

2013 Tree Canopy Study

City of Sumter, South Carolina

Prepared by the Sumter City-County Planning Department

November 21, 2013

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Executive Summary

The City of Sumter has gained **0.3%** in 2013 (33.9%) of tree canopy from the 2007 (33.6%) estimate, with an overall loss of **4.0%** from the 2001 (37.9%) estimate. The management of Green Infrastructure is important component to the city's sustainability and growth goals. The resources to protect and maintain this asset.

Overview

Trees are a valuable asset to any community and are an increasingly important component of urban community settings.

The environmental, economic, and social benefits of trees have been well documented.

Trees have been shown to improve air quality, reduce stormwater runoff, increase property values, and reduce energy consumption.

Trees have an aesthetic value, create a sense of place, and provide habitat for wildlife and recreational space for residents.

This estimate establishes an ongoing assessment for tree canopy in the City of Sumter. It can be used to target areas for conservation, as well as to determine locations for infill. It can also be used to assess the change in tree cover as new aerial photography becomes available.

*A nation that
destroys its soils
destroys itself.
Forests are the
lungs of our land,
purifying the air
and giving fresh
strength to our
people.
— Franklin D.
Roosevelt*

Analysis Process

The ongoing analysis of the tree canopy in Sumter is a way to provide a starting point for conservation methods. It also provides a scientific basis on which plans and programs can be developed with both public and private funding sources. The origin of this canopy study was based upon the Aerial Photography of the winter of 2012-2013. This imagery is considered “Leaf Off” due to the fact it was collected during the winter season. The precision of the aerial photography allow for the determination of hardwoods and conifers with a fairly consistent basis.

The mapping of these features into the Planning Department’s Geographic Information System (GIS) allows for spatial analysis of these features. This analysis helps determine areas within the city that require a greater focus of resources to either arrest the loss of canopy by working with public and private partners or can show where canopy has increased.

The analysis process began by building on the previous analysis of leaf canopy within the city of Sumter. The initial base line canopy comes from the 2001 aerial photography. Next the 2007 imagery was used to determine that year’s canopy. That analysis was then studied based upon various factors (see the City of Sumter Tree Canopy Estimate, August 6, 2013).

To begin this study, the city was gridded into 1 square mile grids to ease in the feature extraction.

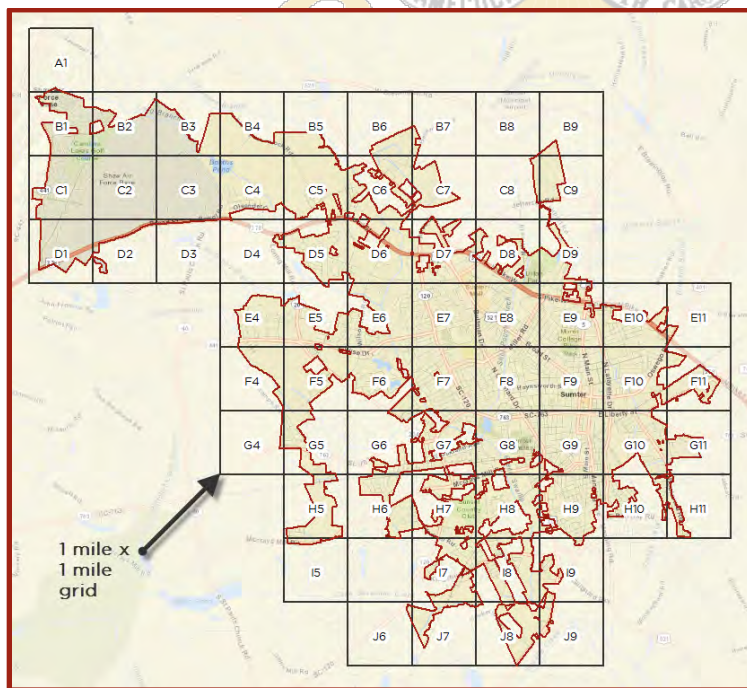


FIGURE 1-CITY OF SUMTER GRID

The process proceeded with planning staff using ESRI ArcGIS Desktop V10 to “heads-up” digitize individual trees and forested areas at 1:1000 scale from the 2013 aerial photography. The process included digitizing new growth and removing areas that had been cleared. Similar to the previous study, after the extraction was completed, the areas of canopy were then calculated for area of coverage.

