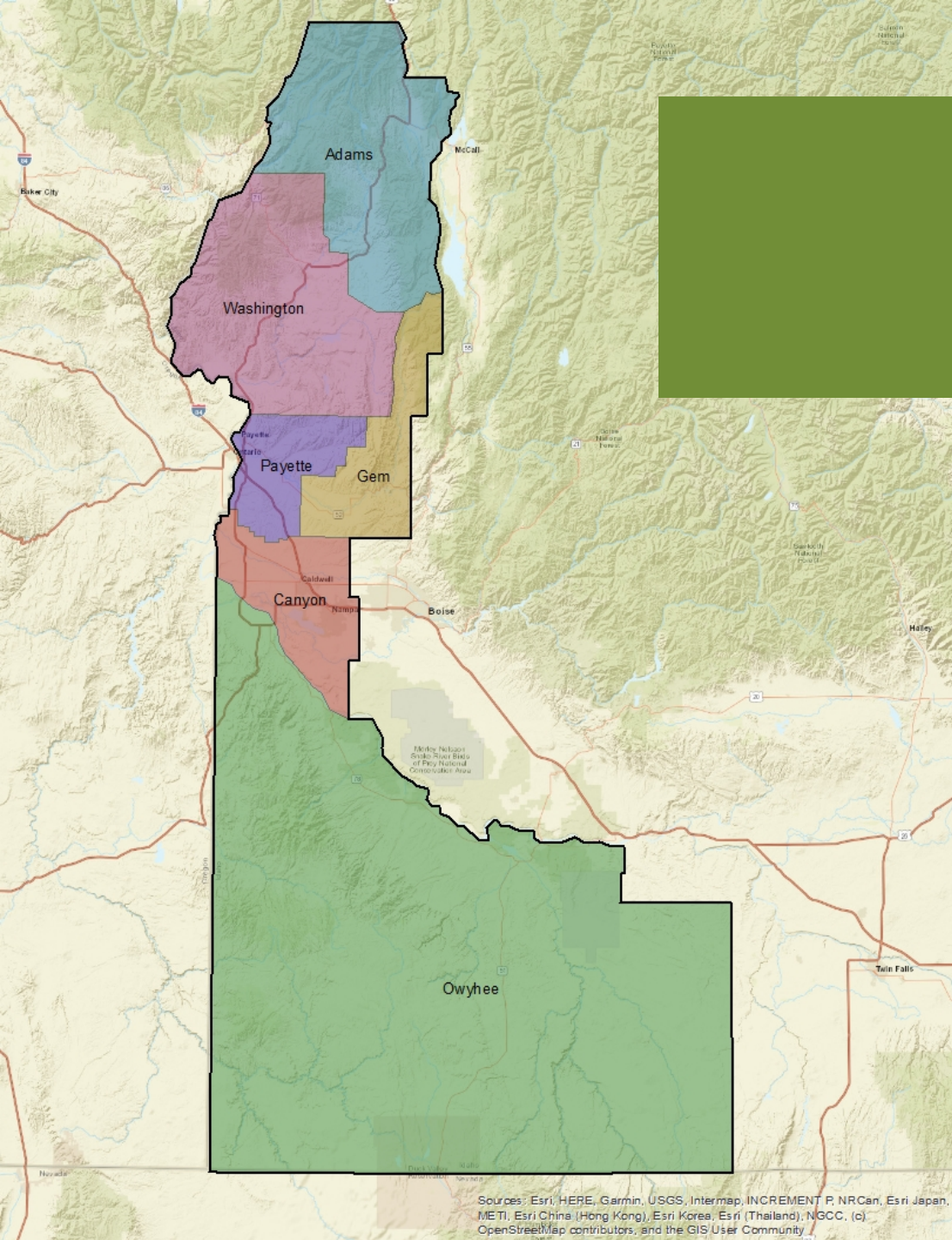


Study Area

Idaho Health District #3 (Southwest)



- Encompasses six counties, including part of the Boise Metropolitan Area
- Includes vast steppe regions, mountains, dense metropolitan areas, and significant amounts of irrigated agricultural land
- Population is approximately 300,000
- Median income ranges from \$22,270 to \$93,029
- 14% of households live below the poverty line



Data collection

For the purpose of this analysis, stores that accept Supplemental Nutrition Assistance Program (SNAP) were categorized into either a “grocery store” or a “convenience store”



Grocery stores fulfilled the criteria of having a large selection of a variety of foods, as well as sizeable produce, dairy, and meat departments

All other types of stores were grouped together as convenience stores. These include gas stations, dollar stores, pharmacies, etc.



