

# Modeling Residential Development



## Watershed Buildout Analysis: *Revealing the unexpected*

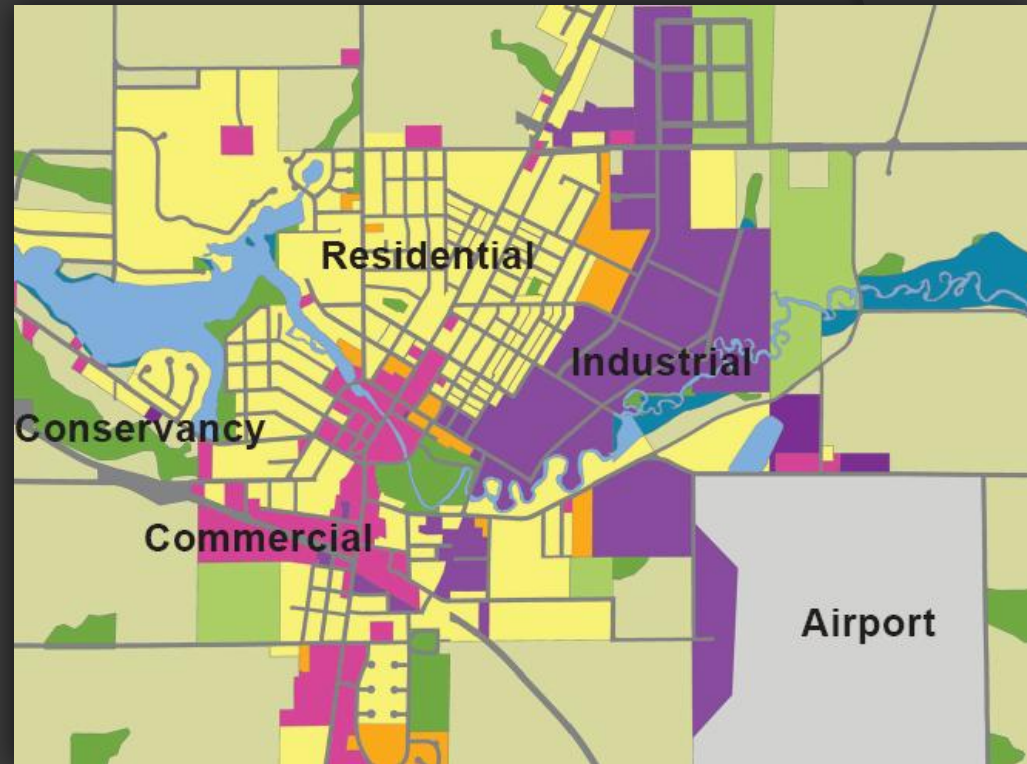


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Lake Leaders 2010

# Testing the zoning law

- ⦿ Zoning and subdivision regulations prescribe how buildable land is to be developed
- ⦿ Residents assume that zoning ordinances protect them from inappropriate development
- ⦿ A buildout analysis allows a community to visualize its regulations and measure impacts



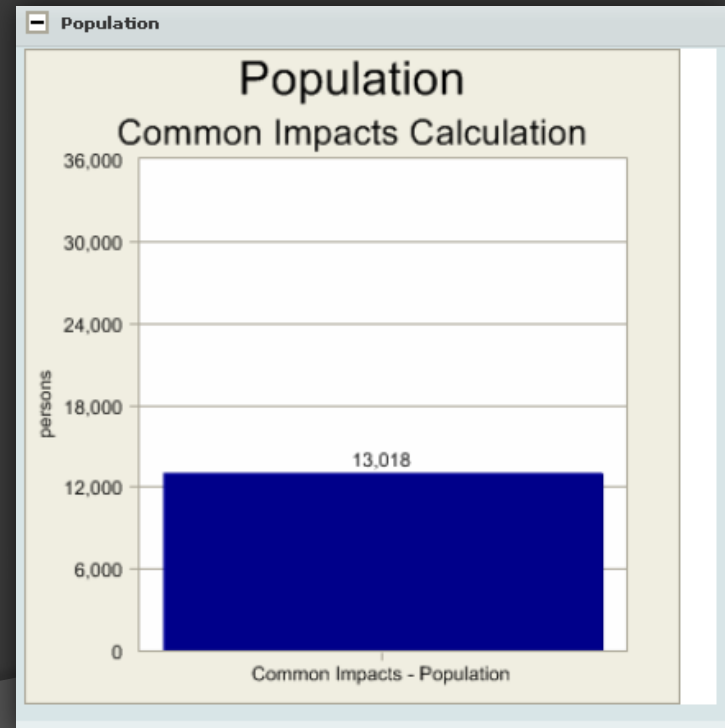
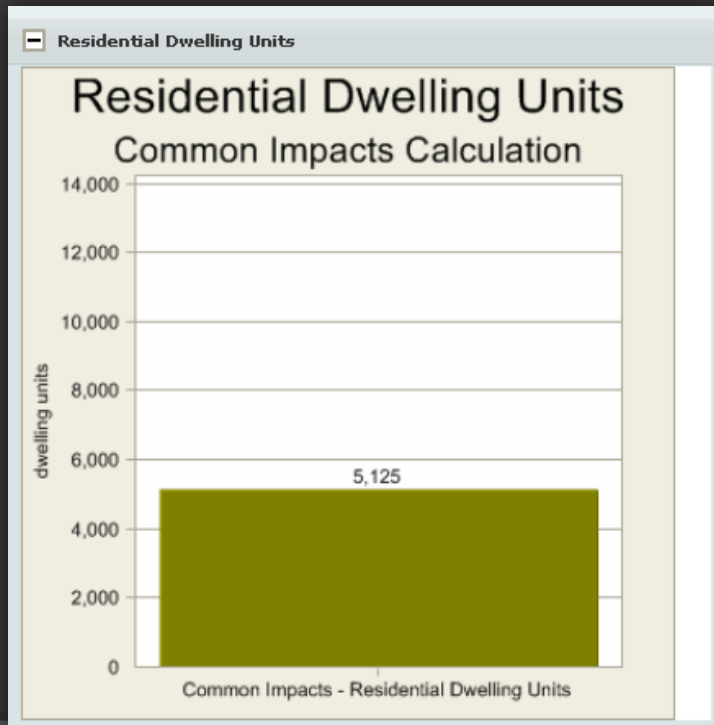
# What is a buildout analysis?

