Smart Growth Indicators in the Suburban Setting

Using Spatial Analysis in Smart Growth

The idea of this project was to measure the "growth attractiveness" of a certain areas within a suburban setting based on Smart Growth indicators. The indicators will be based on the Smart Growth Index system used by the EPA, although the exact software was not be used. Suburban sprawl is a growing problem in the United States, and it is important to examine Smart Growth principles as a potential way of combating this problem. The project had two main parts:

Step #1: Benchmark existing conditions

Step #2: Observe how changes to these conditions affect the indicators

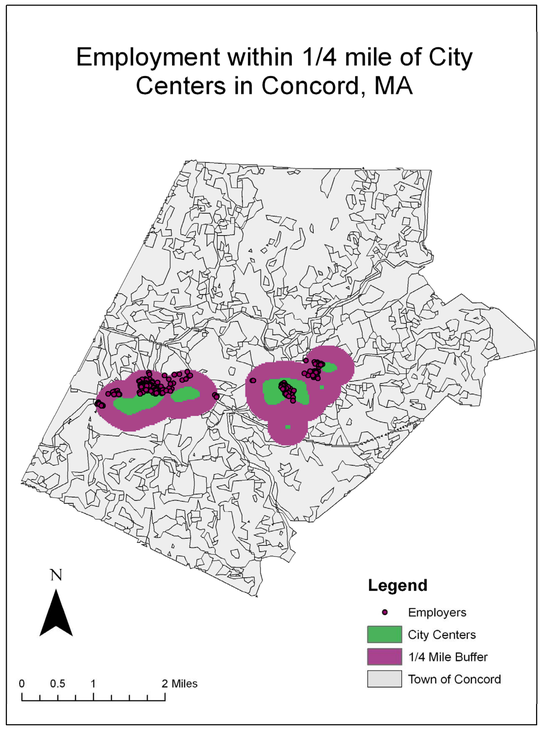
Smart Growth is interesting to consider in a suburban location such as Concord, MA. Suburban neighborhoods tend to be very spread out, involving lots of vehicle trips and inefficient land use. Smart growth has the potential to help these smaller cities to make themselves more environmentally friendly, livable, and economically viable, mostly through carefully considering where they locate new development.

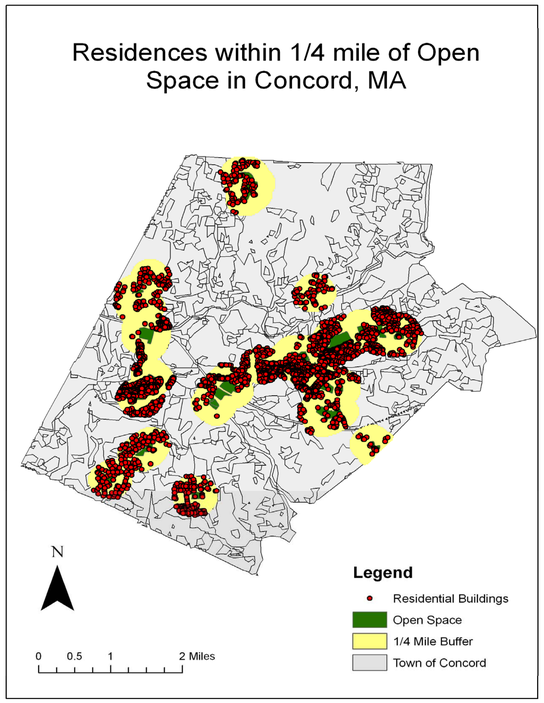
Urban planning and smart growth are all about proximity. Distance from certain areas such as parks or city centers is a very important element in my analysis. Spatial analysis was mainly necessary to find out what features were within a certain distance of some other feature. Spatial analysis was also necessary to calculate the dissimilarity among grid cells for land use.

The Indicator System

The EPA Smart Growth INDEX uses a system of 26 to 29 indicators to analyze smart growth potential for cities. Because of data availability constraints, I chose to use 10 indicators which I felt captured the most important aspects of the Smart Growth principles. They were the following:

Indicator	Expressed As
1. Population density	Number of people/square mile
2. Mixed land use	Dissimilarity among 1 acre grid cells
3. Residential density	Number of residences/square mile
4. Housing proximity to city centers	Percent of dwellings within ¼ mile of city centers
5. Housing proximity to recreation	Percent of dwellings within ¼ mile of parks
6. Employment proximity to city centers	Percent of business and industrial zones within ¼ mile of city centers
7. Park space availability	Park acres/1,000 persons
8. Open space	Percent of total land use as open space
9. Vehicle trips	Average number of vehicle trips per day for all residents





Results of Benchmark

Indicator	Expressed As
1. Population density	682.0 people/square mile
2. Mixed land use	Mean dissimilarity = 3.66
3. Residential density	292.2 residences/square mile
4. Housing proximity to city centers	33.0%
5. Housing proximity to recreation	38.8%
6. Employment proximity to city centers	56.0%
7. Park space availability	190 acres/1,000 people
8. Open space	1.97%
9. Vehicle trips	37, 894 vehicle trips/day

Results After Changes

Indicator	Expressed As
1. Population density	682.0 people/square mile
2. Mixed land use	Mean dissimilarity = 3.66
3. Residential density	293.0 residences/square mile
4. Housing proximity to city centers	33.3%
5. Housing proximity to recreation	38.9%
6. Employment proximity to city centers	57.3%
7. Park space availability	190 acres/1,000 people
8. Open space	1.97%
9. Vehicle trips	Likely fewer than 37, 894 vehicle trips/day

Conclusions

My data show how important it is for cities and towns to have a comprehensive plan. The siting of 20 new businesses and residences did not cause much change in most of the indicators, and in some it did not cause any change at all. This just goes to show that while small advances help, the real challenge is to continue smart growth over the long term, and incorporate it into all decisions being made by the town.

Projection:Massachusetts State Plane NAD 1983, feet

Data Sources: MassGIS and ConcordGIS

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