Austin Tree-Canopy Resource, Phase II Project

Austin Canopy and Water Quality

Project Manager: Ashley Zavala

GIS Analysts: Lowell Hughes, Eli Pruitt

Website: geosites.evans.txstate.edu/g4427/S12

Purpose and Objective

The City of Austin's (COA) Urban Forestry Program approached Austin Canopy and Water Quality (ACWQ) seeking the relationship between tree canopy, water quality and impervious cover.

Purpose: to determine tree canopy and impervious cover percentages for Eii Reaches that met certain parameters.

- Water quality sampling sites at or within 0.5 miles of the downstream intersect of the creek line and reach boundary.
- 3 Water Quality Parameters: Turbidity, Nitrogen, and Temperature
- The team also calculated percentages for a 300ft creek line buffer and the COA buffer.
- As an exploratory project the team also found three watersheds that met the same criteria as the reaches.

Scope

The study area of the project was 126 Eii reaches and 76 watersheds as defined by the City of Austin. To meet our criteria ACWQ focused its analysis on 55 of the 126 Eii reaches. Of the 55 Eii reaches, 3 watersheds that wholly encompassed selected Eii reaches were selected so the same analysis could be performed for exploratory purposed, 9 Eii reaches were the result.

Austin Tree-Canopy Resource, Phase II
Area of Analysis: 55 Eii Reaches and 3 Watersheds

Methodology and Data

The first step in this analysis was to examine the available datasets and interpret what attributes and features were present. Since a stream network did not exist and water quality sample sites were not located at the drainage point for every Eii reach, ACWQ employed a methodology for selecting only those EII reaches that contain water quality sample sites at or within 0.5 miles from the drainage point.

Once this task was completed, the team selected the 2011 water quality data to only include temperature, turbidity and nitrogen level for those selected sites. This information allowed the team to eliminate sample sites and the corresponding reaches that did not contain the required parameters.

The selection process resulted in 55 Eii reaches, and 3 watersheds that wholly encompassed selected Eii reaches were selected so the same analysis could be performed for exploratory purposes, 9 Eii reaches were the result.

ACWQ created a 300ft centerline buffer also based on the creek line layer so that a comparison could be established from the percentages collected from the COA buffer

Next the team clipped the tree canopy, impervious cover, and creek line data to the remaining reaches and both buffers, refer to Figure I below. This allowed the team to find the area of canopy and impervious cover within the reach boundaries and buffers. With the areas ACWQ calculated percentages.

The percentages were extracted and exported into a Microsoft Excel spreadsheet to analyze any trends that might be present.
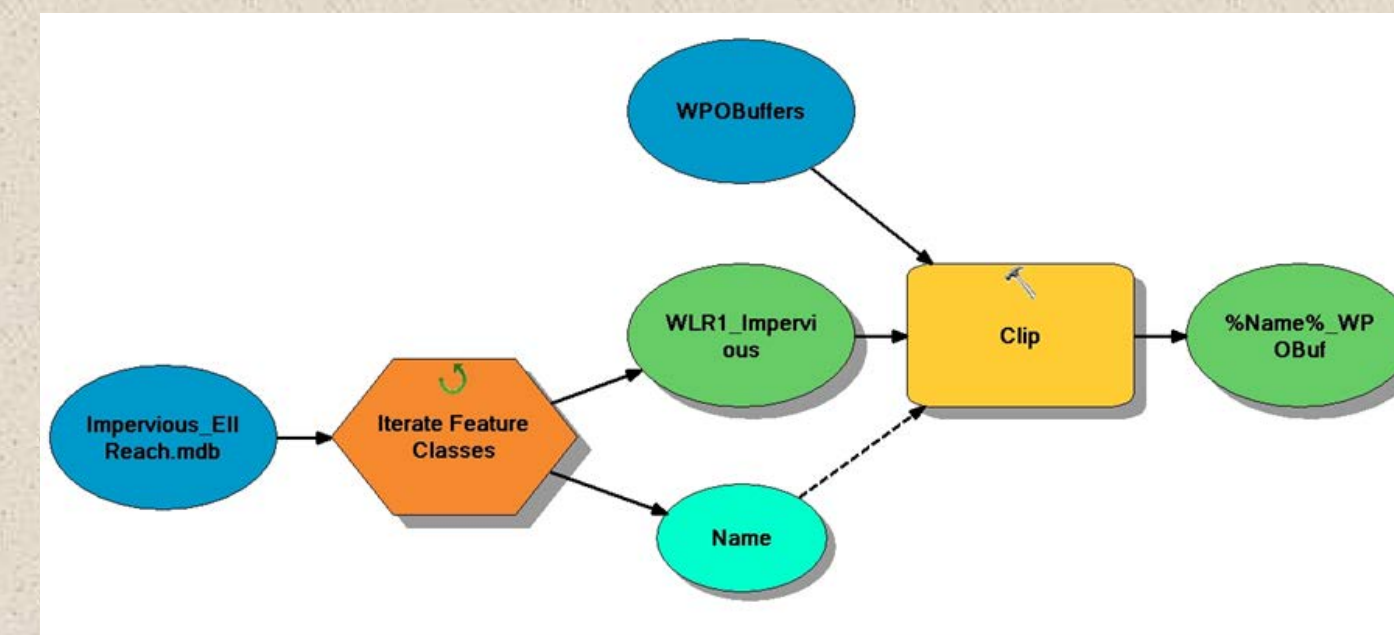