- Plots potential locations of new houses that could be constructed on vacant and buildable land



# What is a buildout analysis?

- A tool designed to estimate the costs/impacts of future development (population, imperviousness etc.)



# Why conduct a buildout analysis?

- Visualize and simulate future development
- Encourage local action
- Measure consequences



# Why conduct a buildout analysis?



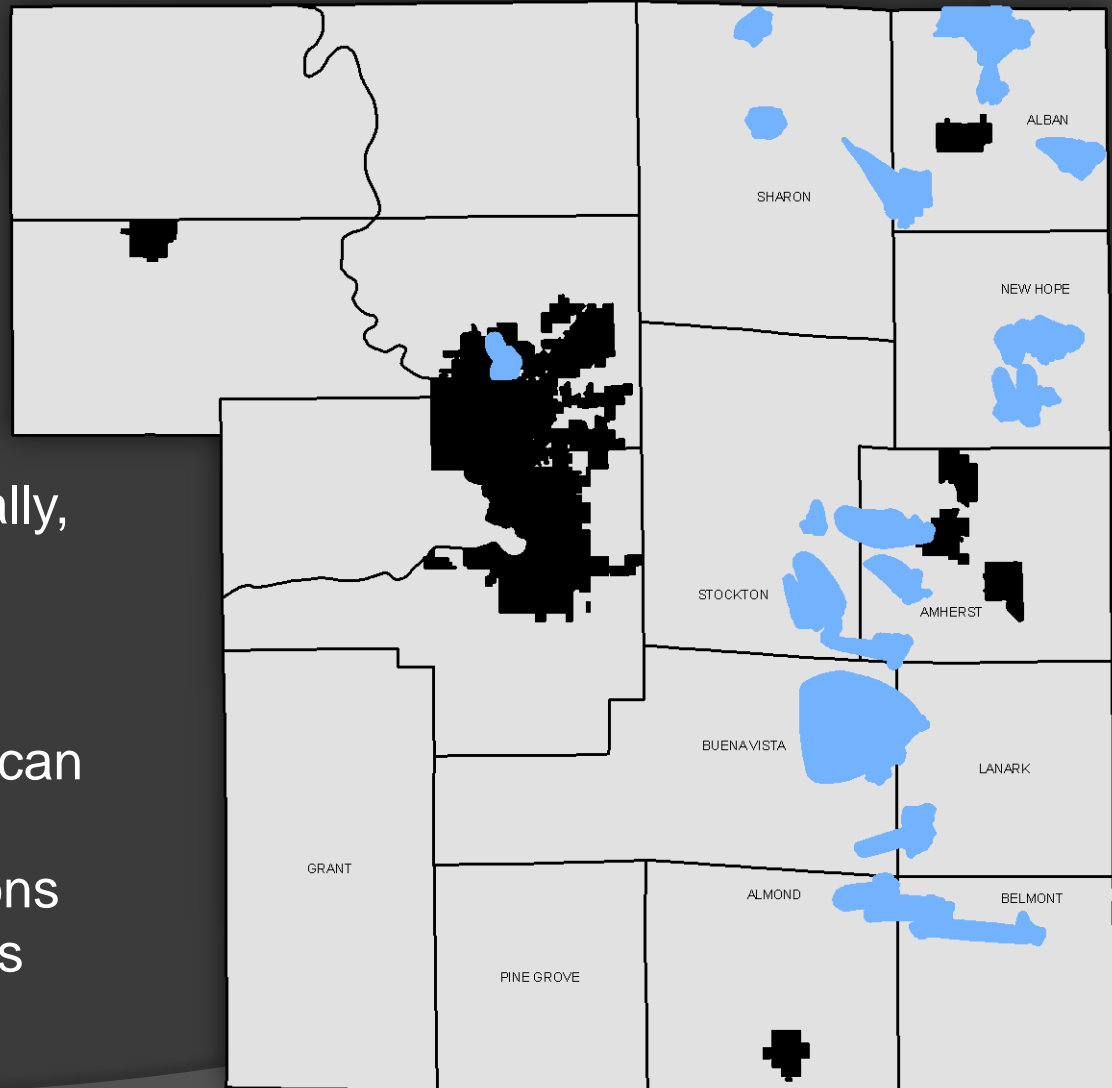
# Why conduct a buildout analysis?



