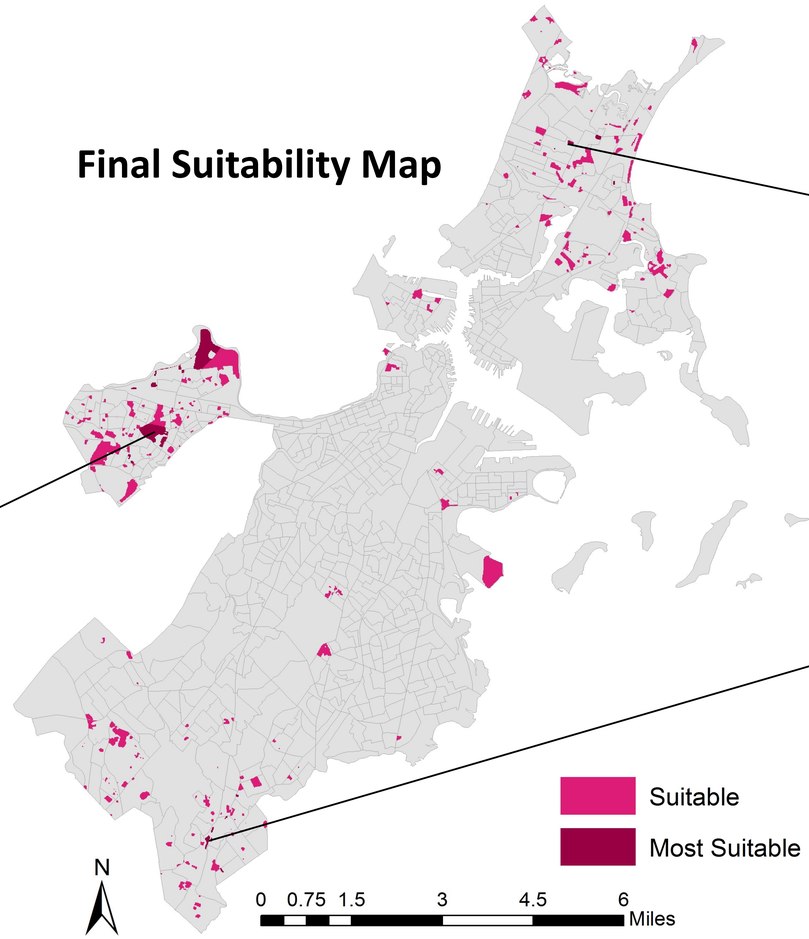
Suffolk County Community Garden Suitability Analysis

Introduction

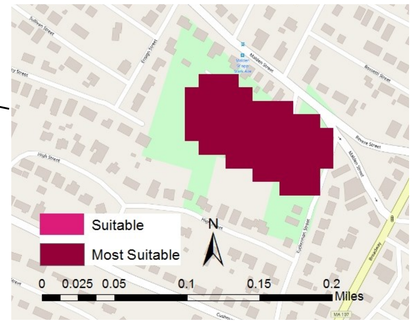
Community gardens have been proven to have very positive effects on the general health of communities. They can be used as a health education tool in schools, and can build a strong sense of community when open and easily accessible to the public. An increased presence of places that promote healthier food choices could be a major help to Boston neighborhoods most vulnerable to rising obesity rates and poor food education.

My research was focused on finding the locations in Suffolk County that are most suitable for a community garden. I used ArcMap to run a suitability analysis on Suffolk county using the data I found pertinent to my research, including median household income, race, and education attainment level by block group, Massachusetts land use, and the locations of MBTA stops and existing community gardens in Suffolk County. I also used iterators in ArcMap to change the weights on the suitability factors and see how changing the importance of each factor changed the suitability mapping.

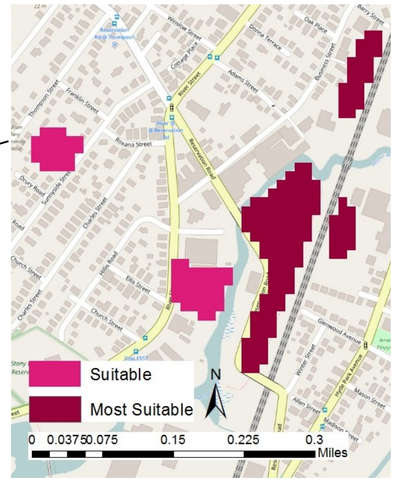
Final Suitability Map

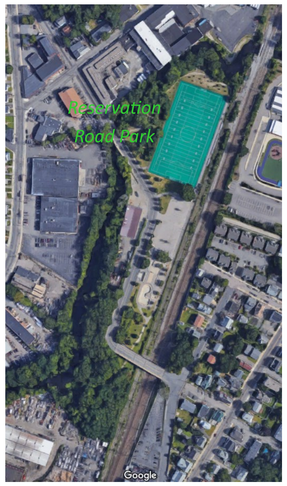


Lincoln School Park, Revere

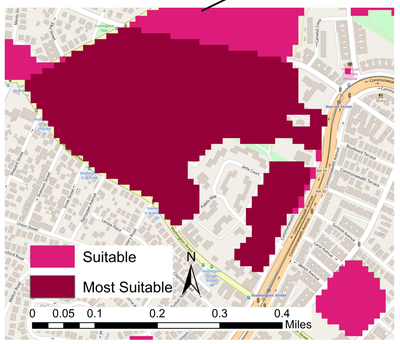


Reservation Road Park, Hyde Park





Fidelis Way Park, Brighton



Methodology

Step One: Organizing Data

- Converted coordinates for existing community gardens into a shapefile in ArcMap, projected them to NAD Massachusetts State Plane Projection

