

# Are Land Prices Shutting Farmers Out of Viable Agricultural Land in Greenville County?

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## Abstract

In recent years, the rapid growth of the city of Greenville and of urban areas in Greenville County has led to the encroachment of developed land on the surrounding, historically agricultural lands of the county. We believe that urbanization is driving up land prices and farmable land is slowly becoming too expensive to purchase, thus prohibiting farmers from affording land that could be used for agriculture. To test our hypothesis, we took land use data from the year 2010 from the USDA and land parcel data from the same year from the GIS department of Greenville County and executed a spatial analysis of land prices for viable agricultural land in the county. Our findings conclude that for land that could potentially be used for agriculture, prices are higher near areas of high urbanization, and oppositely, showing a general trend of decreasing land prices as distance from Greenville increased making farming less viable near urban areas as the prices are prohibitive.

## I. Introduction and Literature Review

The goal of this project was to analyze the spatial pattern of land prices for viable farmland in relation to the urban areas in Greenville County. We hoped to find a that land prices were higher surrounding urban and suburban zones and lower further away from these centers, thereby illustrating a positive correlational link between proximity to developed regions and land price. Similar studies have been done in regions around the world, two of which studied similar characteristics of urbanization in their relation to farmland encroachment. In 2003, Dae-Sik, Mizuno, and Kobayashi did a case study analysis of urbanization and farmland loss in the southern region of the city of Seoul in South Korea. They found that due to rapid expansion in this area, through the process of suburbanization, historically agricultural lands were being priced out and converted for the development of new residential neighborhoods. A second case study by Shahab Fazal in 2000 looked at urban expansion and loss of agricultural land in Saharanpur City, India. Fazal discovered that rising land prices surrounding areas of expansion in urban development were influencing farmers to sell their land due to the large profits that were to be made from selling their land that was previously inexpensive. Unfortunately, this also meant that agricultural land was being lost, demonstrating the importance of agricultural land conservation policies. These two case studies, while not only studying the effect of urbanization on land price, came to similar conclusions that urban encroachment on traditionally agricultural land created market pressures that resulted in decreased viable agricultural land in their respective regions of study.

## II. Methodology

To begin, we downloaded crop data for 2010 from CropScape, a cropland data layer from the National Agriculture Statistics Service of the USDA. We used data from 2010 because that is the most recent year that we have county parcel data from for Greenville County. This gave us a file with all of the land use classes for Greenville County in raster format. Then, we separated out all of the existing agriculture into one file, as well as identified and separated the land use classes that could potentially be used for agriculture (barren, grassland herbaceous, pasture/grass, and shrubland). We added these two layers together to come up with a map showing the locations of existing agricultural land and land that could potentially be used for agriculture. Next we performed a dissolve, which allowed us to join together any areas where these land classes intersected to give us one spatial layer that showed any areas suitable for agriculture. From this, we selected out only the areas that were larger than five acres, which we determined to be the smallest size of a suitable farming plot. Then we took the 2010 cadastral layer for Greenville County parcels and did a spatial intersect with the layer that we created for potential agriculture in order to identify those parcels that contained land that could potentially be suitable for agriculture. From this we selected out any parcels that contained less than five acre of suitable agricultural land. This gave us a map of all the Greenville County parcels that contained five or more acres or what we decided is land suitable for agriculture. We further refined this process to make two more maps, selecting parcels that contained 25 acres or more suitable land and 100 acres of suitable land respectively. Afterward, we were able to calculate the fair market value per acre to determine price of land for each parcel for all three of maps. From these we could make a choropleth maps showing the parcels that contained potentially agricultural land and their prices, allowing us to evaluate and analyze the spatial distribution of suitable agricultural land and price with the county of Greenville.

