Healthy Food Access in Richmond, California

Introduction

There is a shortage of supermarkets and grocery stores offering fresh produce in many urban spaces throughout the United States. For this project, I used suitability analysis to find the best sites for establishing new grocery stores in Richmond, California, an urban area with a large minority population and poor access to healthy foods. My client for this project is Communities for a Better Environment, a non-profit that focuses on environmental justice issues in the Bay Area. This organization would like to understand where the best sites for new grocery stores are in Richmond. These sites should both serve a fair amount of the population and be easily accessed by public transportation. Poor access to healthy food has become an issue of food justice and environmental justice as areas facing supermarket shortages are often predominantly low-income or minority communities. The disparity in access to healthy foods can lead to other health disparities as well. Poor nutrition is linked to higher rates of obesity, diabetes, and heart disease. These areas are often referred to as food deserts because of the lack of availability of quality, affordable fresh foods.

Methods

To begin my analysis, I used Google Maps to locate grocery stores in Richmond that provided access to fresh produce. I reviewed and used the流行s of the shops to decide if these stores carried fruits and vegetables, I excluded small convenience stores, some of which resembled gas stations or liquor stores, because they carried mainly processed or prepared food. I used the geographic coordinates of the stores that stocked fresh produce to create a shapefile of healthy food stores in Richmond. I also found the coordinates of farmers' markets in Richmond and created a separate shapefile for these points as well. After creating these shapefiles, I used the network analysis and suitability analysis to find the areas in Richmond that are the best locations for new grocery stores.

Network Analyst

I used network analyst to generate most of the buffers for my analysis. In order to create buffers I first created the transportation network between each location. Mobility plays a large role in the access to healthy foods. In urban areas, many residents do not own automobiles and rely upon public transportation. It is important for grocery stores to be located in proximity to bike routes and bus stops. In a survey conducted by Johns Hopkins University researchers, they found a quarter-mile (1320 ft.) acceptable walking distance. I used this threshold to generate service area buffers around healthy food stores and farmers' markets in Richmond to visualize the areas that lacked easy access to fresh produce.

I used network analyst to generate service area buffers around fire stations and bus stops as well. I used the census data to locate the census blocks with the highest population density, I created a new point shapefile and placed a point in the center of each of the most densely populated block groups and generated 1320 feet buffers around the centers of the block groups with the highest population. Grocery stores in these densely populated areas would have a greater demand for food due to the larger population, and facilities in these densely populated areas could provide service to a greater number of people.

Suitability Analysis

I conducted a suitability analysis to find the best areas to create new grocery stores in Richmond. The service areas from the network analysis were used as layers in this analysis. I considered proximity to fire stations, bus stops, bike routes, and areas of dense population/ opportunities for this analysis. I used proximity to existing farmers' markets and grocery stores as constraints for this analysis in order to find the areas where the greatest need for grocery stores existed. Proximity to fault lines was a constraint for this suitability analysis as well. Zoning data for the City of Richmond was used to identify zones suitable for a new grocery store. Industrial and agricultural areas were avoided while commercial areas were favored.

Conclusion

Several sites in Richmond were found to be highly suitable locations for new grocery stores through this suitability analysis. These sites are located near public transportation making it easier for residents who do not own automobiles to purchase healthy foods. In addition, these sites are located near heavily populated areas of Richmond. I used the zoning layer to better understand where in Richmond it would be easiest for a new grocery store to be approved. Because grocery stores would most easily be approved for construction in commercially zoned areas, I chose areas with high suitability as areas with a weight on the factor map of 5 or 6 which is also located in a commercial zone. However, many of the best sites for grocery stores are located in residential zones, and zoning polices would need to be relaxed in order to allow for grocery stores to be established there. The zoning areas significantly reduced the suitable sites for new stores. In some urban areas, local governments have relaxed zoning restrictions to increase the number of areas where grocery stores can be constructed and improve residents' access to fresh foods.

New Service Areas

Below is a map of potential new sites for grocery stores in Richmond. I created a new point shapefile and polygons in commercial zones in Richmond that had the highest suitability for new grocery stores. The sites were used to calculate new service areas of 1320 feet to visualize where these sites would be most affected by these new stores. The orange buffers represent the new service areas of these grocery stores. As can be seen in the map below, there are still many areas of Richmond that do not have adequate access to fresh food. Because this analysis was dependent on the presence of public transportation availability, removing or changing existing bus and bike routes could make these areas more suitable for new stores in these zones.

Map Information

Projection: California State Plane Zone 1 NAD 83
I used vector models for all of my layers in this map. Sources of data included:
• The City of Richmond (zoning)
• City of Richmond website (fire stations)
• Contra Costa County website (traffic stations)
• OSM data (walkable areas)
• Coordinate data for existing grocery stores and farmers’ markets were collected using Google maps. This coordinate data was converted into point shapefiles in ArcGIS using the Add XY Data tool.

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Geography C188 Section 104

References

Legend

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Proximity to farmers’ markets (1320 ft. buffer)
Proximity to faults (5280 ft. buffer)
Proximity to fire stations (5280 ft. buffer)
Proximity to bus stops (1320 ft. buffer)
Proximity to bike routes (2840 ft. buffer)
Proximity to areas of dense population (1320 ft. buffer)
Proximity to points of interest (1320 ft. buffer)
Proximity to susceptible areas (1320 ft. buffer)

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