The “food environment” is measured by the **proportion of grocery to convenience stores** in each block group

GIS Methods

Choropleth/point mapping

Grocery stores,
sociodemographic

Buffer analysis

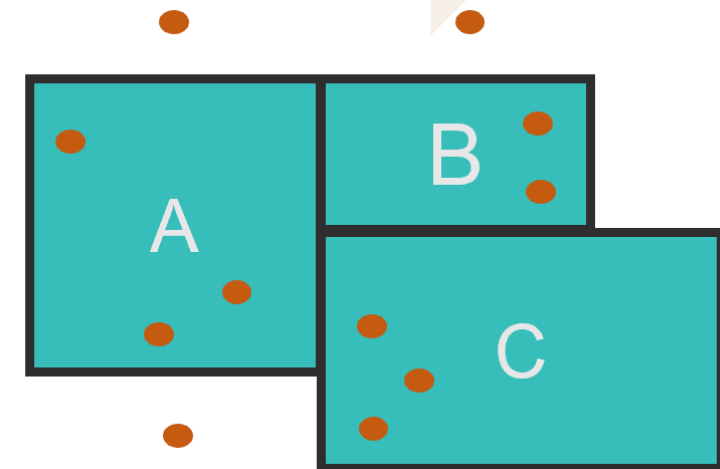
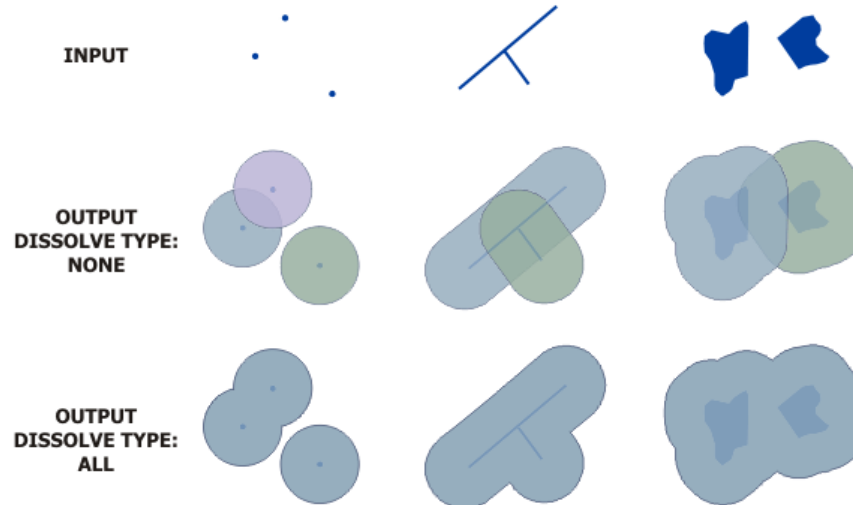
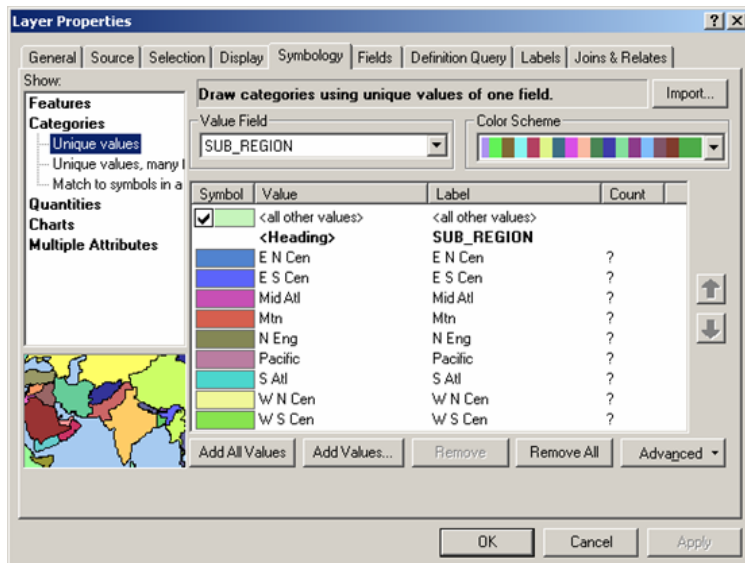
centered on census
block group (one-mile)