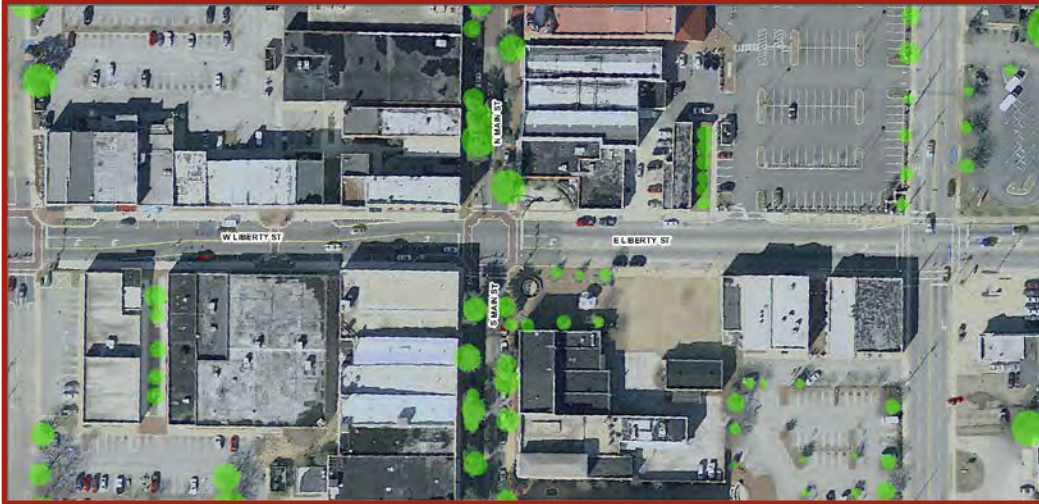
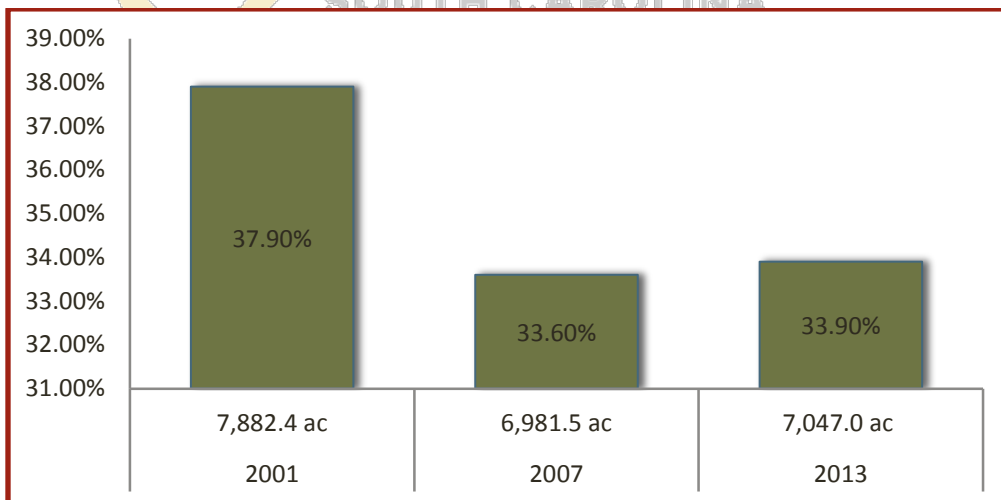


FIGURE 2-EXTRACTION PROCESS EXAMPLE

Results

The City of Sumter comprises 20,778.78 acres of which approximately **7,047.0** acres in 2013 are covered by tree canopy (33.9% of city). This is a **0.3%** increase from 2007 (6,981.5 ac of tree canopy). This is a 4.0% loss from the 2001 estimate (7,882.4 ac).



This table represents the loss/growth of canopy for the years 2001, 2007 and 2013.

Areas of Canopy Loss

Comparative Analysis

These areas in the following maps represent the differences between the 2007 and 2013 canopy to determine **Loss**, Figure 3 is an example. The 2007 features are mapped in red and the 2013 features are mapped in green. The 2013 features were laid atop the 2007 features. Places where the map shows red are areas that were cleared between those years.

