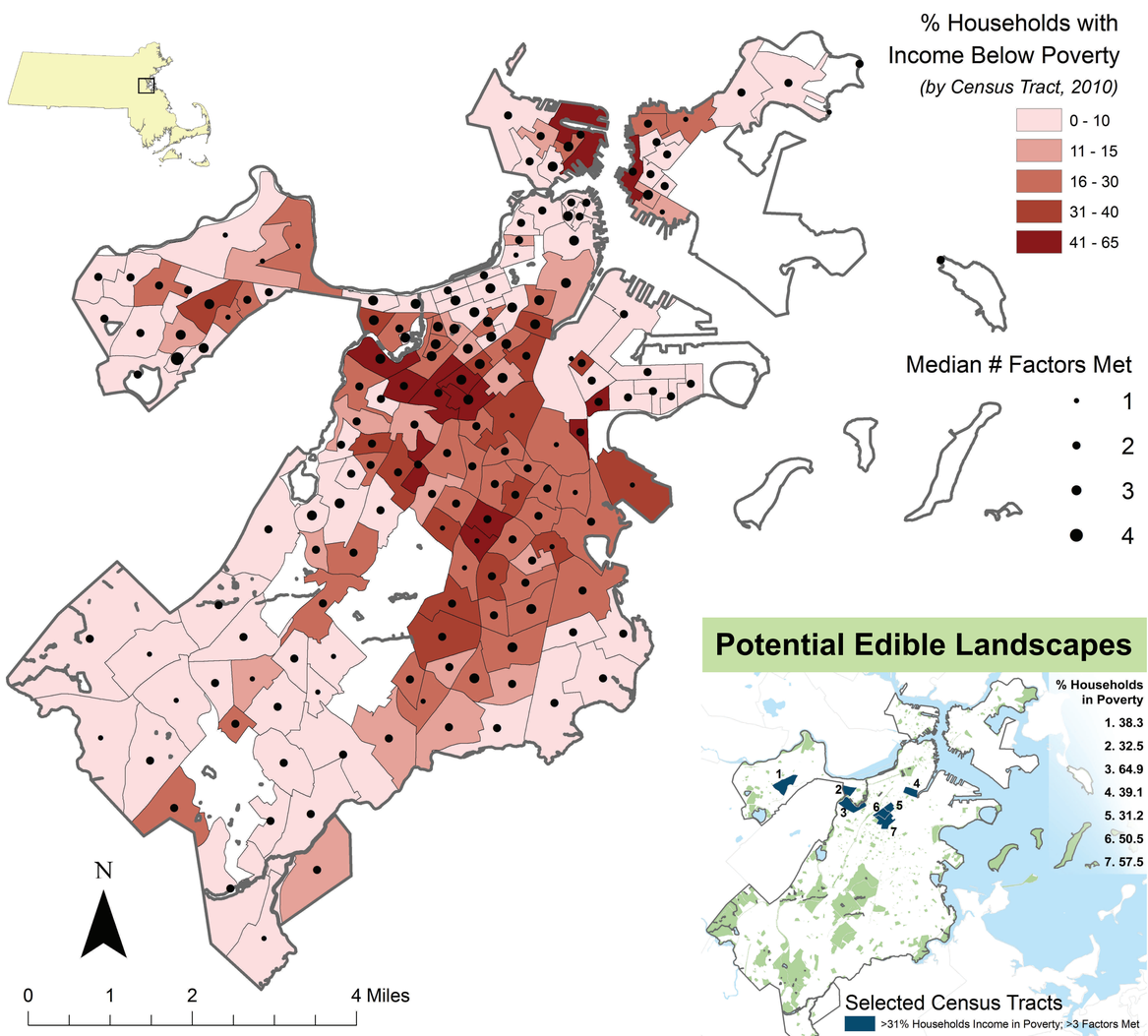
Boston's Edible Landscapes: Feeding Low-Income Areas

Introduction

In 2011, 14.9% of all households in the U.S. were food insecure; of these, 34.5% were low-income households below the poverty line.[1] To be food insecure means to lack access at all times to enough food for a healthy and active lifestyle.[2] Community gardens and other forms of edible landscapes are growing solutions to increasing food insecurity especially in areas of low-income populations. For this project, I wished to locate edible landscapes in proximity to areas of low-income populations as a solution to increase their healthy food access and help alleviate food insecurity.

Characteristics for mapping suitable edible landscaping sites in Boston included pervious land cover, education potential, accessibility, and areas with least access to grocery stores. Education potential of land was analyzed according to walkability from schools and community gathering places (community centers). Walkability from MBTA stops was another factor included in the final analysis as a means to gage accessibility. Finally, potential edible landscaping outside of ¼ mile walkability from grocery stores was factored into the analysis as a way to find areas with limited access to fresh produce. Through spatial analysis of these factors, identified potential edible landscapes to grow nutritious, fresh food accessible for low-income populations are possible solutions to improving food security in the city of Boston. As a pilot project, I hope for this analysis to be of use for querying any urban areas with growing potential to serve as a stepping stone towards a more thorough analysis of edible landscapes within food insecure and low-income areas.

