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Does More Green equal More Green?: A Comparison of Vegetation in Rich and Poor Neighborhoods in Utah County

Alan Peters
Roxanne Yorgason
Cinta Nielsen
Alison Fletcher

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Background
Greenery is an important part of any urban environment. Besides being visually appealing, landscaping performs important ecological functions such as food and habitats for some creatures and cooling effects for the urban ecosystem. For these and other reasons, places with green lawns and mature trees are highly desirable. Landscaping, however, is not cheap. Planting and maintaining appropriate trees, shrubbery, or grasses can be costly to private homeowners, businesses, or municipalities. This can result in unequal amounts of trees and other greenery between rich and less affluent communities, and a disparity between rich and poor neighborhoods within the same city. Using remote sensing, GIS, and landscape ecology methods, we hope to determine whether or not there are significant differences in the quantity and quality of greenery in wealthy and less affluent neighborhoods within Utah County.

Methods
Using GIS land ownership data for Utah County we mapped individual residential property values to determine "rich" and "poor" areas. We selected eight 1 sq. mile areas throughout northern and southern Utah County for our sampling sites. We then obtained LANDSAT satellite imagery for the entire county and after cropping each of our sites, isolated Band 3 (Red) of the imagery in order to discriminate between vegetation and other surfaces. Using seven classifications, we defined the highest two classes as vegetation. In order to measure differences in landscapes between our sites, we used landscape metrics - a way to quantify spatial pattern. We ran several metrics on both our rich and poor sites, but focused our analysis on percent of landscape, contagion, and total core area.

Results

<table>
<thead>
<tr>
<th>Payson (Poor)</th>
<th>Springville (Rich)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of Total Landscape</td>
<td>15%</td>
</tr>
<tr>
<td>Contagion</td>
<td>2.5</td>
</tr>
<tr>
<td>Total Core Area</td>
<td>50</td>
</tr>
</tbody>
</table>

Figure 1. Two of our eight test sites in Utah County: downtown Payson (a "poor" site) and southeast Springville (a "rich" site).

Figure 2. Band 3 of LANDSAT. The red indicates areas with high vegetation.

Figure 3. LANDSAT imagery classified into seven classes. Here the dark and light pink colors indicate vegetation.

Analysis
After graphing our results in order to compare rich and poor areas, we noticed that (with the exception of Provo) "rich" areas showed higher values for each metric. Provo was the only location that illustrated the opposite trend (Figure 4). This is likely because it is a college town with relatively older parks and poor neighborhoods with more mature vegetation. A higher percent of total landscape in rich area suggests more vegetation. Higher contagion values tell us that greenery is more clumped together and higher values for total core area indicate larger lot sizes in richer areas. Although poor areas show a significant amount of vegetation, it is less than rich areas and more isolated.

Conclusion
Our results indicate that “more green” does, in fact, equal “more green”. Wealthier property owners have more money to invest in quality private landscaping and maintenance. Also, wealthier communities have more funds to plant parkway trees and maintain public green space. It is also possible that since areas with more trees and greenery are more desirable, the higher vegetation itself drives up property values. This disparity is significant because of the potential effects on public health, attitude, and general welfare on the residents of these areas.