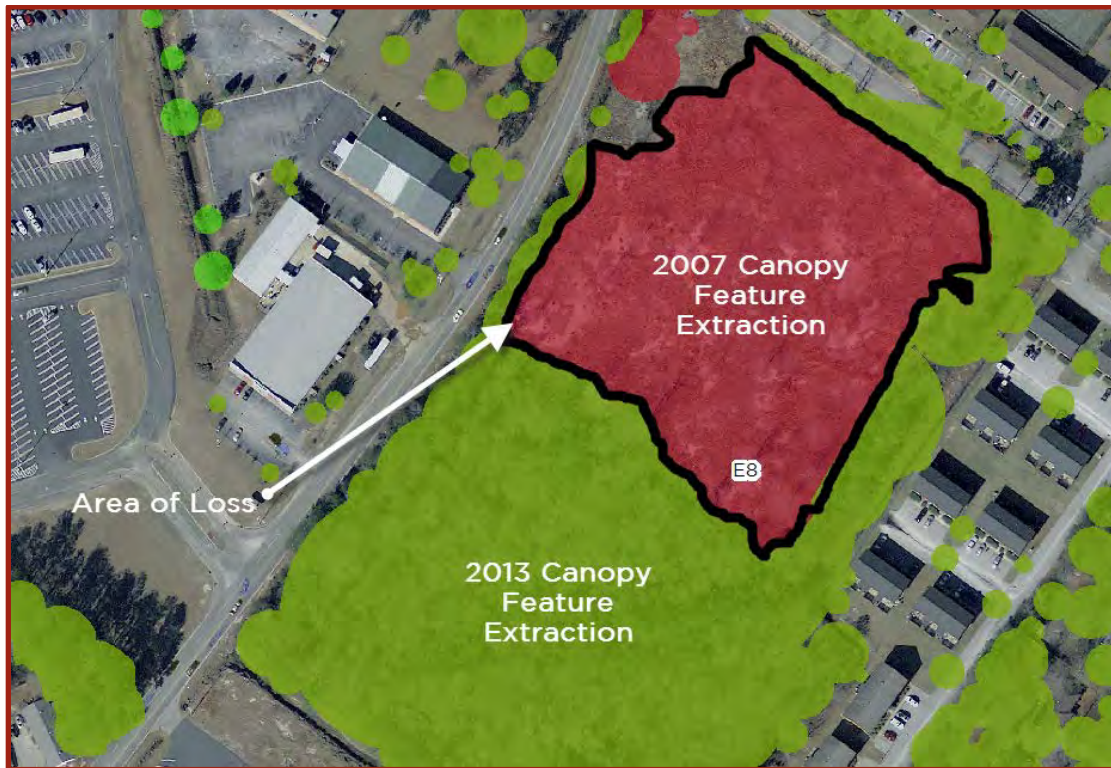


FIGURE 3-CANOPY LOSS EXAMPLE

Grid Summary

Figure 4 (Grids A1 to D7): These grids showed significant loss in some areas, the reasons typically were due to changes on Shaw AFB with the realignment of roads and golf course holes. Construction of new facilities that support the 3rd Army arrival from Atlanta are shown in grid C3. Grids C6 and D6 had logging activities that occurred during the period between aerial photography flights.

Figure 5 (Grids E4 to G9): Grids F4 and F6 had logging activities that occurred during the period between aerial photography flights. E7 had loss due to the new facilities being built around Palmetto Park.

Figure 6 (Grids H5 to J9): Grids H6 and H9 had residential construction activities that caused canopy loss.

Figure 7 (Grids B8 to D9/E10 to G11): Grids D8, F10 and F11 had logging activities that occurred during the period between aerial photography flights.

Along with the forestry activities that occurred, there were also new residential and commercial constructions.