# Thinking Regionally

Decisions are made locally,  
but issues go beyond  
boundaries

Regional buildout maps can  
help groups understand  
how local growth decisions  
impact neighboring areas



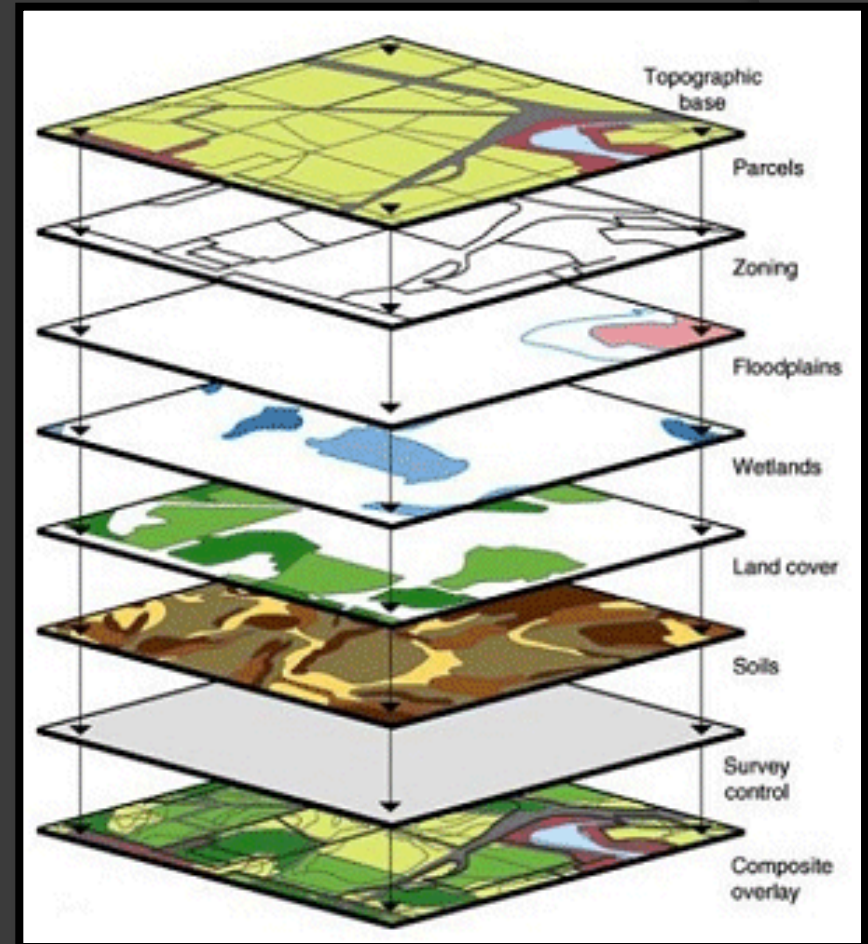


# Analysis Assumptions

- Only modeled residential development
- New development will occur at the minimum lot size (maximum density)
- Results are not a prediction, but show what can happen

# Buildout Methods

- ◎ Data Sources:
  - Tax parcels
  - Zoning districts
  - Wetlands
  - Slope
  - Public lands
  - Roads
  - Floodplains
  - Open water/streams