## III. Results

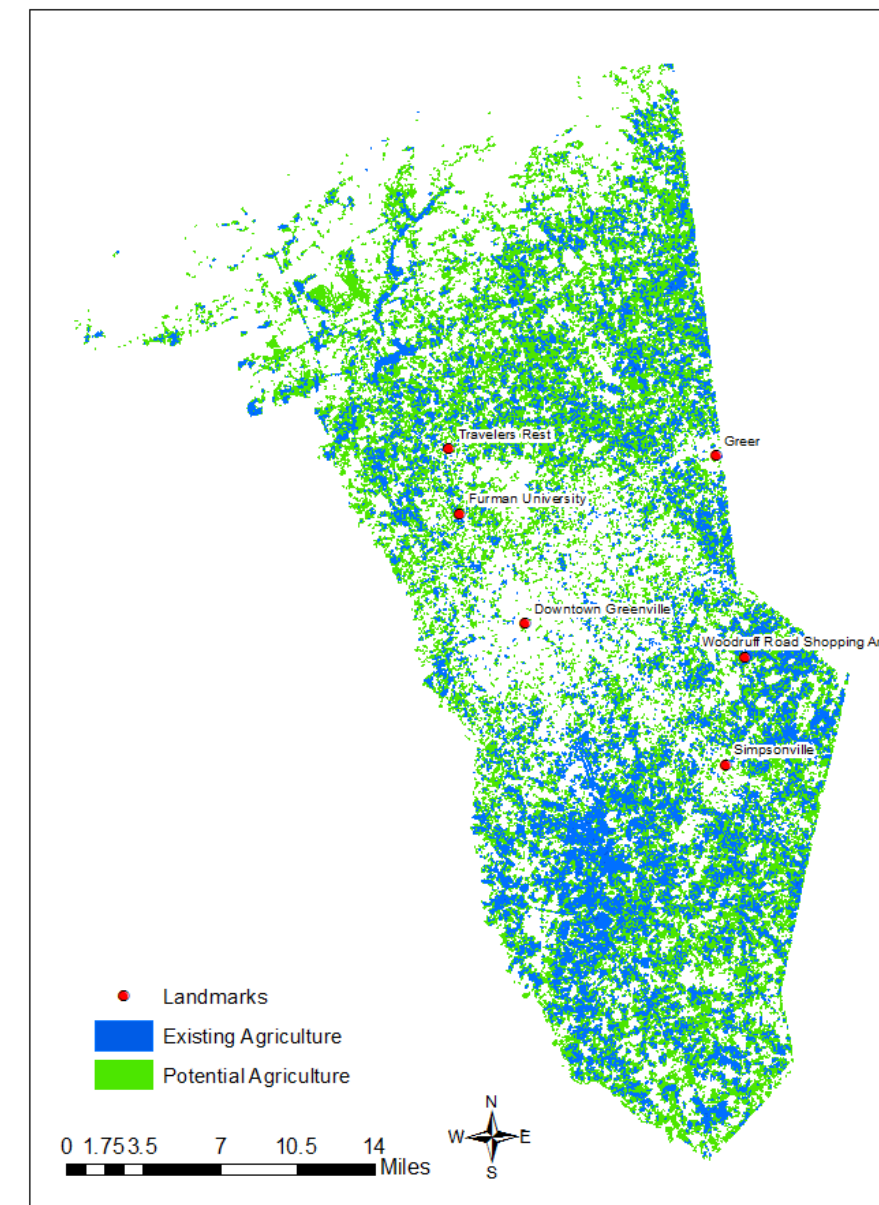


Figure 1: Locations of existing agricultural land in relation to viable agricultural land.