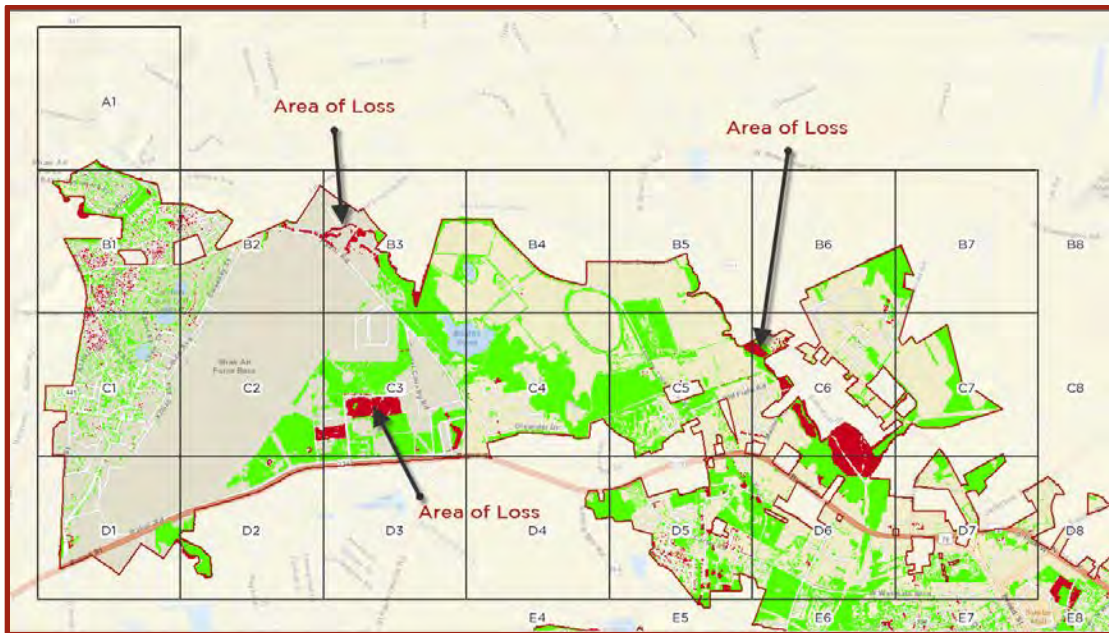


FIGURE 4 AREAS OF CANOPY LOSS (GRIDS A1 TO D7)

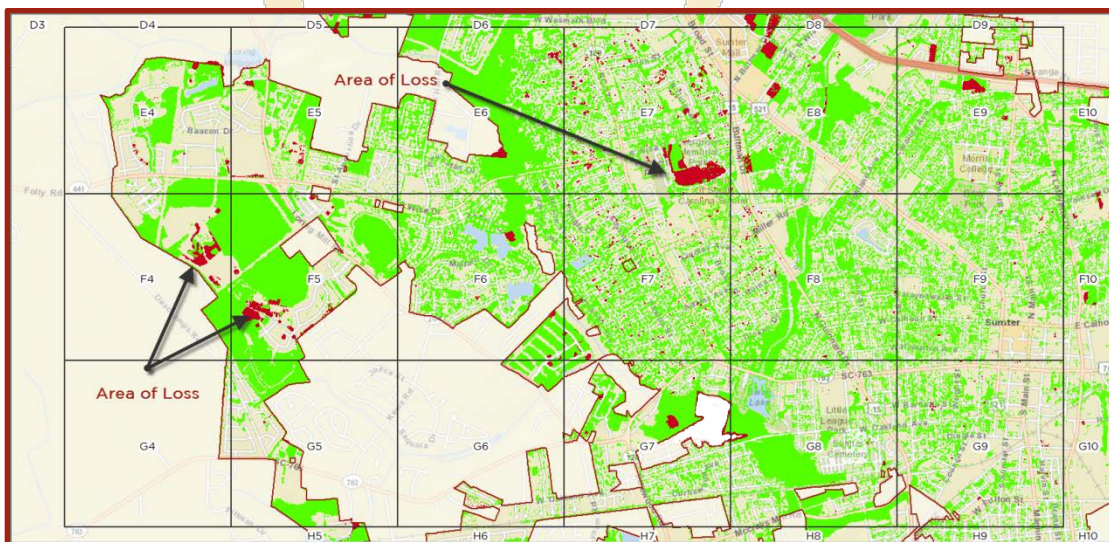


FIGURE 5-AREAS OF CANOPY LOSS (GRIDS E4-G9)

