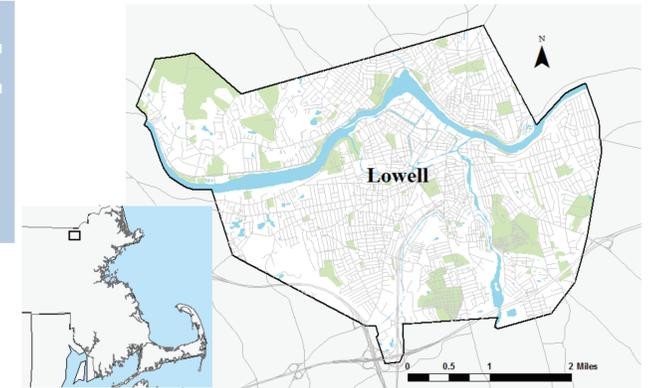
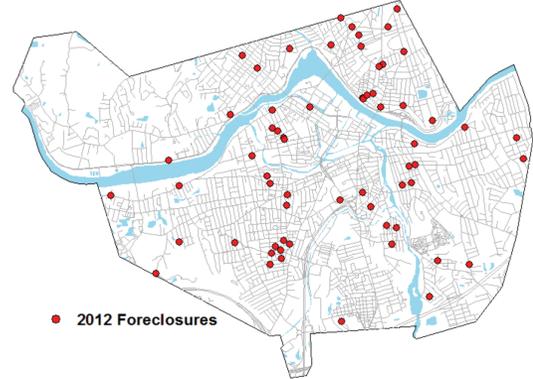


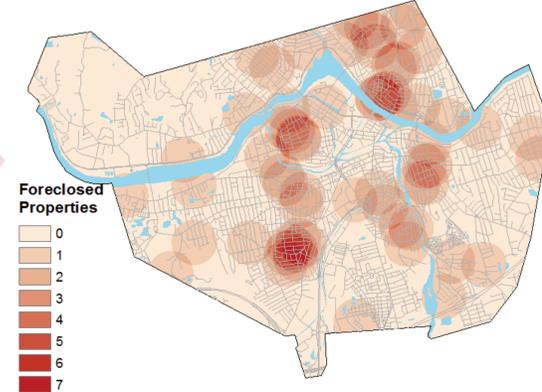
# Targeting Areas for Revitalization in Lowell, MA: A demonstration of Methodology