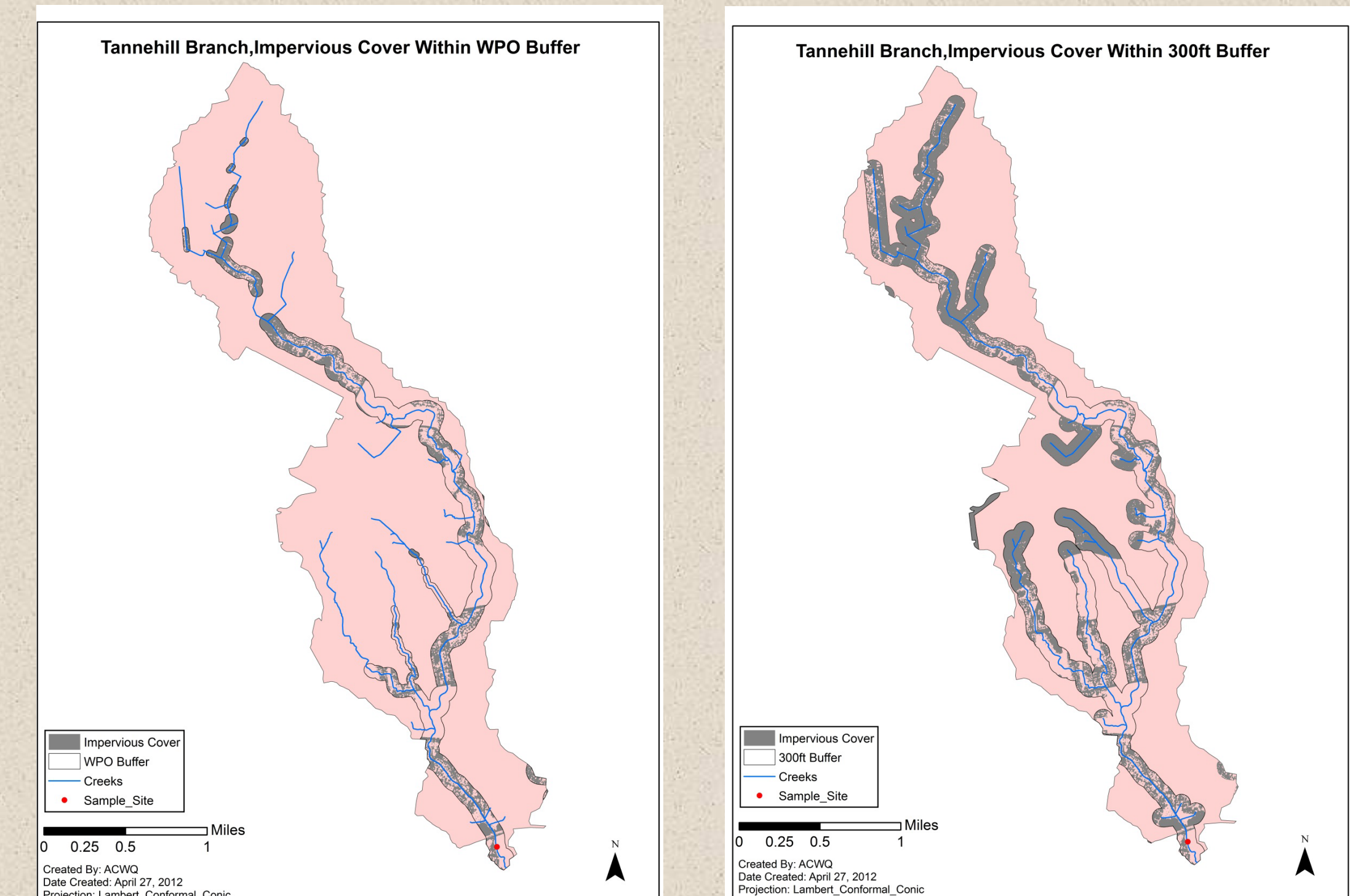