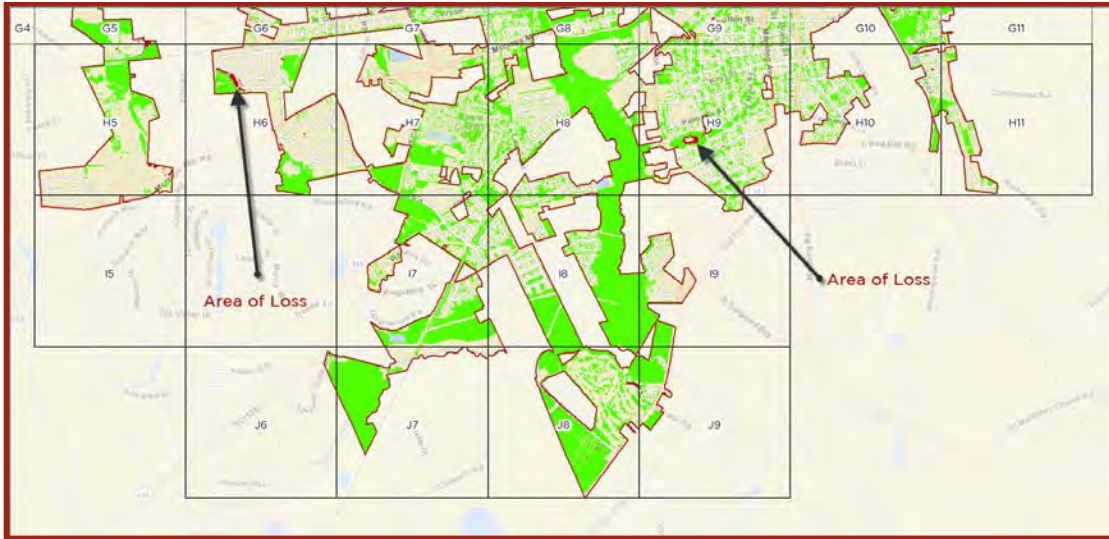


FIGURE 6-AREAS OF CANOPY LOSS (GRIDS H5-J9)

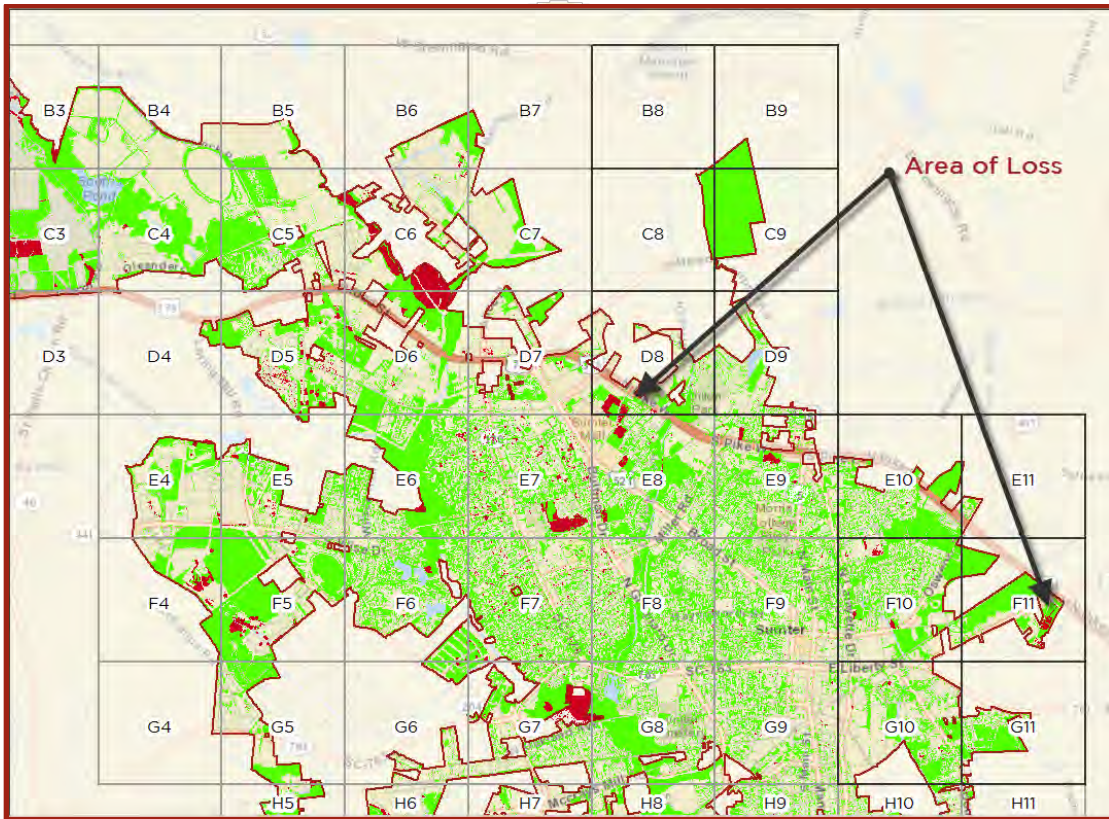


FIGURE 7-AREAS OF CANOPY LOSS (GRIDS B8-D9/E10-G11)

Areas of Canopy Gain

Comparative Analysis

These areas in the following maps represent the differences between the 2007 and 2013 to determine canopy **Gains**, Figure 8 is an example. The 2007 features are mapped in red and the 2013 features are mapped in green. The 2007 features were laid atop the 2013 features. Places where the map shows green are areas that had growth between 2007 and 2013. The lack of features in red shows where canopy was gained between those years, thereby showing an area in green.



FIGURE 8-CANOPY GAIN EXAMPLE

Grid Summary

Figure 9 (Grids A1 to D7): These grids showed gains in some areas. The typical reason being various forestry activities areas. Additionally, some natural growth is seen in D5 and D6.