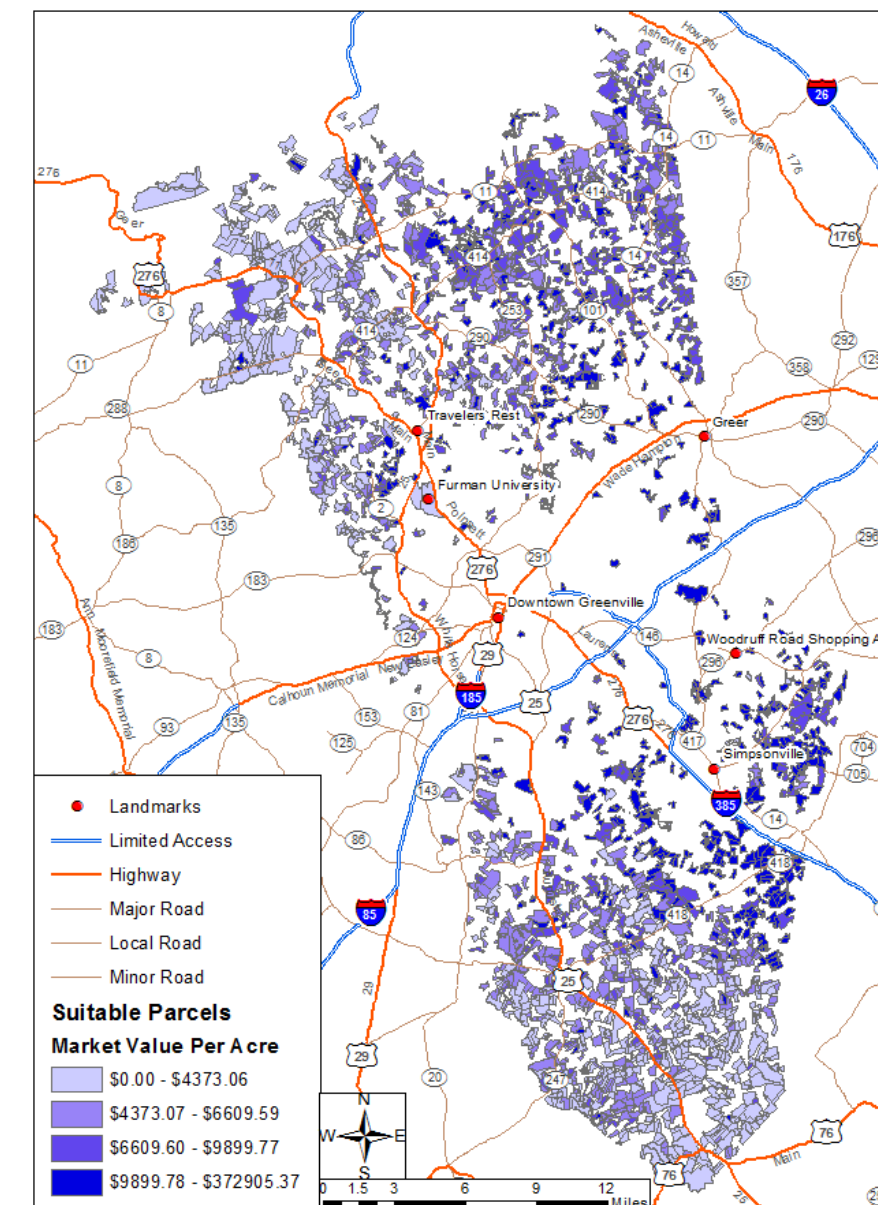


Figure 3: Land prices for parcels with 25 acres or more of suitable agricultural land. Note the general trend of more expensive land (dark blue) being located nearer to highly developed areas surrounding Greenville.

