

Jilo to the People: Mobile Farmers Market Site Suitability in Somerville, MA



Background

A report from the Somerville Mayor's Office called the city a "community of immigrants". Recent waves of people have come from Brazil, Portugal, El Salvador, Haiti and China, and many are hungry for food reminiscent of their homelands. Groundwork Somerville (GWS) is a non-profit organization that promotes sustainable community development and revitalization through a variety of programs, including an urban farming program called The Green Team. Local youth leaders on The Green Team grow, harvest, and sell produce at eight Mobile Farmers Market locations throughout the city. In addition to offering an opportunity for youth to learn about agriculture and entrepreneurship, the Mobile Farmers Market program serves residents that lack access to fresh, affordable and culturally appropriate food. GWS grows produce for immigrant populations, such as Jilo, a type of eggplant used in Brazilian cuisine.

Current mobile market locations experience varying degrees of success, and GWS is concerned that some locations are not reaching the target audience. As such, GWS is interested in assessing locations throughout the community that might better meet their goals.



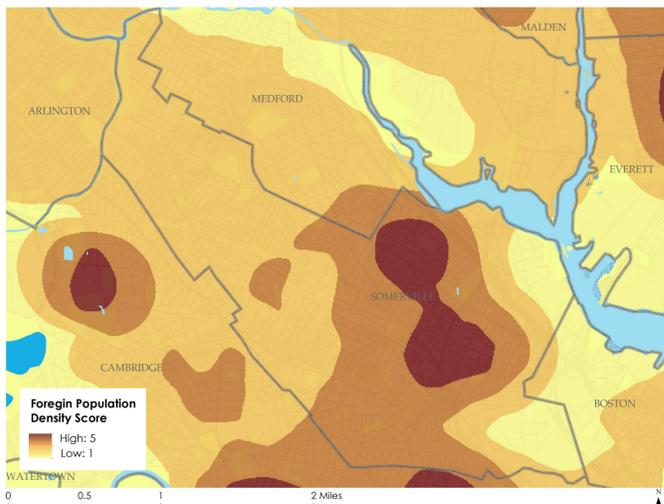
The GWS Green Team harvesting produce from the South Street Farm in October 2015. Photo Credits: Caitlin Joseph

Methods

Ideal mobile market locations are those that are 1) favorable to a viable market; and 2) accessible for low-income and immigrant residents. A spatial model was created in ArcMap to identify potential sites and evaluate the suitability of current sites based on variables that approximate viability and accessibility. Data were used to represent locations that are:

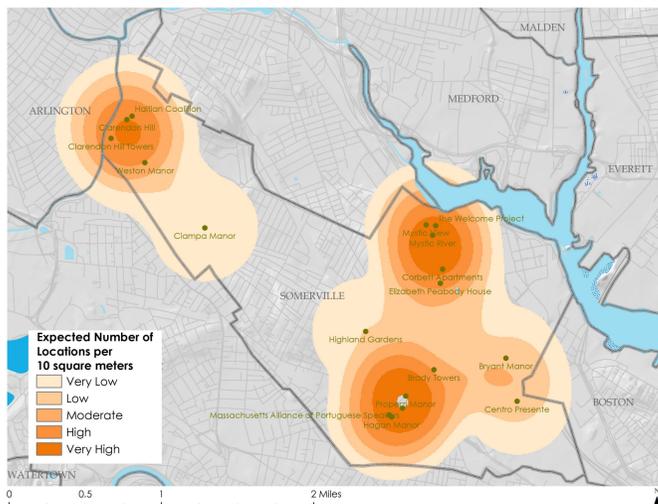
- Within convenient walking distance from subway stations;
- Within convenient walking distance to areas with high densities of foreign born residents;
- Located in areas with high densities of low-income housing and immigrant support services;
- A sufficient walking distance away from competitor farmers markets; and
- Located on land that is currently in desirable use.

Raster layers were created from all source data, and spatial analyses were performed at a cell size of 10 m to output meaningful scores of suitability for each parameter. These scores were summed without weights using Map Algebra, and suitability scores resulted.



Focal Statistic of Foreign Born Population Density by Land Area in Meters

Demographic data at the Census Block Group level and was normalized by land area in meters, rasterized and input into the Focal Stat tool to express the number of foreign born residents within a 500 meter radius of each cell. This represents the number of foreign born residents within ~1/4 mile of sites identified by the model.