Figure 10 (Grids E4 to G9): These grids showed gains in some areas. E4, F7, G7 experienced some natural growth. G5 had apparent forestry activity.

Figure 11 (Grids H5 to J9): These grids showed gains in some areas. H5 to H10 experienced some natural growth and apparent forestry activity.

Figure 12 (Grids B8 to D9/E10 to G11): These grids showed gains in some areas. E10 and F11 experienced some natural growth and apparent forestry activity.

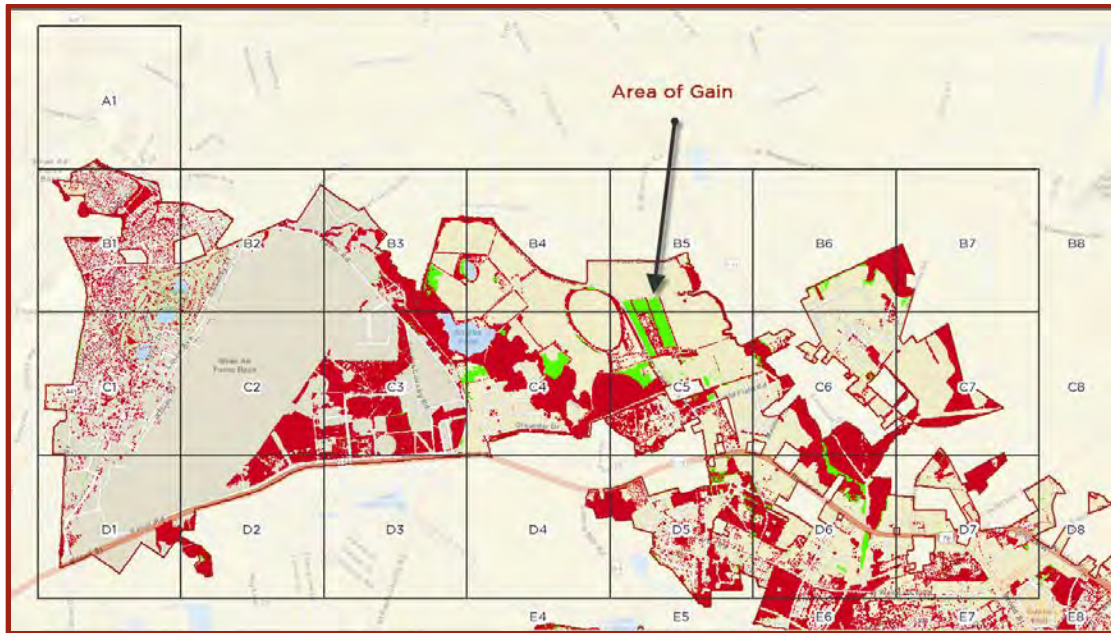


FIGURE 9-AREAS OF CANOPY GAIN (GRIDS A1-D7)

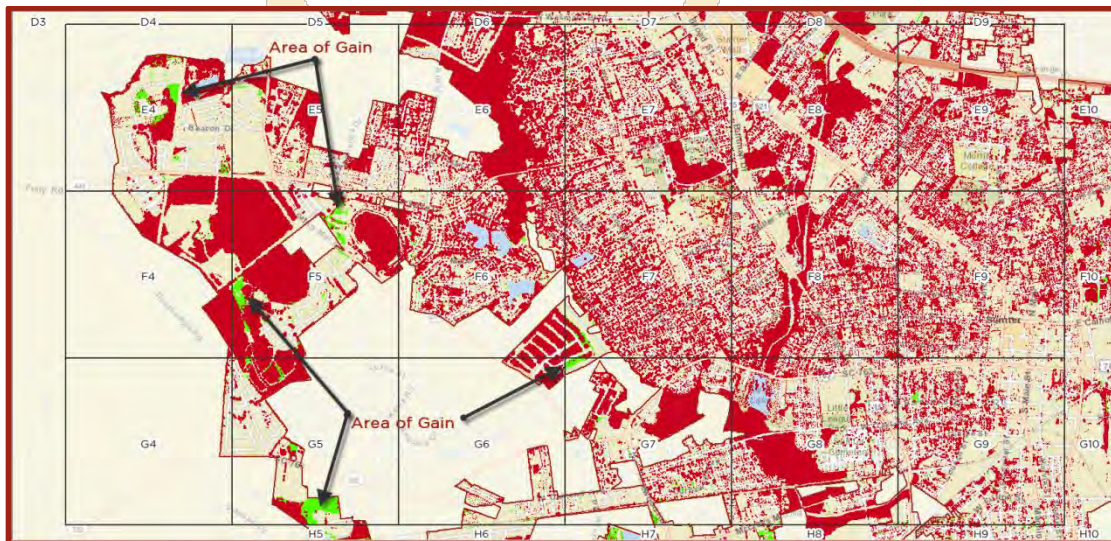


FIGURE 10-AREAS OF CANOPY GAIN (GRIDS E4-G9)