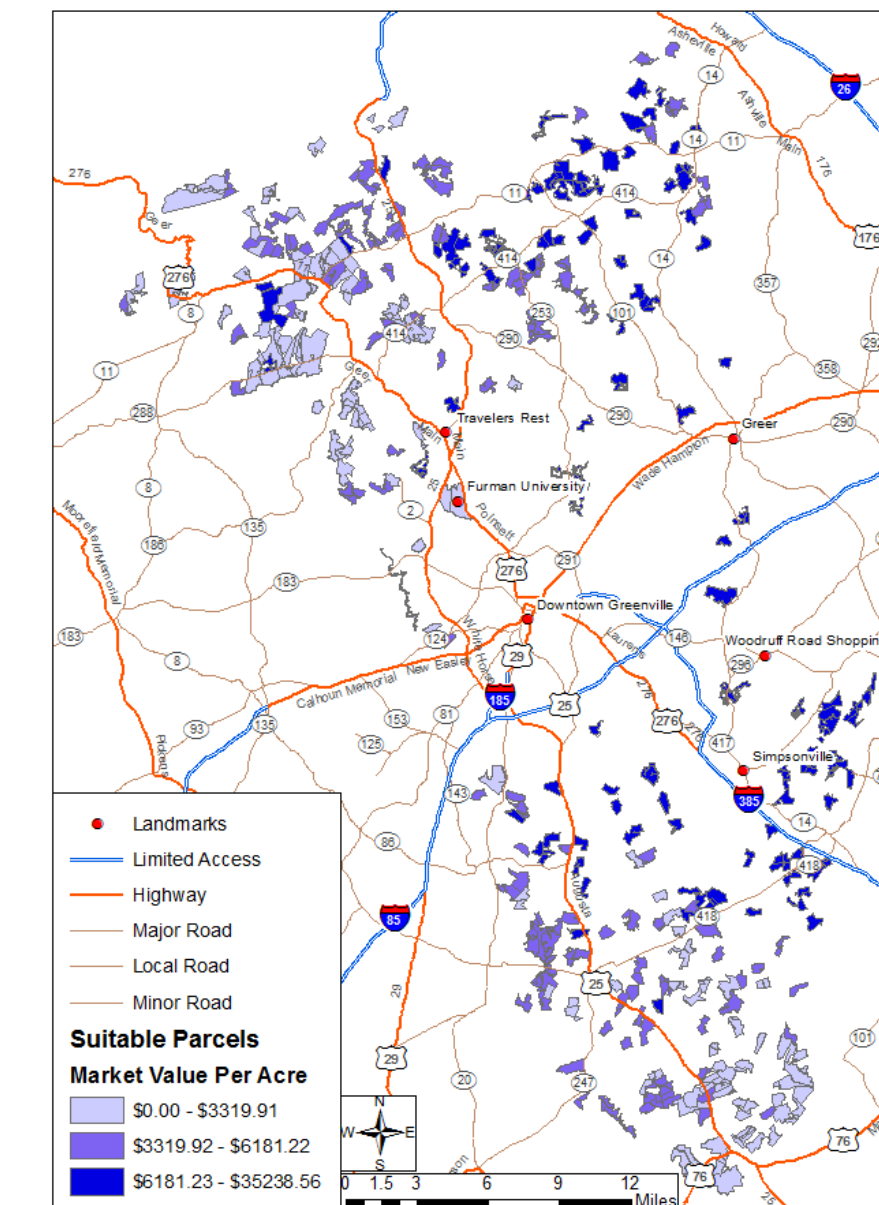


Figure 4: Land prices for parcels with 100 acres or more of suitable agricultural land. Notice the same trend of higher land prices near developed areas and vice versa here, even for these large plots of land.

