Suburban Sprawl Continues in Rhode Island

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Introduction

In 2006, the Rhode Island Statewide Planning Program developed a framework for the state’s future land use goals, documented in “Land Use 2025 – State Land Use Strategies and Plan.” Land Use 2025 separated the state into two parts by an “Urban Services Boundary” (USB), focusing future development inside the USB to its extent possible. Land Use 2025 noted that RI was at a tipping point in 2006. Increasing rates of suburban sprawl – defined as units of Medium to Low Density Residential land occurring disproportionately outside of the USB – threatened the state’s economy and natural greenspace. Recommendations to control sprawl were outlined in the document. This project aimed to quantify and map statewide suburban sprawl to efficiently prevent additional sprawl, and stay on track in meeting the state’s land use goals by the year 2025.

Research Questions

- Is Rhode Island combating suburban sprawl in accordance to its Land Use 2025 plan?
- Where could RI target policy initiative and allocate resources to most efficiently prevent sprawl?

Data Preparation

Source of data layers
- Two spatial data files characterizing RI Land Use/Land Cover (LULC), the USB file, and the State boundary file, were downloaded from the Rhode Island Geographic Information System (www.rigs.org). The LULC files represented LULC in two distinct years – 2004, and 2011 (dated 12/2007 and 07/2015, accessed 2/20/16). The LULC data were developed for RIGIS by outside vendors by interpretation of orthophotographs and classification to the Anderson Level III coding schema.
- State imagery – provided by ESRI (dated 1/27/15 and 5/20/16, accessed 4/15/16 from http://www.esri.com/data/basemaps); the New England states boundary - the USB was created from this data (dated 12/28/15, accessed 4/21/16 from https://www.census.gov/geo/cen)
- Subsequent data layers were created from these using a variety of geoprocessing tools (see analysis section).

Challenges in data preparation

RIGIS datasets downloaded extended into neighboring states, so I had to prepare the data to include only land use information for RI. I also had to re-code existing Anderson Level III classes as either “developed” or “undeveloped”.

Types of data included

The format of data from RIGIS was in the ESRI shapefile format. The standard coordinate system for all RIGIS data is Rhode Island State Plane Feet, NDAD 1983. Created data retained this format (shapefile) and coordinate system.

Types of software used

I used ESRI ArcGIS for Desktop 10.3.1 for this project. ArcMap and ArcToolbox allowed for the preparation and analysis of the data, while ArcCatalog was used to manage created and downloaded data sets. ArcGIS Server 10.3.1 provided access to RIGIS/ESRI map and image services.

Results

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Data analysis types

- Interesting – this geoprocessing tool allowed for the identification of land use polygons that changed from undeveloped to developed between the two time periods in question.
- Feature to Point – the area of change for any given polygon was quite varied across the state. Some “change polygons” could be quite small. While the cumulative quantity of change could be represented in table/graph form, a method was needed to illustrate clusters of change. The Feature to Point geoprocessing tool provided an output shapefile of points for input to the Optimized Hot Spot Analysis geoprocessing tool.
- Optimized Hot Spot Analysis – this geoprocessing tool allowed me to find statistically significant clusters of Medium, Medium-Low, and Low Density Residential land.

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