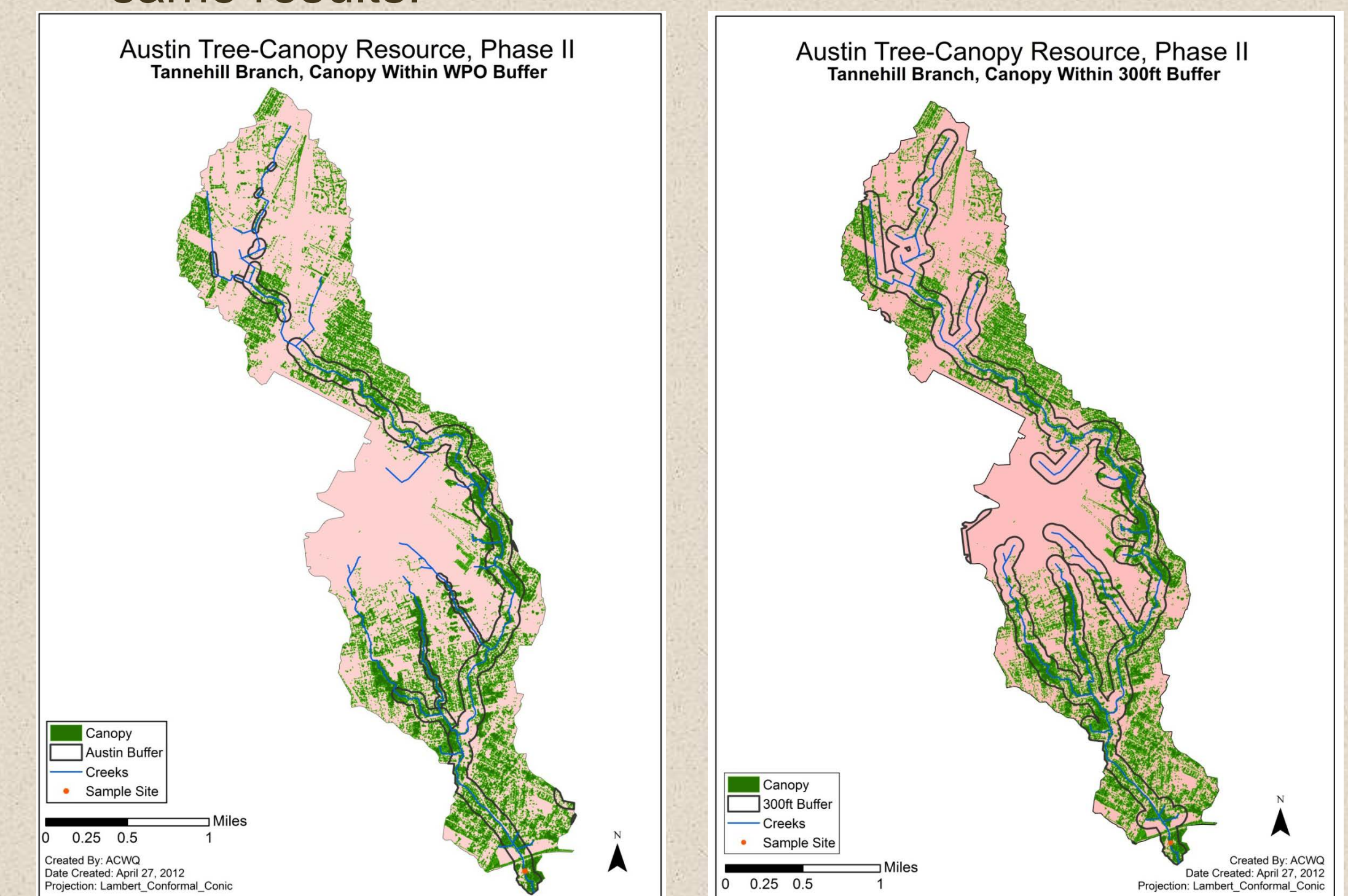Figure I. Feature Class Clip Model