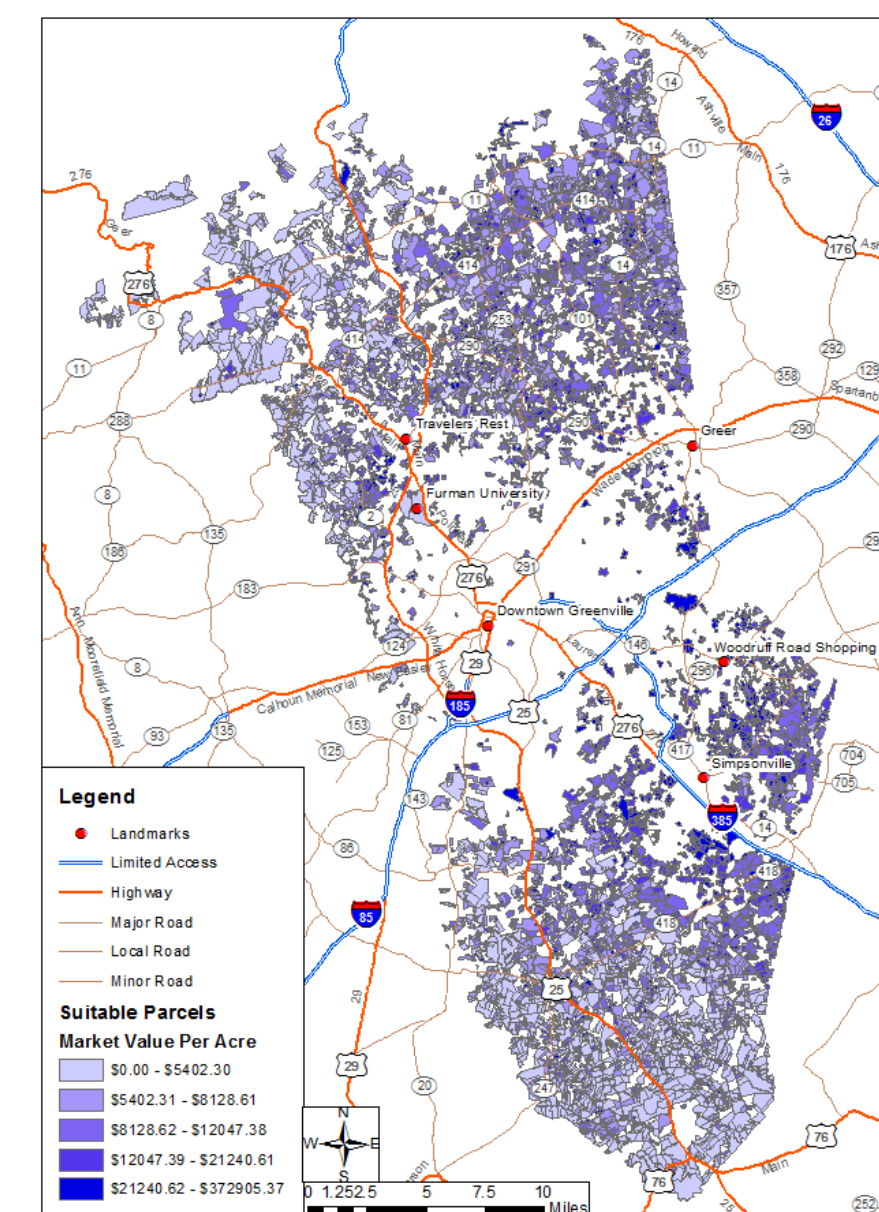


Figure 2.1: Land prices for parcels with 5 acres or more of suitable agricultural land.