# Buildout Methods

- Step 1: Start with all available lands

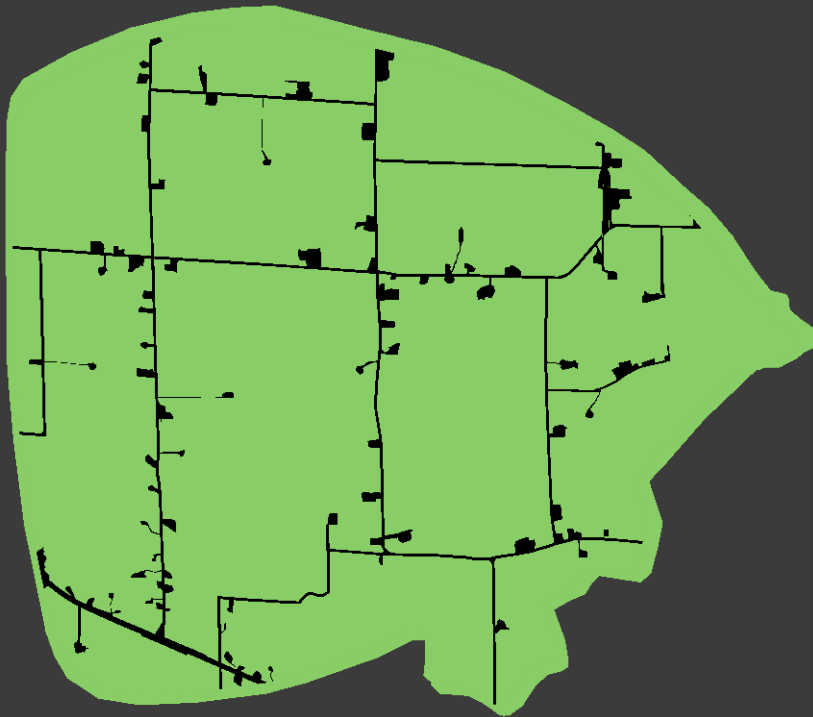


Spring Lake Watershed



# Buildout Methods

- Step 1: Subtract non developable lands



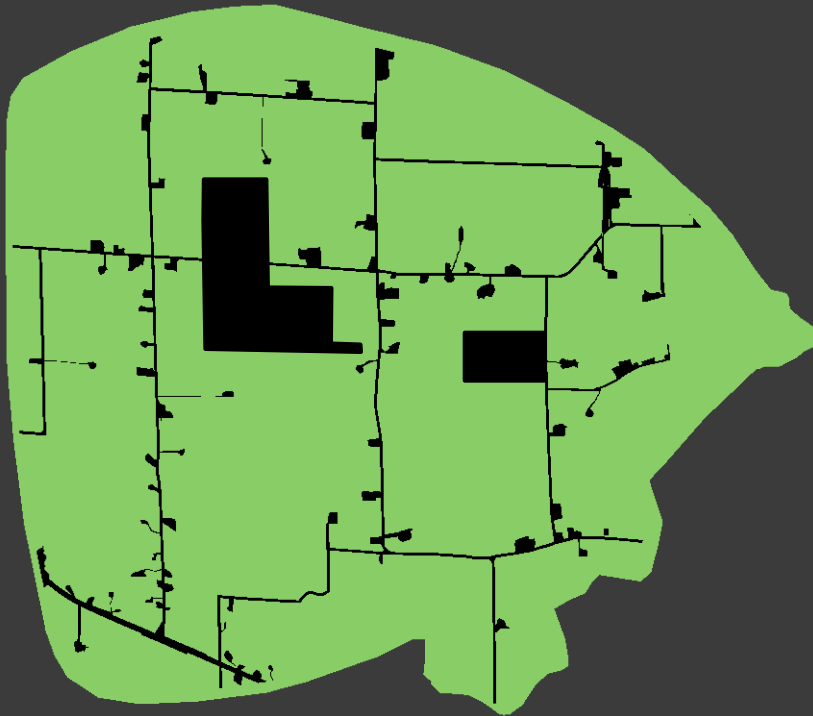
Spring Lake Watershed

Existing development



# Buildout Methods

- Step 1: Subtract non developable lands



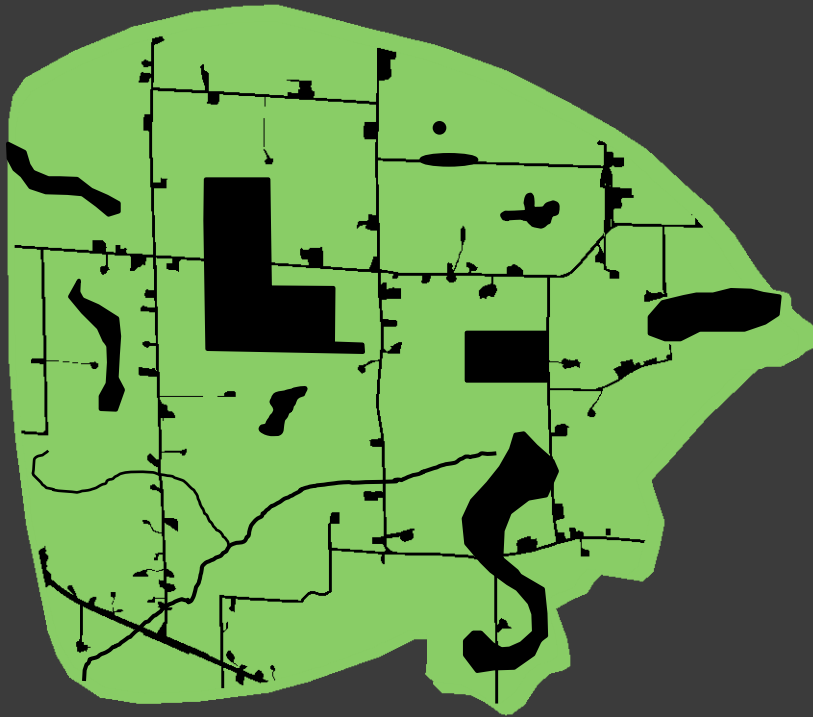
Spring Lake Watershed

## Public lands



# Buildout Methods

- Step 1: Subtract non developable lands



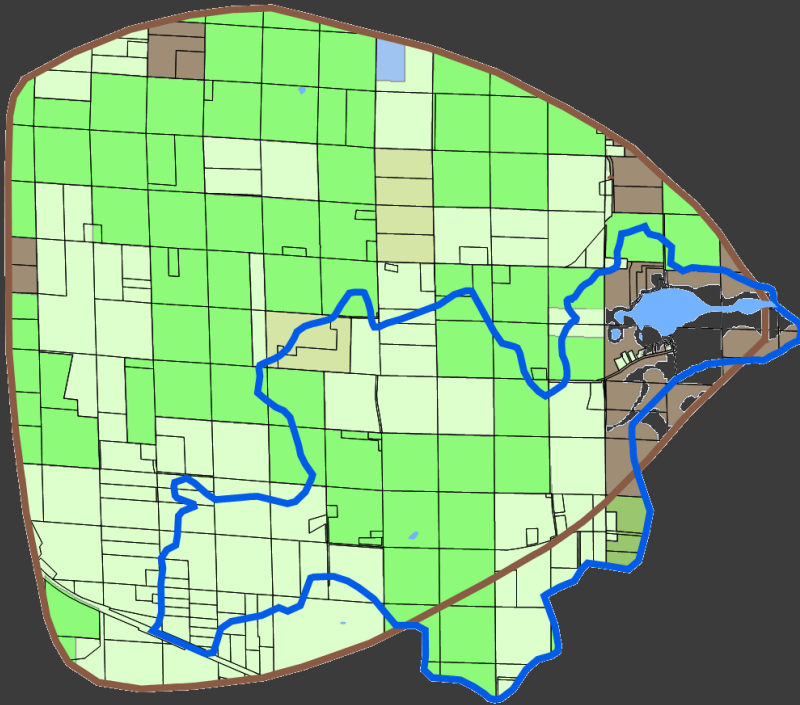
Spring Lake Watershed

## Constraints



# Buildout Methods

## ● Step 2: Merge Parcel and Zoning layers



- Regulatory tool, a police power of the local government.
- Regulates:
  - Density
  - Use
  - Dimensions

# Buildout Methods

## Step 3: ESRI ArcGIS & Community Viz

The image shows a screenshot of the ESRI ArcGIS 360 software interface. The main window displays a map with a green area representing a build-out site, overlaid with a black grid of parcel boundaries. The software's interface includes a menu bar (File, Edit, View, Bookmarks, Insert, Selection, Tools, Window, Help), a toolbar, and a left-hand pane showing a 'Scenario 1' tree view with various layers like 'Town Border', 'Open Water', 'landuse\_waterbody', 'hydrology', 'Developed