

FOOD JUSTICE

Mapping Food Access in Greater Boston

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INTRODUCTION

In the United States, racial/ethnic minority neighborhoods are disproportionately affected by increased rates of morbidity, mortality and adverse health outcomes. Poverty, residential segregation and neighborhood deprivation are believed to be associated with these health outcomes. Many urban areas lack supermarkets, limiting access to healthy foods for neighborhoods with low-income residents. The USDA describes a “food desert” as being a mile away from a supermarket, while the city of Baltimore defines it as being 1/4 mile away from a supermarket. In this study I attempt to look at food access in 6 towns in the Greater Boston Region using Baltimore’s proposed distance of 1/4 mile.



METHODOLOGY

Using the North American Industry Classification System, supermarkets and convenience stores were located based on the Reference USA website. The American Community Survey (2014) was used to get population and poverty data. Euclidean distance of 1/4 mile from supermarkets was measured and reclassified. The kernel density of convenience stores was measured and assigned a low value if there was a high density of convenience stores and a high value if there was a low density of stores. Similarly, population density was reclassified and assigned high values for higher density and lower values for lower density. Families with income below poverty level were also assigned high values (high poverty) and low values (low poverty). Finally, raster calculator was used to examine low vulnerability and high vulnerability areas. The population affected in high- and low-vulnerability areas were calculated using the tabulate area tool.

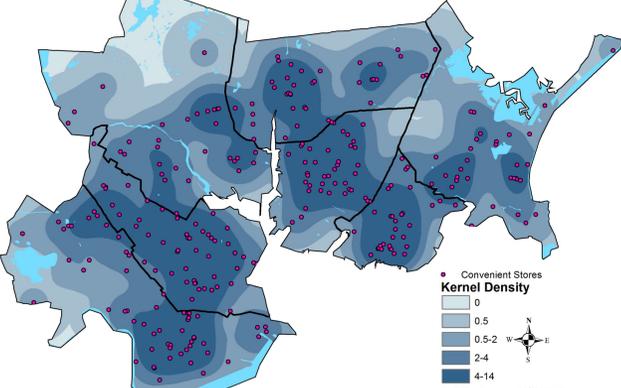
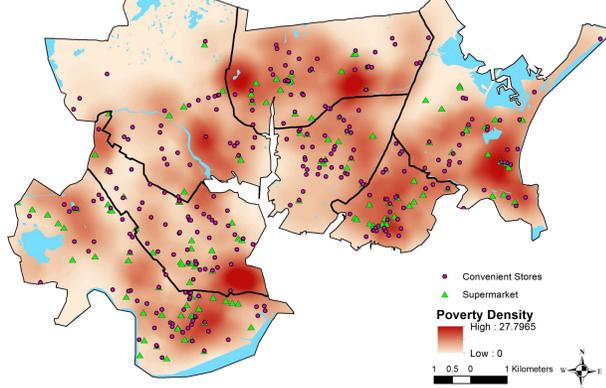
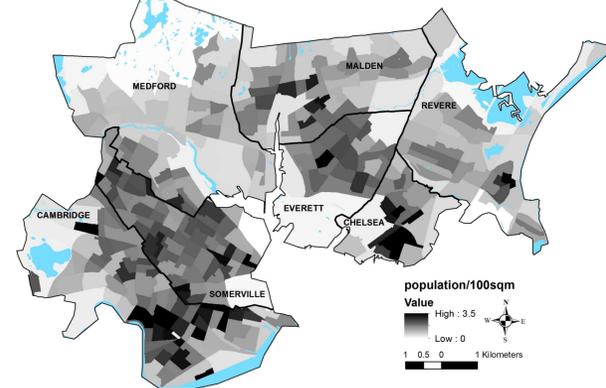


Fig 1: Population density

Fig 2: Family poverty density

Fig 3: Kernel density of convenient stores

RESULTS

Using the 1/4 mile distance, we see that there are large areas in the greater Boston area that do not have access to supermarkets. In the areas that have a high vulnerability score, almost 358,095 residents do not have easy access to supermarkets.

There are 7125 families in these areas that have incomes below poverty level. In the lower vulnerability areas, almost 3701 families do not have proper food access.

These areas probably have access to convenience stores which assigns them a lower vulnerability score.

	Vulnerability	
	Low	High
Total Population	162831	358095
Families below poverty	3701	7125
% Family Poverty	2.27%	1.99%