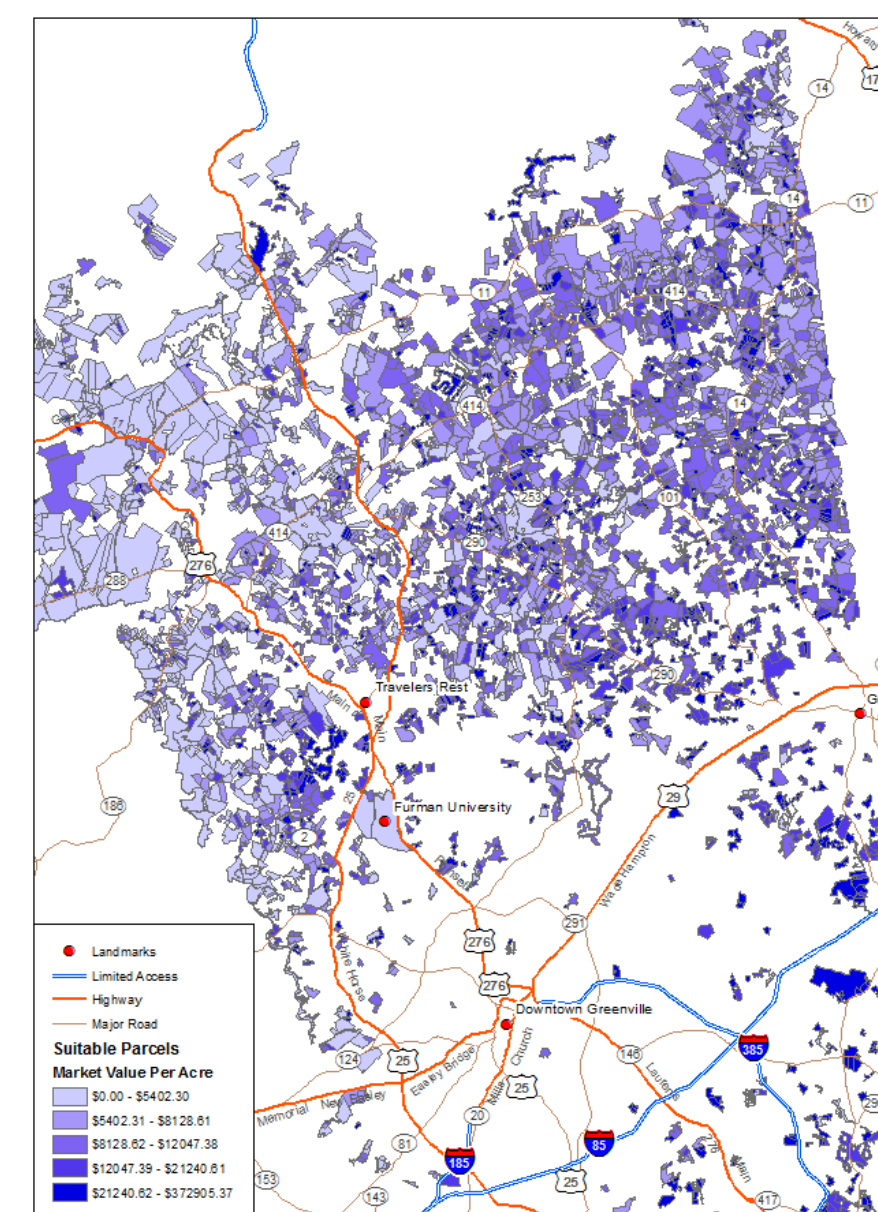


Figure 2.2: Land prices for parcels with 5 acres or more of suitable agricultural land. Zoomed in North of Greenville. Observe how the land prices decrease as you move away from downtown Greenville.