Areas', 'Surface Watersheds', 'Ground Watershed', 'Parcel Boundary', 'Build-Out Results', 'Current Building', 'Setbacks', 'Watersheds', 'parcels\_county', 'Beyond New Road Limits', 'Slopes > 20%', 'Parcels/Zoning', 'Zoning Districts', 'Watersheds2', 'landcover', 'landcover 1', and '2008 Ortho'. The 'Build-Out Wizard' dialog box is open in the foreground, titled 'Specify Land-Use Layer'. It contains the following text and controls:

**Build-Out Wizard**  
Select the layers and attributes containing your land-use information.

Layer containing land-use information (like a zoning layer, master land-use plan, or a parcel map):

Attribute specifying land-use designation (like zoning type, permitted use description, or land-use code):

Attribute specifying unique identifier of each land-use area (like feature ID or parcel number). If unsure, use the default:

Preview of land-use designations:

R1  
B  
R2  
I  
R3  
NL

[What data is required to run a build-out analysis?](#)

[What happens if I click Back, Save & Exit, or Cancel?](#)

Buttons: Save & Exit, < Back, Next >, Cancel



# Buildout Methods

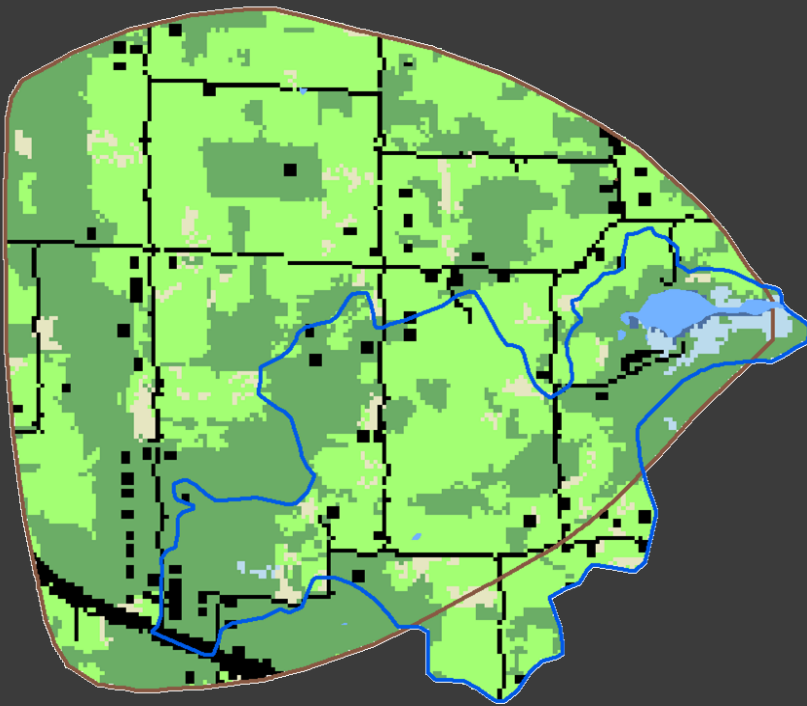
The screenshot displays the ArcGIS 3D Analyst interface for a scenario named "Scenario 1". The main window is divided into several panels:

- Left Panel (Scenario 1):** A tree view showing the scenario's components. Checked items include "Open Water", "Developed Areas", "Surface Watersheds", "Ground Watershed", "Parcel Boundary", "Build-Out Results", and "Build-Out Buildings".
- Top Panel (Scenario 1):** A 3D bar chart titled "Build-out" comparing "Current" (black bar, ~200 units) and "Build-out" (red bar, 609 units) dwelling units. The y-axis is labeled "Dwelling Units" and ranges from 0 to 700.
- Main View:** A map showing a land cover area with a grid overlay. Red dots represent "Build-Out Buildings" scattered across the land cover. Blue lines indicate water bodies or boundaries.
- Bottom Panel (Drawing):** A toolbar for drawing and editing, including tools for selection, drawing, and text.

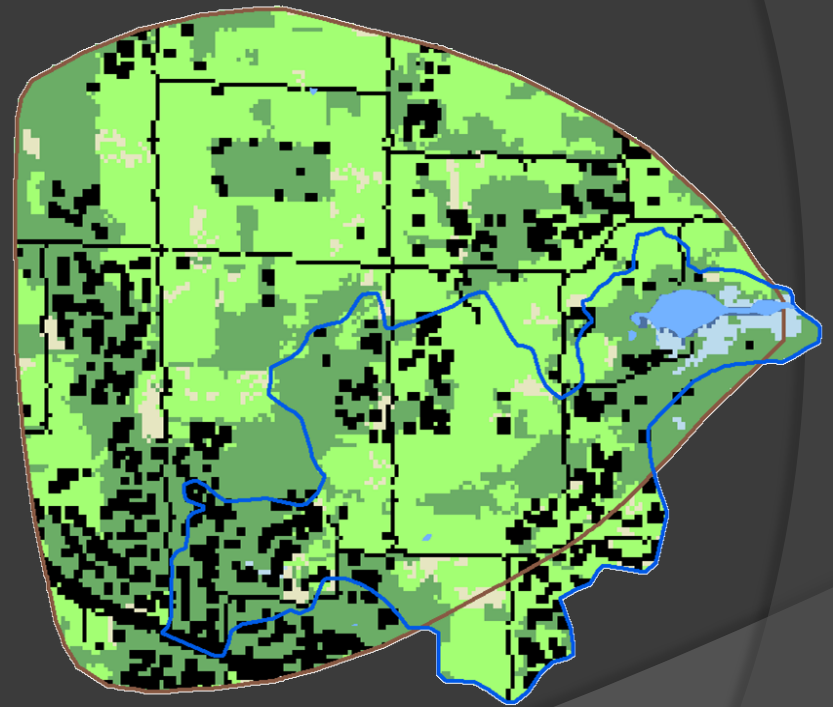
At the bottom right of the interface, the coordinates "567188.351 437076.142 Meters" are displayed.