Spatial join

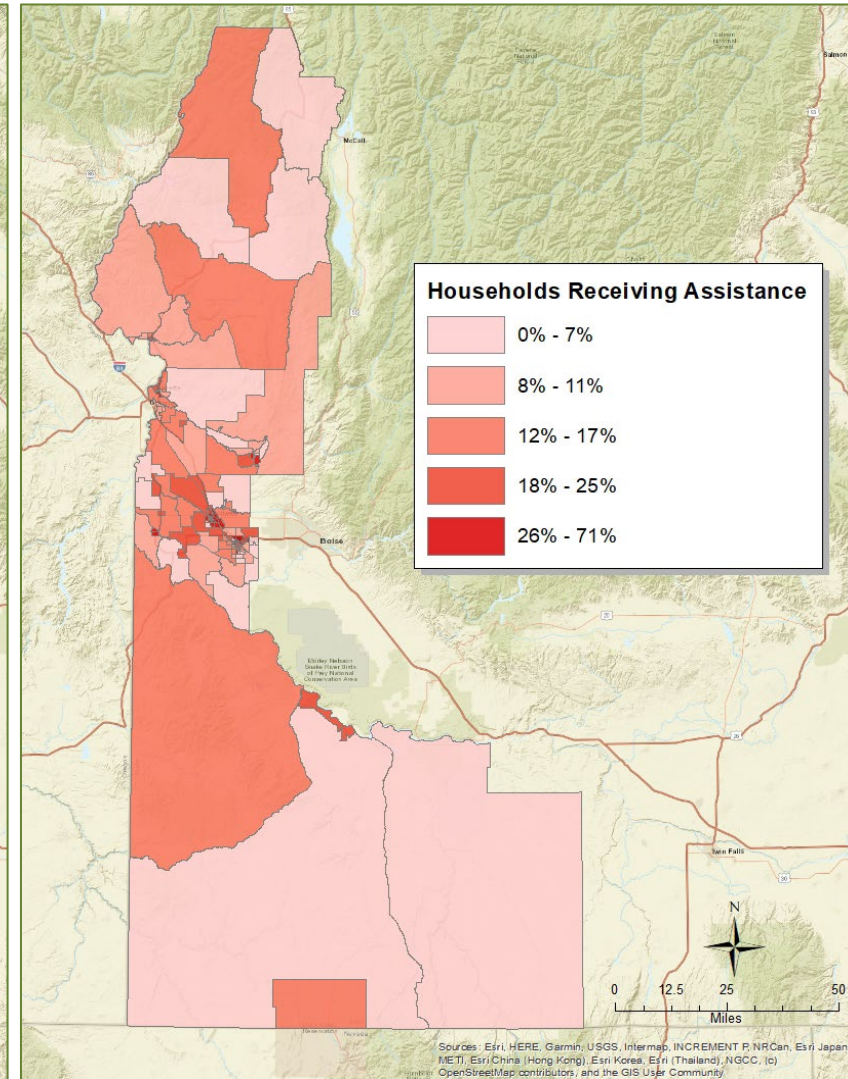
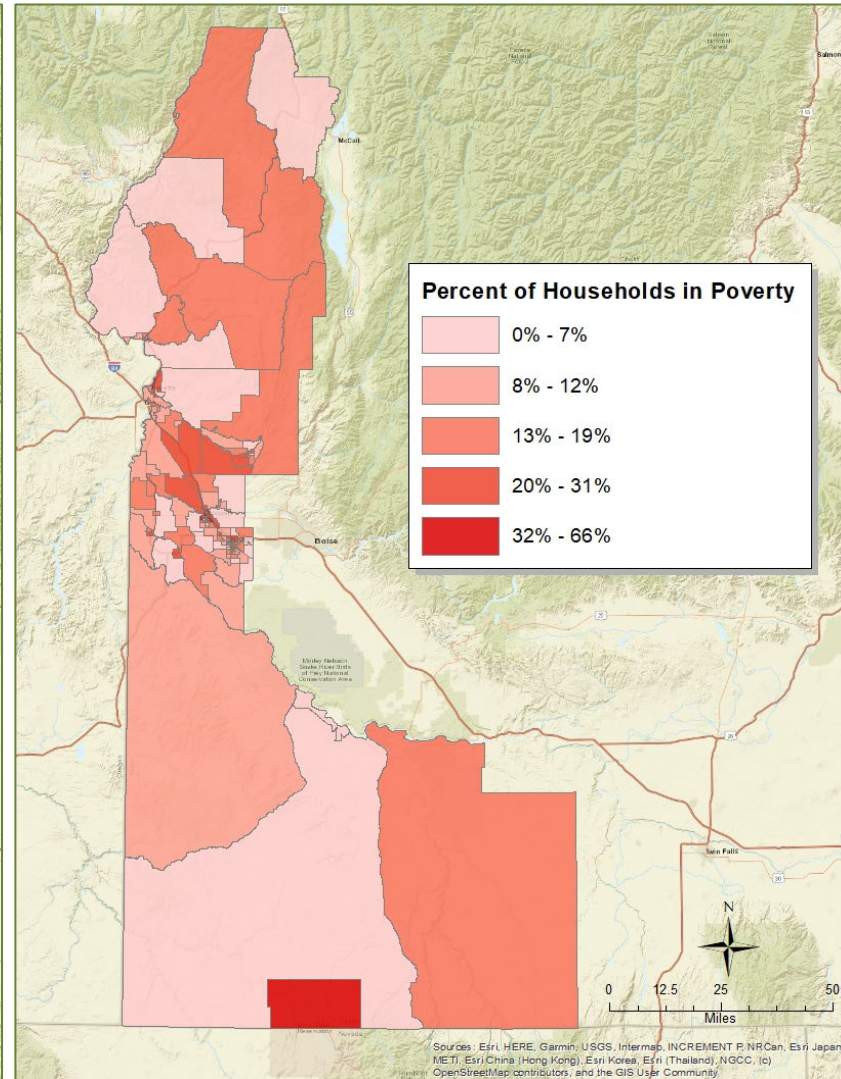