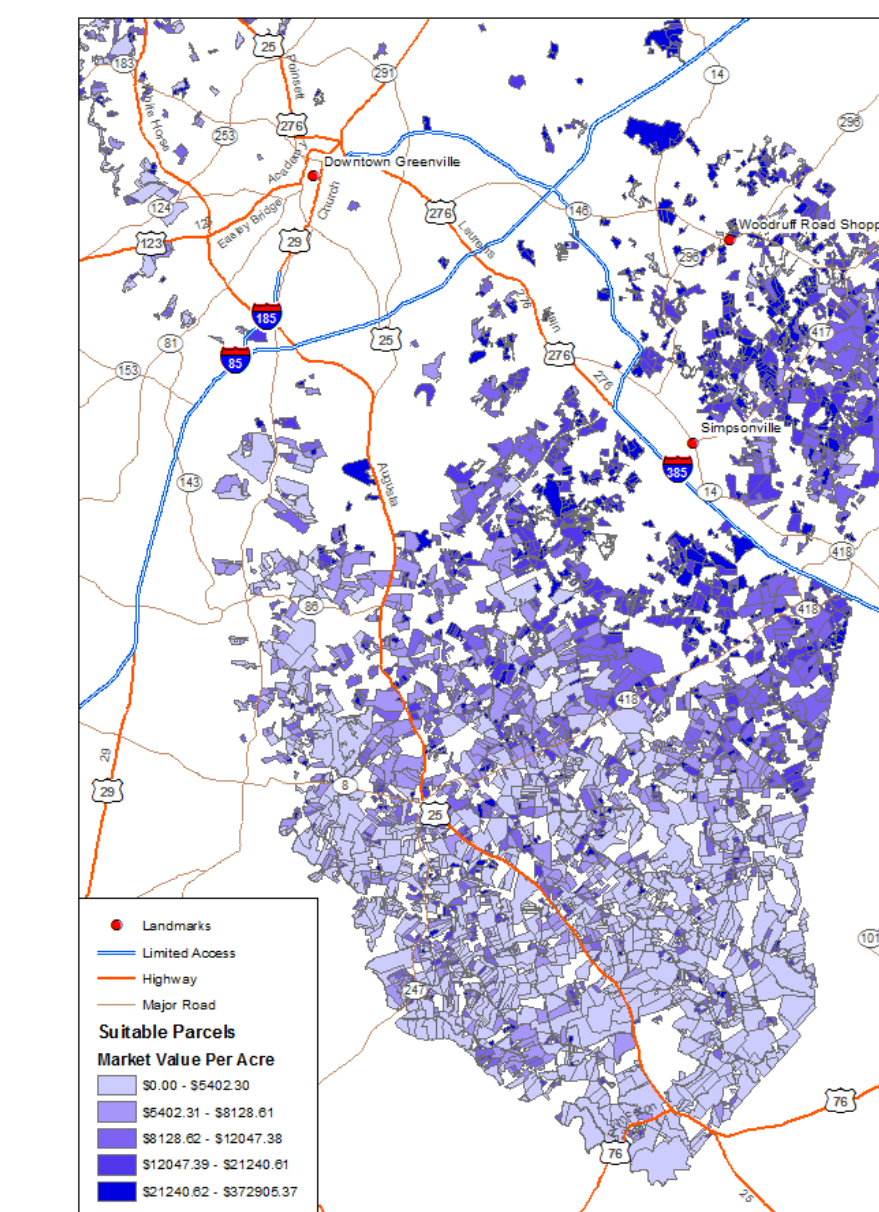


Figure 2.3: Land prices for parcels with 5 acres or more of suitable agricultural land. Zoomed in South of Greenville. Take note of the higher land prices around the developed regions surrounding I-385, Simpsonville, and the Woodruff Road shopping area.

## IV. Conclusion

Our resulting maps clearly show that the spatial pattern of land prices for parcels suitable for agriculture in Greenville County is what we hypothesized it to be. Each one of our maps, whether for parcels containing five, twenty-five, or one-hundred acres of viable agricultural land (figures 2.1, 3, and 4, respectively) shows a pattern of increased land prices nearer to metropolitan areas, and conversely, decreased land prices further from developed areas. From this we can conclude that urban sprawl in Greenville county is driving up land prices around newly developed areas and is causing land to become prohibitively expensive close to urban regions.

## V. Future Research

The next step in this analysis will be to define what the "average" farmer can afford to pay per acre. This is difficult to do because this information will be locally variable, as well as difficult to calculate. Furthermore, a second step will be to look at soil types in the areas we have identified as potential agriculture in order to determine whether the soil type is suitable for agriculture. This would help in our analysis of viable agricultural land spatial patterns and give us a better idea of what land have the most potential for agriculture. Another extension of this project would be to assess whether the vast woodland areas in Greenville County could be used for agriculture. Large areas of Greenville County are covered by deciduous and evergreen forests, yet not all of these areas are suitable for farming. We could determine whether wooded areas could potentially be used for farmland by assessing the slope gradients of the land. Finally, a fourth step in future research would be to perform a temporal analysis on areas that have been converted from non-urban to urban land use and examine whether land prices in the surrounding areas have increased since the new development.

## VI. Sources and References

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