# Buildout Methods

- Step 4: Estimate land cover change

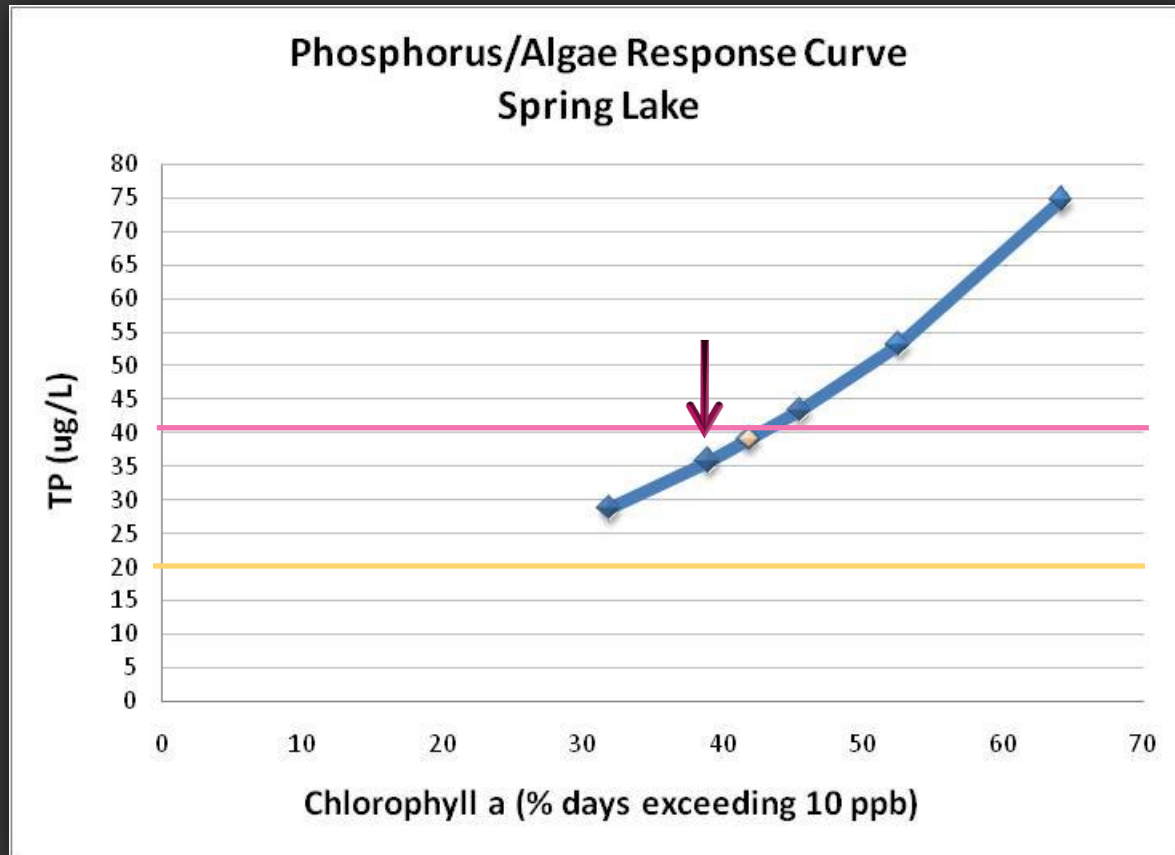


Current land cover:  
2,688 developed acres

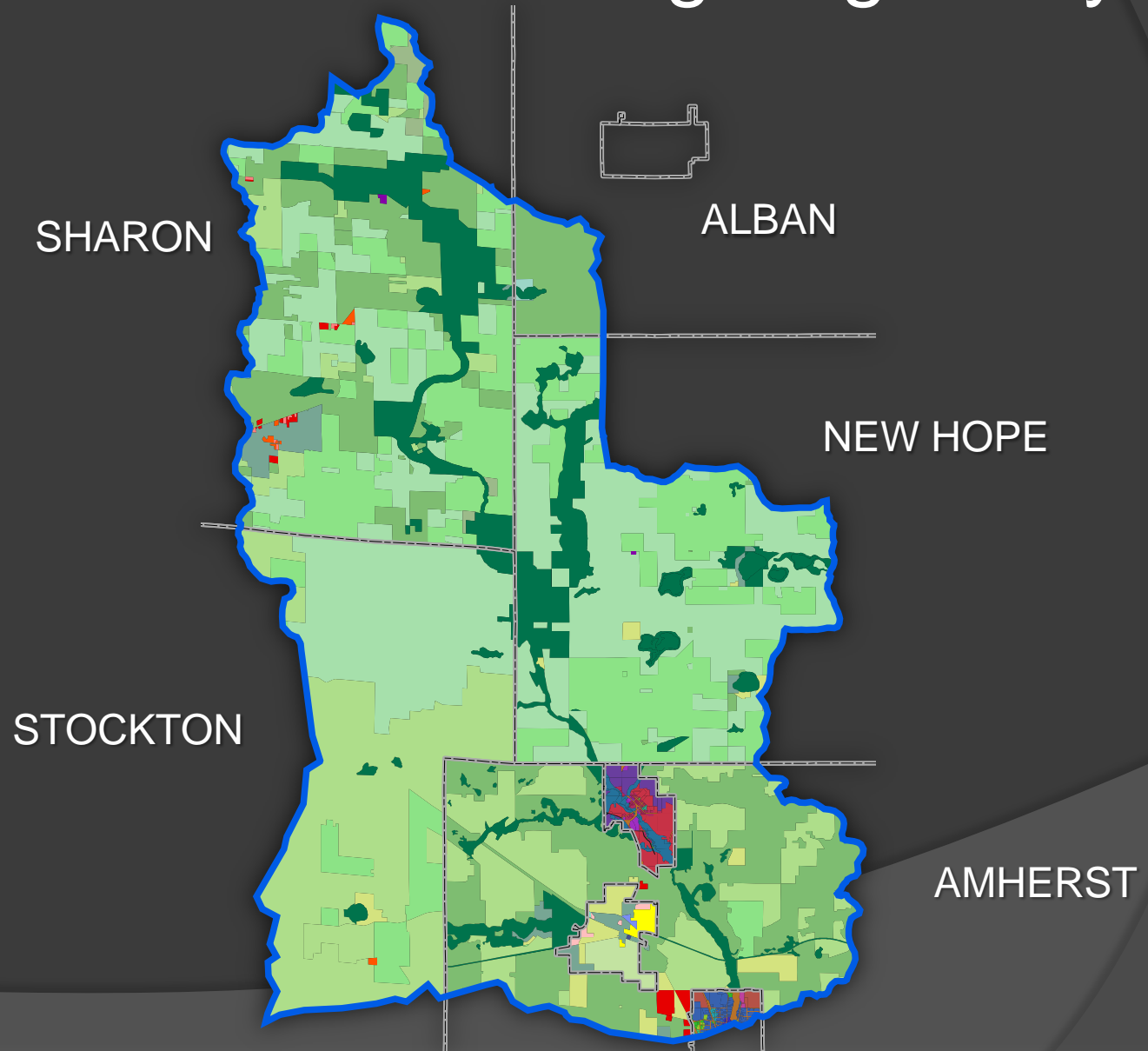


Land cover at buildout:  
3,115 developed acres

# Buildout Results

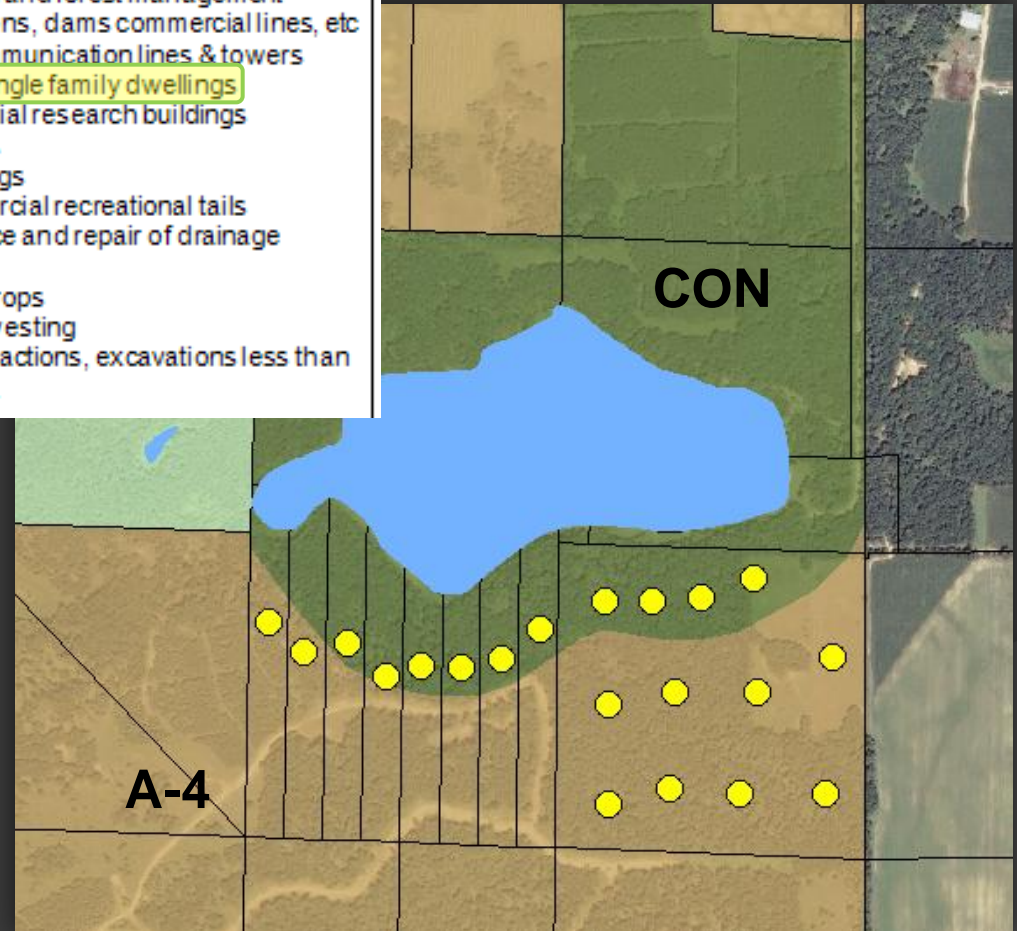


# Importance of Thinking Regionally



# Policy Implications

<p><b>Conservancy (CON)</b> Min. lot size: 30,000 sq. ft.</p>	<ol style="list-style-type: none"><li>1. Grazing</li><li>2. Wild crop harvesting</li><li>3. Hunting, fishing, trapping</li><li>4. Wildlife, fish and forest management</li><li>5. Power stations, dams commercial lines, etc</li><li>6. Utility &amp; communication lines &amp; towers</li><li>7. Seasonal single family dwellings</li><li>8. Nonresidential research buildings</li><li>9. Public parks</li><li>10. Boat landings</li><li>11. Noncommercial recreational trails</li><li>12. Maintenance and repair of drainage systems</li><li>13. Specialty crops</li><li>14. Timber harvesting</li><li>15. Ponds, extractions, excavations less than 30,000 sq. ft.</li></ol>
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# Questions