Households in Poverty and Edible Landscape Potential



Potential Edible Landscapes

Methodology

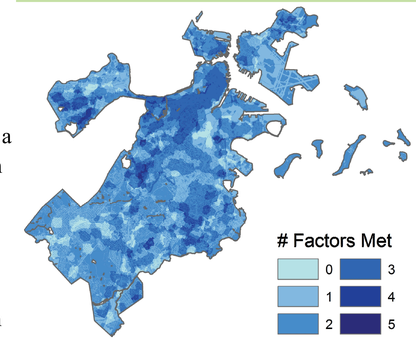
1. Obtain necessary data sets for factors included in analysis.

   Data for schools, community centers, and grocery stores were geocoded. Impervious raster data sets were clipped individually to Boston's boundary, and merged as a mosaic in a new raster dataset with a cell size of 1.

1. Create network service areas of ¼ mile around schools, community centers, MBTA stops, and grocery stores using street centerlines from MassGIS TIGER roads.

2. Convert each of these service area polygons to raster data sets (cell size 1) for ranking analysis and reclassify so that 1 = inside possible areas, 0 = outside of possible areas.
3. Add up raster to create an edible landscape suitability raster surface using the Spatial Analyst Raster Calculator.
4. Overlay the final suitability raster surface to Low-Income Households dataset using Zonal Statistics.
5. Zonal Statistics as Table created a table with data of the final raster surface that was then joined to the Low-Income Households attribute table. Median number of factors met was used for analysis.
6. Query to get areas with % families in poverty ≥ 30 and median number of factors met >3, and create a new layer to single out these Census Tracts.
7. Create a new field in final selected Census Tracts layer and use the field calculator to calculate acres of potential edible landscapes.

Factor Raster Surface



Results

There are a total of 3203 acres that meet at least three designated suitability criteria of an edible landscape. Of these, 613 acres are located in Census Tracts (2010) with greater than 30% of households in poverty. This analysis shows the potential of pervious surfaces in an urban city like Boston for growing food and not just larger open spaces. Community gardens are usually limited to areas greater than 1 acre; however, even small patches of land that meets suitability requirements would be able to grow fresh produce for the community to eat, especially low-income families . The City of Boston and organizations should consider looking at any small area of land as a means to alleviating food insecurity for low-income households while increasing the city's food self-sufficiency.

In a larger project, additional factors can be included in the analysis and weighted to identify more appropriate land for growing food. For example, these factors could include slope, land ownership and public access, accessibility by road and a buffer away from roads. With further research, food insecure areas can be determined based on further factors other than low-income for a more rounded analysis.

Acres of Edible Land

Census Tract	Edible Landscape (Acres)
1	148
2	62
3	126
4	66
5	41
6	61
7	109
Total	**613**

Cartographer: Kai Ying Lau | Fall 2012

Data Sources: MassGIS, US Census Bureau (2010 ACS 5-Year), Tufts Server (M Drive), ReferenceUSA

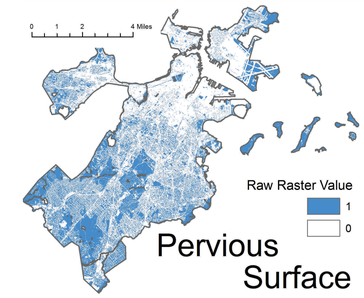
Projected Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001, Meters

[1] Economic Research Service (ERS). U.S. Department of Agriculture. (2012). "Food Security in the U.S." http://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us.aspx

[2] United We Serve, U.S. Department of Agriculture. (2012). "Let's Glean! United We Serve Toolkit." http://www.usda.gov/documents/usda_gleaning_toolkit.pdf

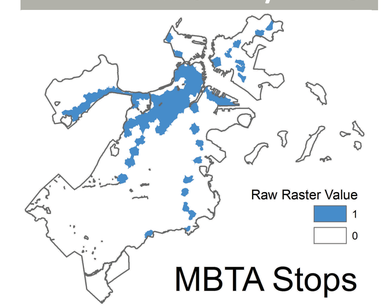
Tufts

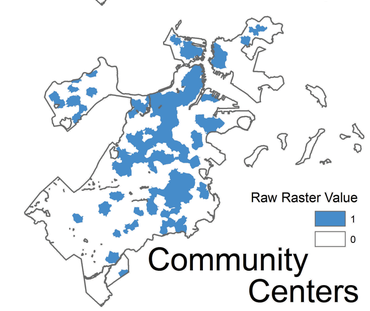
Factor Maps

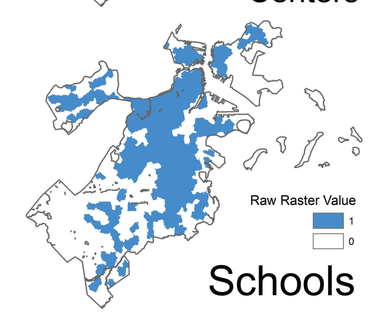


Service Area

Within 1/4 Mile







Outside 1/4 Mile