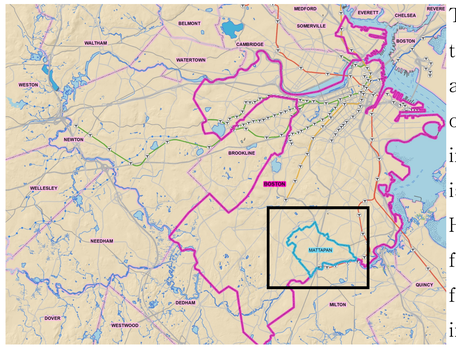
# Evaluating New Grocery Store Locations in Mattapan, MA

## Background



The connection between limited food access and health outcomes in low-income communities is well documented. However, analyzing food access and finding solutions to increase food security in these communities prove to be complicated tasks. This project looks at the example of Mattapan, a low-income neighborhood located in Boston, Massachusetts, to demonstrate the usefulness and limits of applying mapping tools to the issue of food access. Mattapan is a particularly salient example as its obesity rate is 16% higher than the rest of the city of Boston.[1] In addition, Mattapan has a large immigrant population and a child poverty rate of 42%, both factors that can contribute to food insecurity.[2]

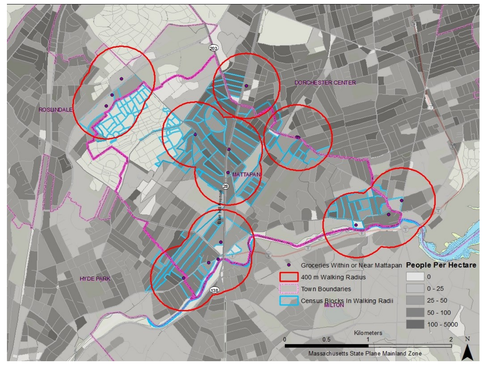
## Methodology

The main critical entities in this model include:

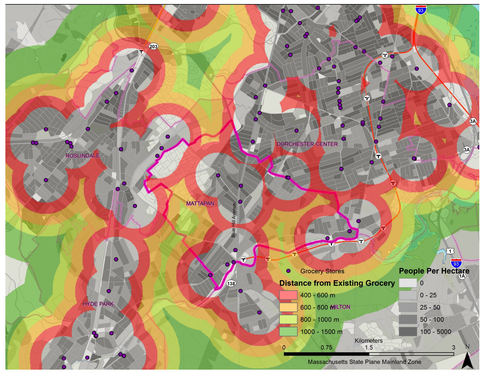
- Population Density
- Grocery Store Locations
- Walking Radii Around Grocery Stores

The main spatial mechanism this model explores is how many Mattapan residents are within walking distance to a grocery. A walking radius of 400 m is used because it estimates the distance a person can walk in five minutes.[3] This model centers on walkability, rather than other transit, because walkable access to grocery stores has been associated with obesity.[4] Using demographic data from the 2010 Census and grocery store business data from Reference USA, this model demonstrates the current situation in Mattapan. To analyze potential new grocery locations, GIS raster tools, such as Euclidean Distance and Reclassify, aid in identifying possible locations based on three important factors: (1) Distance from existing grocery stores, (2) Current land use, and (3) Proximity to densely populated blocks. These three factors are then combined using the Raster Calculator to obtain an overall score for grocery store feasibility in any given location in the neighborhood.

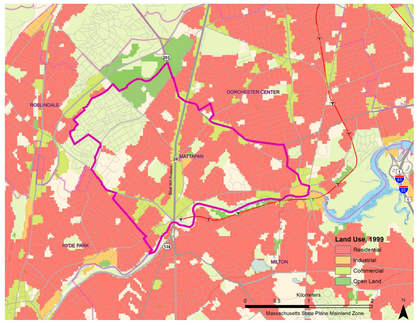
## Mattapan Today



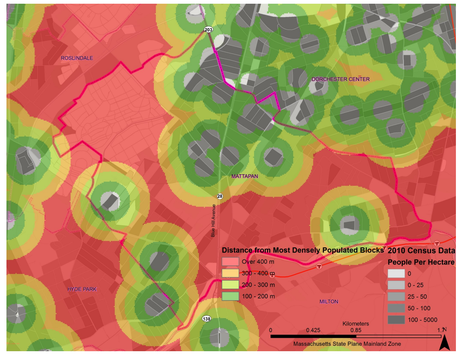
| Mattapan Today | |
|---|---|
| Total Population | 25672 |
| Number of Grocery Stores | 18 |
| Percent of Mattapan residents within walking distance to grocery stores | 55 % |



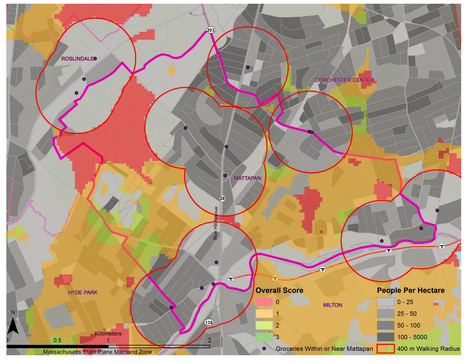
**Distance from existing grocery stores.** To maximize the number of new residents within walking distance to a grocery store, new grocery stores should not be too close to existing grocery stores.