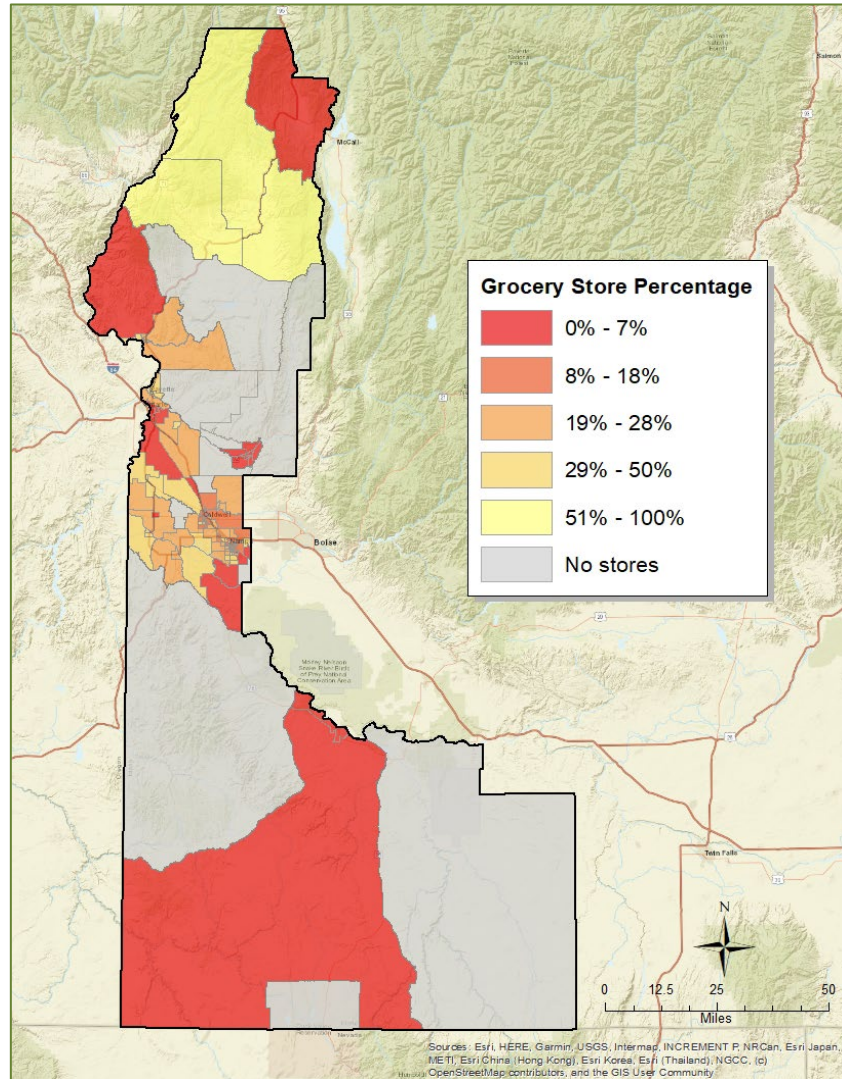
Stores and each of
census block group's
borders