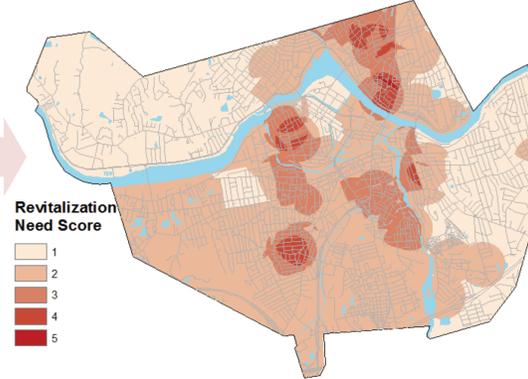
Location of 2012 Foreclosures



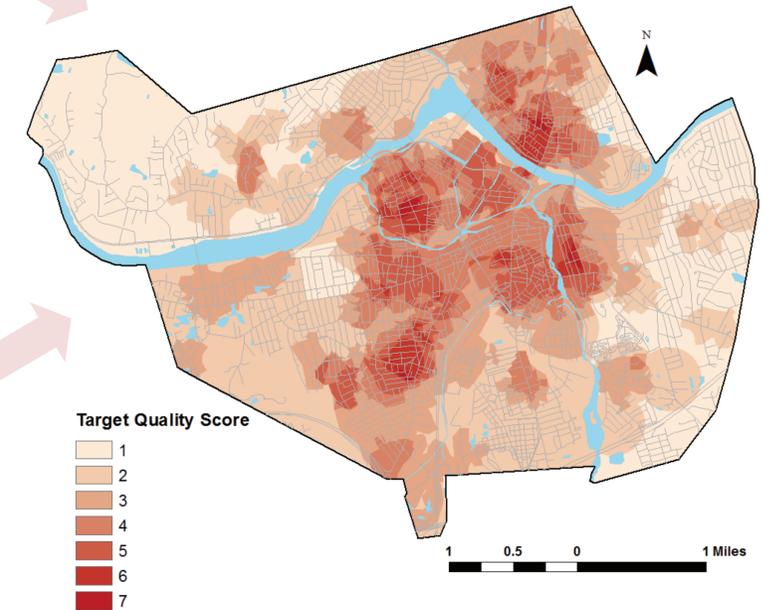
Foreclosure Density



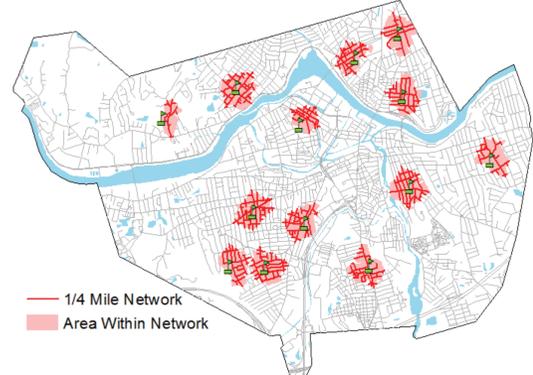
Revitalization Need



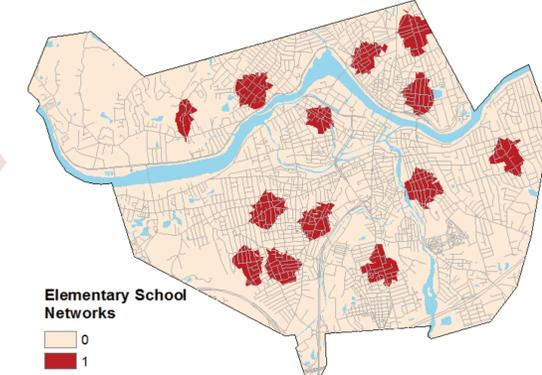
Revitalization Target Quality



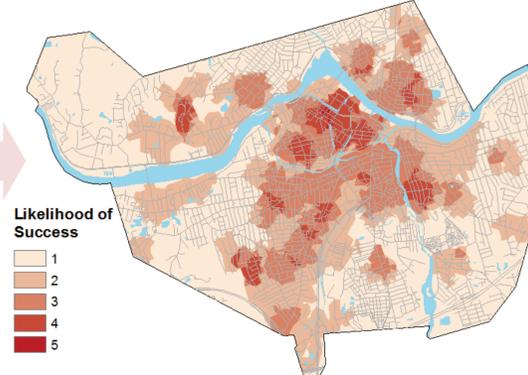
Elementary Schools' "Accessibility" Networks



Elementary Schools' "Accessibility" Raster



Likelihood of Success



## Introduction

Lowell, MA is a former mill town in northern Massachusetts. After serving as the birthplace of the American Industrial Revolution, it fell on hard times in the 20th century. It has since experienced a resurgence and has seen a significant amount of economic growth over the past 20 years. However, there are still a large number of low income residents in Lowell, and as a result the city was hit particularly hard by the most recent recession. The purpose of this analysis is to determine which parts of Lowell should be targeted by revitalization efforts. In this analysis, I have identified criteria by which areas may be selected, and used ArcGIS to determine which areas of Lowell best meet these criteria. The list of criteria I have used is by no means meant to be exhaustive or optimal, but will suffice to demonstrate the methodology.

## Methodology

To identify areas that are good candidates for revitalization efforts, I used two categories of criteria: need and likelihood of success. The need based criteria were poverty rates (by census tract) and proximity to properties that have been foreclosed on in 2012. To measure likelihood of success, I used accessibility to important amenities, which included public schools (separated into elementary, middle and high schools), grocery stores, and employment centers (defined as businesses with over 500 employees). To perform the analysis, I first collected point data on each of the criteria (except for poverty rates, for which I used Census 2010 data to determine poverty rates by census tract). Next, I analyzed the need and likelihood of success variables separately, before combining them into a final raster layer showing the quality of revitalization targets.

### Likelihood of success analysis

For each likelihood of success variable, I used the Network Analyst tool to create "accessibility buffers" based on the network distance from the points (1/4 mile for elementary and middle schools and grocery stores, 1/2 mile for high schools, 1 mile for employment centers). I then converted the buffers to a single polygon for each variable. Next, I used the Polygon to Raster tool to create a raster layer for each variable, where each cell value was equal to 1 if the cell was within the particular variable's network polygon, and 0 if it was not. Finally, I used the raster calculator tool from Spatial Analyst to combine each of the five variables' raster layers into one raster layer. In this layer, each cell was given a value equal to the number of network polygons it was a part of.

### Revitalization need analysis

I analyzed the revitalization need variables in a slightly different way. I created the 2012 foreclosure raster layer using the Point to Raster tool. This created a layer in which each cell's value was based on the number of properties that have been foreclosed on in 2012 that are within a 1/4 mile radius (Euclidean distance) of that cell. I created the poverty rate raster layer by using the Polygon to Raster tool. This time, the cell values were based on the poverty rate in the census tract the cell was located in (i.e. all cells within a given census tract received the same value). I then reclassified this raster layer to assign scores of 1 (low poverty) to 5 (high poverty). Next I created the Revitalization Need raster by using the Raster Calculator tool to combine the 2012 Foreclosure raster and the Poverty Rate raster. This resulted in values equal to the number of foreclosed properties within a 1/4 mile radius, plus the poverty rate score (1-5). Finally, I reclassified this layer into 5 categories with values of 1 (low need) to 5 (high need), to produce the revitalization need raster.

### Revitalization target quality analysis

The final step in the process was to combine the Likelihood of Success raster layer with the Revitalization Need raster layer. I did this by again using the Raster Calculator tool. The resulting revitalization target quality layer produced cell values ranging from 2 to 8 (though the maximum possible value was 10). For simplicity purposes, I reclassified these values as 1 (low quality target) to 7 (high quality target).

## Discussion

The methodology I have demonstrated here could be used by local, state, or the federal government, or by non-profit organizations to identify neighborhoods where revitalization efforts (i.e. affordable housing development, after school programs, job training programs, etc.) should be targeted. The final "Revitalization Target Quality" map is an easy way to visualize the areas of a city where revitalization efforts are likely to produce the most social benefit. I found it informative to create separate maps to visualize the need based and likelihood of success criteria individually. This also made it easier to weight the two categories of criteria equally when producing the final map. However, this is not a necessary step in producing the target quality map. If one were interested only in visualizing the overall quality of potential target areas, they could calculate that raster layer directly from the individual criteria layers. This might also be a better way of doing the analysis if one had significant empirical evidence to support hypotheses regarding what the relative weight of each criteria should be.



Cartographer: Matt Missett  
Date: May 9, 2012  
Projected Coordinate System: NAD 1983 State Plane MA (meters)  
Data Sources: MassGIS, www.census.gov, Middlesex North Registry of Deeds, Reference USA