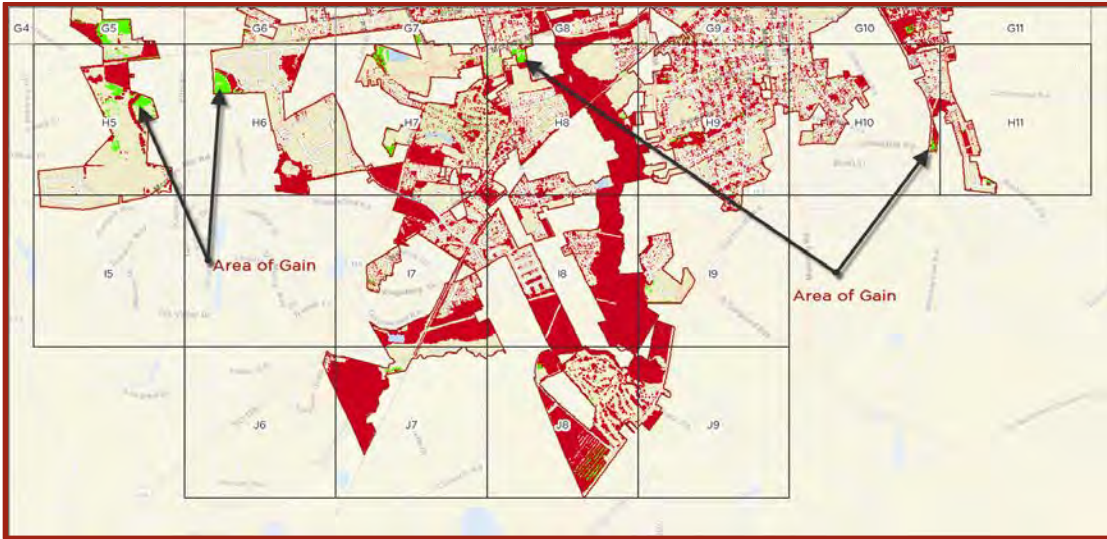


FIGURE 11--AREAS OF CANOPY GAIN (GRIDS H5-J9)