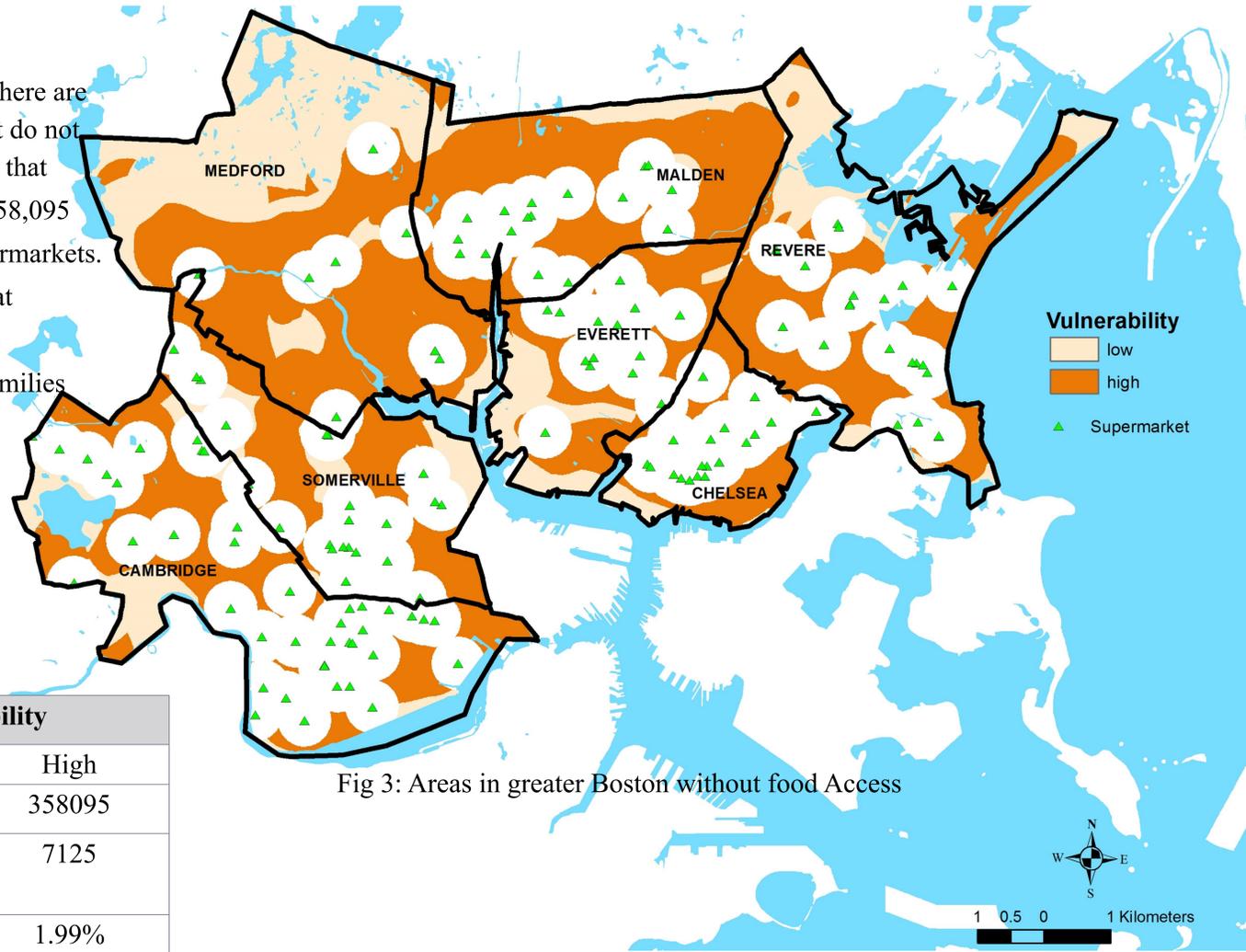


Fig 3: Areas in greater Boston without food Access

LIMITATIONS

The Euclidean distance measures the overall distance of 1/4 mile and does not map the actual walking distance of 1/4 mile, overestimating the population that the supermarket actually serves. This model uses ACS data on families under poverty. There are better measures like poverty of all residents rather than just families. This data results in underestimation of the population below poverty level that are affected. Furthermore, the ACS data itself is flawed as it is an estimation based on the data from a subsample, hence there is a possibility that the data in the table is over or underestimated.

FUTURE DIRECTIONS

This model can be further improved by looking at block level data to get a detailed look at the specific blocks that are getting impacted by the lack of food access. It would be of interest to look at the health outcomes in these neighborhood to see if there is a relationship with lack of access to supermarkets and health in the greater Boston area. Also, looking at access to vehicles could further narrow down the true vulnerable population in these areas. Additionally, data on race and ethnicity would be helpful to identify vulnerable populations. Although this model gives a general idea in highlighting areas within Greater Boston that do not have super market access, it requires further detailed information to pinpoint areas where building a supermarket would best serve the population.

Sources:

Walker,R.E., Keane C.R., Burke J.G., 2010, Disparities and access to healthy food in the United States: A review of food deserts literature, Health and Place, Vol 16, 876-88

Santo,R., Palmer,A., Buczynski,A., 2015, Researching the Baltimore City Food Environment: Contribution from the Johns Hopkins Bloomberg school of Public Health

Map Data Sources:

MassDEP Hydrography (1:25,000), March 2010, US Geological Survey: MassDEP GIS Program

Town Boundries, February 2014, Mass Department of Public works, MassGIS

American Community Survey, 5-year Estimates . 2010-2014, US Census Bureau

U.S. Business Database, Reference USA