**Existing Land Use.** Current land use limits possible building locations for new stores. This map highlights four types of land use that could potentially work and excludes non-starter sites, such as T-stops, cemeteries, and recreation spaces that are important for the community's access to physical activity.

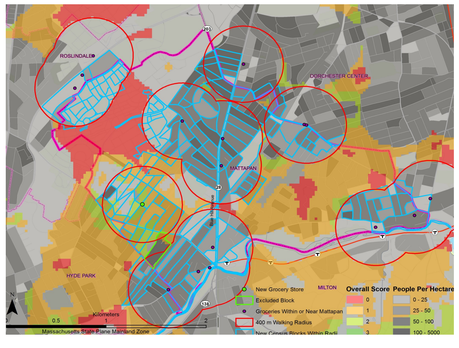


**Population Density.** Ideally, a new grocery store will be situated near a densely populated block, but not *on* a densely populated block because that would require demolishing already existing housing for residents. Here, the most densely populated blocks have over 100 residents per hectare.



**Raster Calculator Results** Combining all three considerations, this map indicates potential areas to inspect for grocery store development. There are no areas with the maximum score of 3, and only a few small areas with scores of 2.

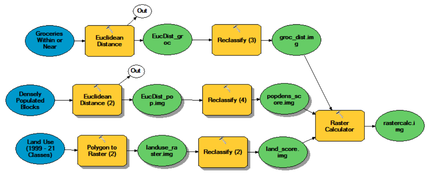
## A Spot for Trader Joe's?



| New Grocery Details | |
|---|---|
| Distance from an existing grocery store | 800—1000m |
| Land Use | Open Land |
| Proximity to densely populated block | 300—400 m |
| Overall Feasibility Score | 2 out of 3 |
| New percentage of Mattapan residents within walking distance to a grocery store | 62% |

## Results

These maps highlight the limited amount of potential locations for a new grocery store in Mattapan. There remains little land that is close enough to densely populated blocks that is not itself residential land, which one would not want to destroy. Thus, while there remains a handful of locations worthwhile of analysis by grocery store developers, renovating current grocery stores and improving transit between blocks outside the walkability radii and the grocery stores may be the best solutions. However, the methodologies used in this model (shown right) can be extended and applied to other neighborhoods or cities.




## Discussion

Several issues limit the interpretation of this model's findings. First, Reference USA business data was last updated in 2014. Since then, new grocery stores may have opened in the area. In addition, grocery store data ignores other potential sources of food, such as food pantries, corner stores, farmer's markets, and home gardens. In the same vein, this model does not consider differences in grocery store quality. Residents may choose to avoid their closest grocery store because they prefer the offerings at one further away. Second, this model does not account for factors that affect walkability such as sidewalk condition and slope. Lastly, as you can see highlighted on the final experimental map, one highly densely block overlaps with the walkability buffers, but not enough to be counted in the total estimate of residents within walking distance to a grocery store. Overall, this model provides an optimistic analysis of grocery access. Future projects could use vector and raster techniques to add the aforementioned considerations to the model.

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**References:**

1. Mattapan Disease Rates. Tufts Clinical and Translational Science Institute. www.wellnesstrail.tuftsctsci.org/nrighborhoods/disease_rates/mattapan
2. C. Khan & J. Martin. *The Measure of Poverty: A Boston Indicators Project Special Report*. The Boston Foundation, 2011.
3. Western Australian Planning Commission. *Liveable Neighbourhoods: A Western Australian Government Sustainable Cities Initiative*, 2nd ed. Perth: Western Australian Planning Commission, 2000.
4. Rundle, Andrew, et al. "Neighborhood Food Environment and Walkability Predict Obesity in New York City." *Environmental health perspectives* 117.3 (2009): 442-7. *ProQuest*. Web. 12 May 2016.

**Data Sources:**

2010 Population and Housing Census, January 2011, US Department of Commerce.

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Zip Codes (5-digit) from HERE (Navteq) July 2015. HERE.



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