Statistical analysis

Correlation between
sociodemographics &
food access



Results (1)

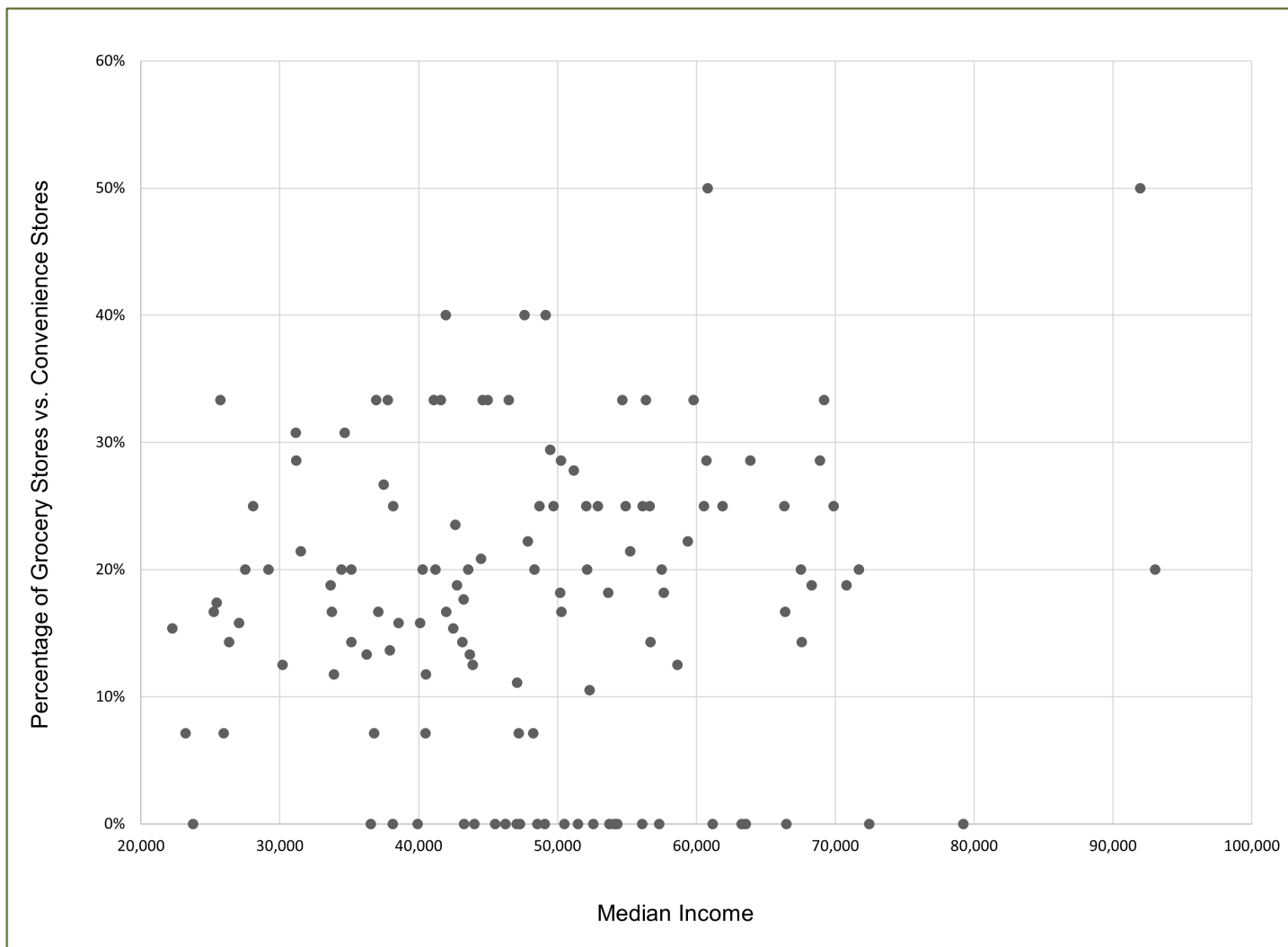




Results (2)



Median Income vs. Percentage of Grocery Stores



The correlation coefficient between a household's median income and the quality of their food environment was less than 0.01. In this analysis, there did not appear to be any relationship between income and which type of store to which a person has most ready access.

Coefficients calculated for other vulnerable populations (such as children, seniors, or minorities) showed similarly low correlations.

Food Deserts

Idaho Health District #3 (Southwest)

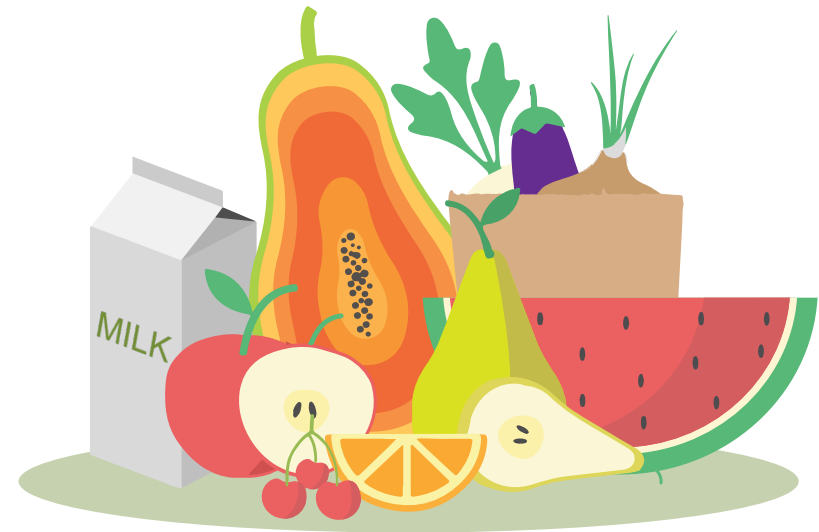


Even if there is no correlation between income and food *environment*, there are still a troubling amount of people that do not have access to even one grocery store.

The red block groups shown have no grocery stores. While some of these areas are sparsely populated, there are still 49,000 people represented, accounting for 16% of the population.

Future Work

- Ensure that stores just slightly out of study area are taken into account – they might have been within buffer zones
- Incorporate public transportation options
- Separate out rural and urban areas
- Replicate study at different levels – census tracts, blocks, zip code, etc.





Sources

National Historical Geographic Information System

- Census block group shapefiles
- Demographic information

U.S. Department of Agriculture

- Location data for all stores accepting SNAP benefits within study area



Literature Reviewed

Chen, X. (2019). Enhancing the Two-Step Floating catchment AREA model for Community food Access MAPPING: Case of the Supplemental Nutrition Assistance Program. *The Professional Geographer*, 71(4), 668-680.

Hamidi, S. (2019). Urban sprawl and the emergence of food deserts in the USA. *Urban Studies*, 57(8), 1660-1675.

Li, Y., & Du, T. (2019). Where is the fruit? Multidimensional inequalities in food retail environments around public elementary schools. *Child: Care, Health and Development*, 500-508.

Schuetz, C. K., & Laninga, T. (2016). The Spatial Distribution and Quantification of Food Insecurity in the North Central Health District of Idaho. *Journal of Hunger & Environmental Nutrition*, 11(3), 396-413.