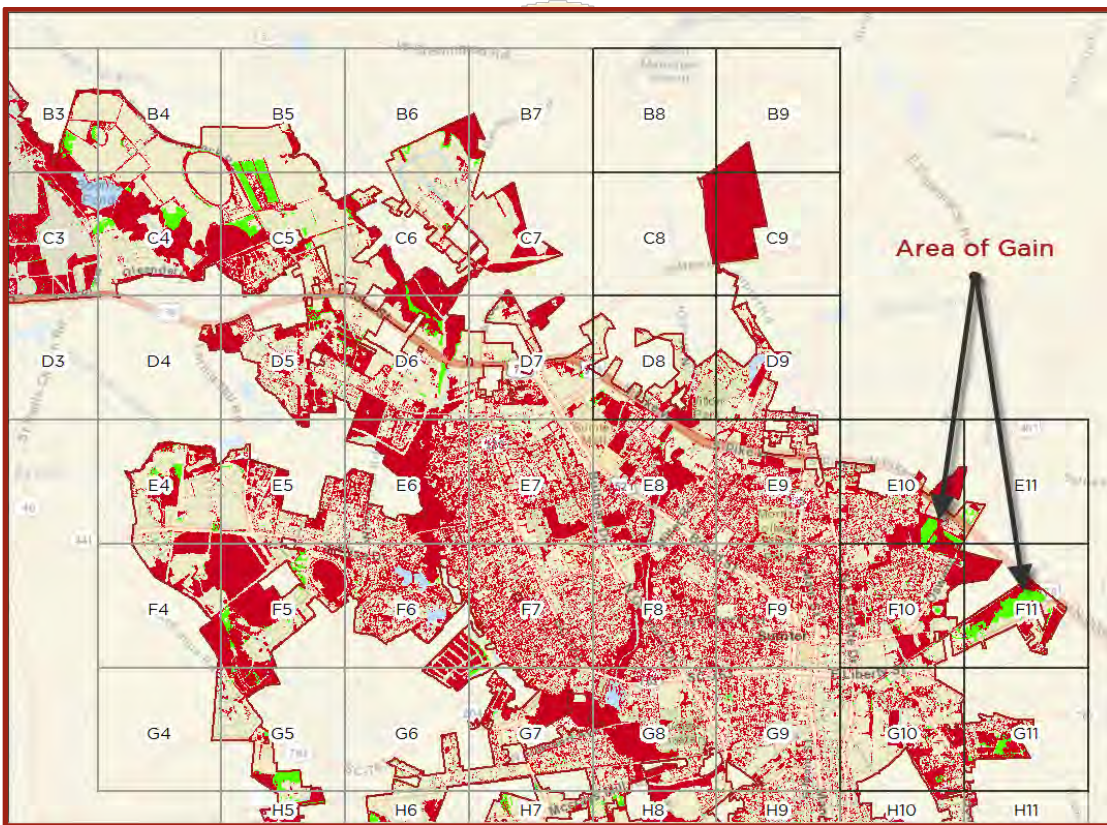


FIGURE 12--AREAS OF CANOPY GAIN (GRIDS B8-D9/E10-G11)

Conclusion

This study is conclusive that the City of Sumter is losing tree canopy over time. While the tree canopy loss rate was reversed from the previous study (0.3%), the canopy is still at a lower value than in 2001. This rate of decline can be directly tied to several factors within the city limits. Construction of residential and commercial properties, agriculture and arboriculture activities bear a combined burden on loss of canopy. The development of Sumter and the surrounding areas are dependent upon these activities, there is potential for expansion of the tree canopy while still encouraging economic growth.

Figure 13 shows how the city of Sumter compares to other cities in the United States. *

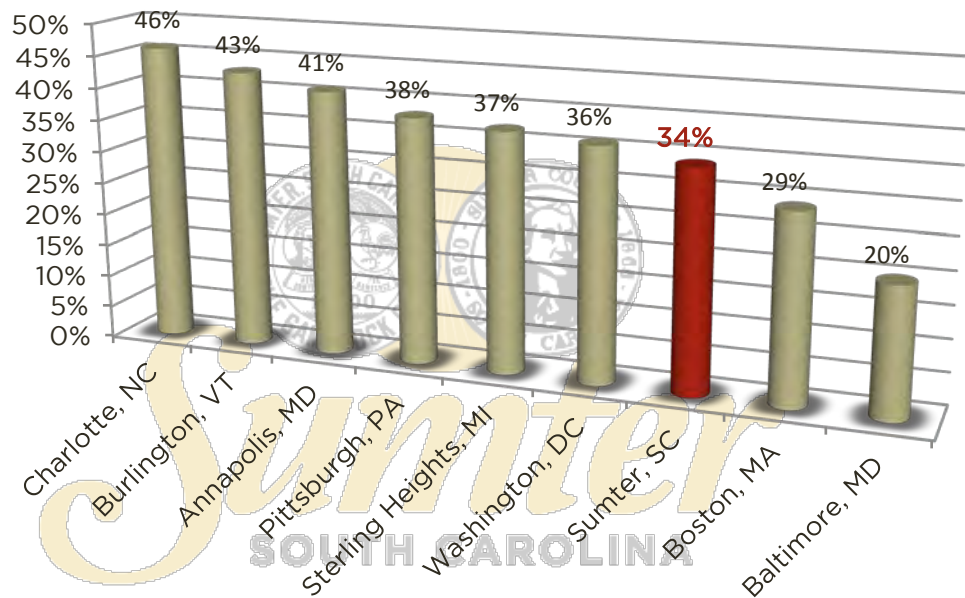


FIGURE 13 TREE CANOPY COVERAGE PERCENTAGE

Opportunities

Set a goal to increase green infrastructure to 40% by 2030

Seek foundations that can support public/private partnerships to plant new trees on both public and private lands.

Dedicate staff members and resources to promote and manage green infrastructure.

Credits:

Prepared by the Sumter City-County Planning Department:

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*Sources: <http://www.usmayors.org/trees/treefinalreport2008.pdf>
<http://www.dnr.state.md.us/forests/programs/urban/urbantreecanopygoals.asp>

DISCLAIMER:

While the data for this study has been tested for accuracy, the Sumter-City County Planning Commission disclaims any and all responsibility for the exact accuracy. The Sumter City-County Planning Commission shall not become liable to the user(s) of this study for any reason(s). In using this study, the user(s) agrees to hold the Sumter City-County Planning Commission harmless of any or all liabilities arising from its use.