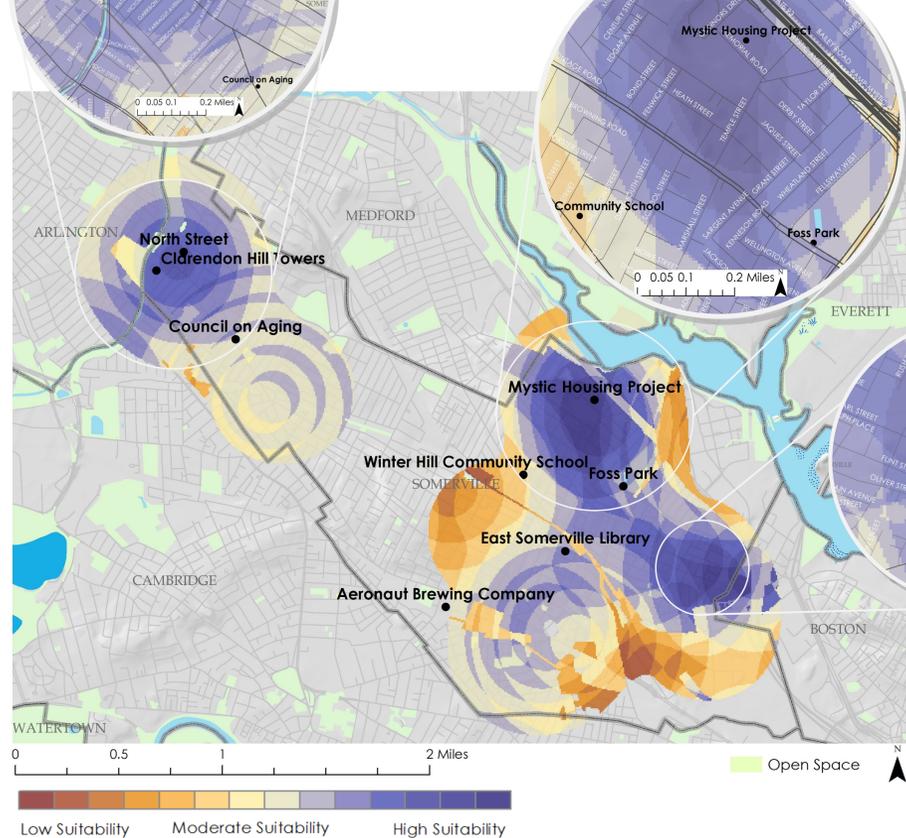


Kernel Density of Low-Income Housing and Immigrant Support Services

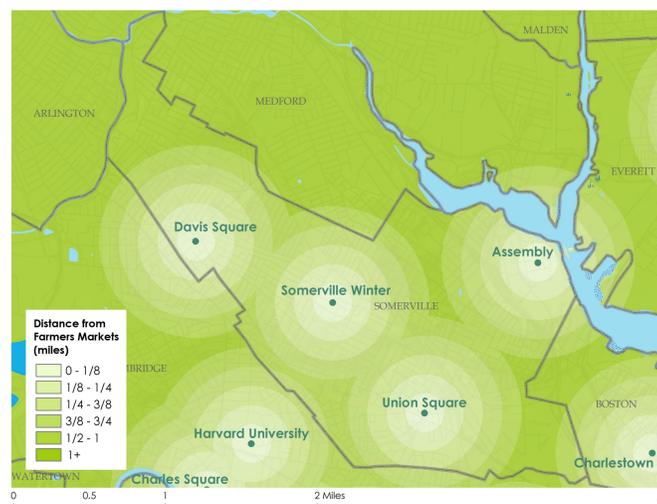
Point data for housing and support resources represented locations with higher likelihoods of reaching GWS's target customer base. Kernel Density was used to express the expected count of services and/or housing locations within each cell. Areas of higher densities of these desirable community resources are represented in darker orange.

Results

Below, areas of higher suitability are deep purple, and current mobile market sites are referenced in black. Based on this analysis, the North Street and Clarendon Hill sites are on the higher end of the suitability spectrum, while the Council on Aging site has moderate suitability. Of the current sites, the Mystic Housing Project market is predicted to be the most suitable, while Aeronaut Brewing Co. is the least suitable. If this analysis fits well with GWS's real experience of the success of these sites, results presented here may be useful for exploring new sites. Specifically, this analysis suggests that sites of interest may exist between Rush St. and Brighton St. in the South East area of the city.



Site Suitability and Current Mobile Farmers Markets



Euclidean Distance from Existing Farmers Markets

Point data on non-mobile farmers market locations was used to model the experience of walking from competitor markets to sites identified by the model. Distances within 1/8 mile of competing markets were considered unsuitable in the model. Darker greens indicate more desirable areas for potential mobile farmers markets.

Limitations

The Transit Capacity and Quality of Service Manual from the Transportation and Research Board of the National Academies indicates that convenient walking distances to transit stops in North America are between 1/4 - 1/2 miles depending on the type of transit and the walkability of the route. In this model, these thresholds were utilized when reclassifying raster layers with scores to express desirable walking distances from existing farmers markets and transit stops, and to potential mobile market sites from areas of higher proportions of foreign born people in the population. These estimates may not be as applicable to convenient walking distances to markets as they are to transit stops. Future analyses could be improved by building on research that indicates walking distances that are specifically applicable to farmers markets.

Land use data were gathered by ortho imagery captured for the .5 meter resolution in April 2005. Land use change since 2005 will not be accounted for in this model, nor will land use differences across a less than a .5 meter area.

Point data used as a proxy for low-income housing and immigrant support services was obtained from a project collaborator who plotted points from addresses after speaking with GWS in October of 2015 about the relevant community resources that the organization was interested in targeting. The creator searched for relevant resources online, then created a Google Earth map that was used in this analysis. This data may underrepresent the relevant resources and, if so, may indicate their spatial distribution differently than they are in reality.

Data to express the density of the foreign born residents were only available at the Census Block Group level. Block Groups are clusters of census blocks, which are closer approximations of city blocks. As such, the data in this analysis do not reflect the number of foreign born residents from one city block to the next as closely as they would had data been available at the Block level.

In future analyses, weights could be assigned in the model to express higher priority parameters.

Citations

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- Transit Capacity and Quality of Service Manual, Third Edition. Transit Cooperative Research Program, Transportation and Research Board of the National Academies. Pages 4-18 - 4-20. Published 2013. Accessed May 2016. <http://www.trb.org/Main/Blurbs/169437.aspx>
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Cartographer: Caitlin Joseph

Fundamentals of GIS, Spring 2016

Projection: NAD 1983 State Plane Massachusetts