Step Two: Demographic Suitability Analysis

- Used ***Polygon to Raster*** on median household income, percent nonwhite, and percent over 25 with highest education attainment at or below high school by block group
- ***Reclassified*** rasters, reversing values for income so lower income has higher value
- ***Weighted Overlay*** with 50% income, 25% pnonwhite, 25% phslower

Step Three: Geographic Suitability Analysis

- Used ***Euclidean Distance*** on MBTA stops and existing gardens, hard-coded 10 class intervals of 0.25 miles for both, and **Reclassified** rasters, reversing values for MBTA
- ***Weighted Overlay*** with equal weights for each

Step Four: Final Suitability Analysis

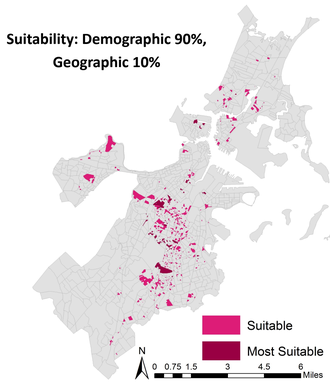
- ***Weighted Overlay*** with equal weights for demographic and geographic suitabilities
- One ***Con*** to give only the most suitable class, and another ***Con*** to give only plausible garden areas based off land use
- ***Majority Filter*** to give suitable areas with at least four neighboring cells also suitable

Step Five: Implementing Iterators

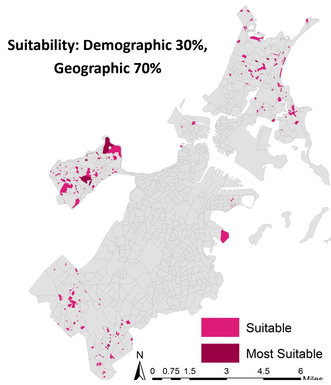
- Used a ***Field Value*** iterator to loop over percentages for Demographic vs Geographic Suitability (90-10, 80-20, … , 10-90). Fed values to a ***Raster Calculator*** and applied the same ***Con*** and ***Majority Filter*** processes to get final suitability analyses.

Suitability Mappings of Different Weights

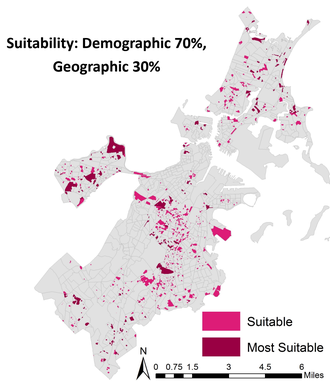
Suitability: Demographic 90%, Geographic 10%



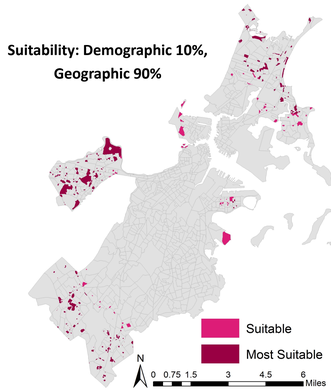
Suitability: Demographic 30%, Geographic 70%



Suitability: Demographic 70%, Geographic 30%



Suitability: Demographic 10%, Geographic 90%



Results

The results show big pockets of suitable areas in Revere, Allston/Brighton, and the Hyde Park/West Roxbury neighborhoods. These results are unsurprising, as more or less all of these areas had instances of lower median incomes, high percentages of non-white residents, and high percentages of lower education attainment. These areas are also full of MBTA stops and are furthest from the existing community gardens in Suffolk county.

Changing the weights on the suitability analysis factors also led to expectable results. With weights leaning more towards Demographic suitability, the resulting sites are more focused in the Dorchester and Roxbury neighborhoods, where non-white population percentages are high, and education and median income levels are low. Conversely, weights in favor of Geographic factors clustered on the outer edges of Suffolk County, far from existing community gardens.

Sources

NAD 1983 Massachusetts State Plane Projection
Suffolk County Land Use—MassGIS, 2005
Block Group Demographic Data—2015 ACS
Locations of Existing Boston Community Gardens—thetrustees.org
Satellite Images from Google Earth

Cartographer: Jack Vallerie, GIS 102: Advanced GIS, 9 May 2017

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