Percent of Impervious Cover; EII Reach

Percent of Impervious Cover in 300 ft. Creek buffer; EII Reach

Results and Conclusions

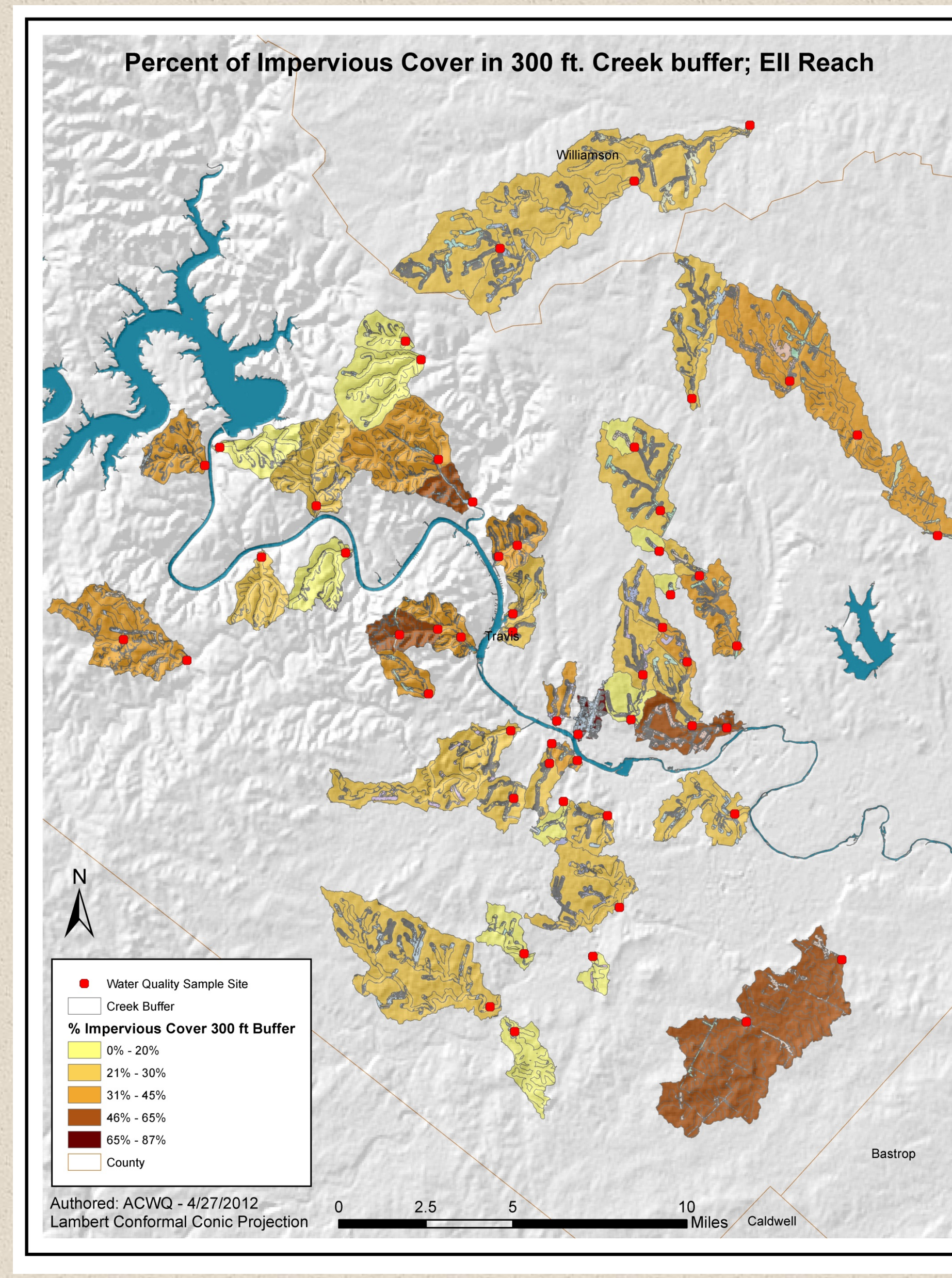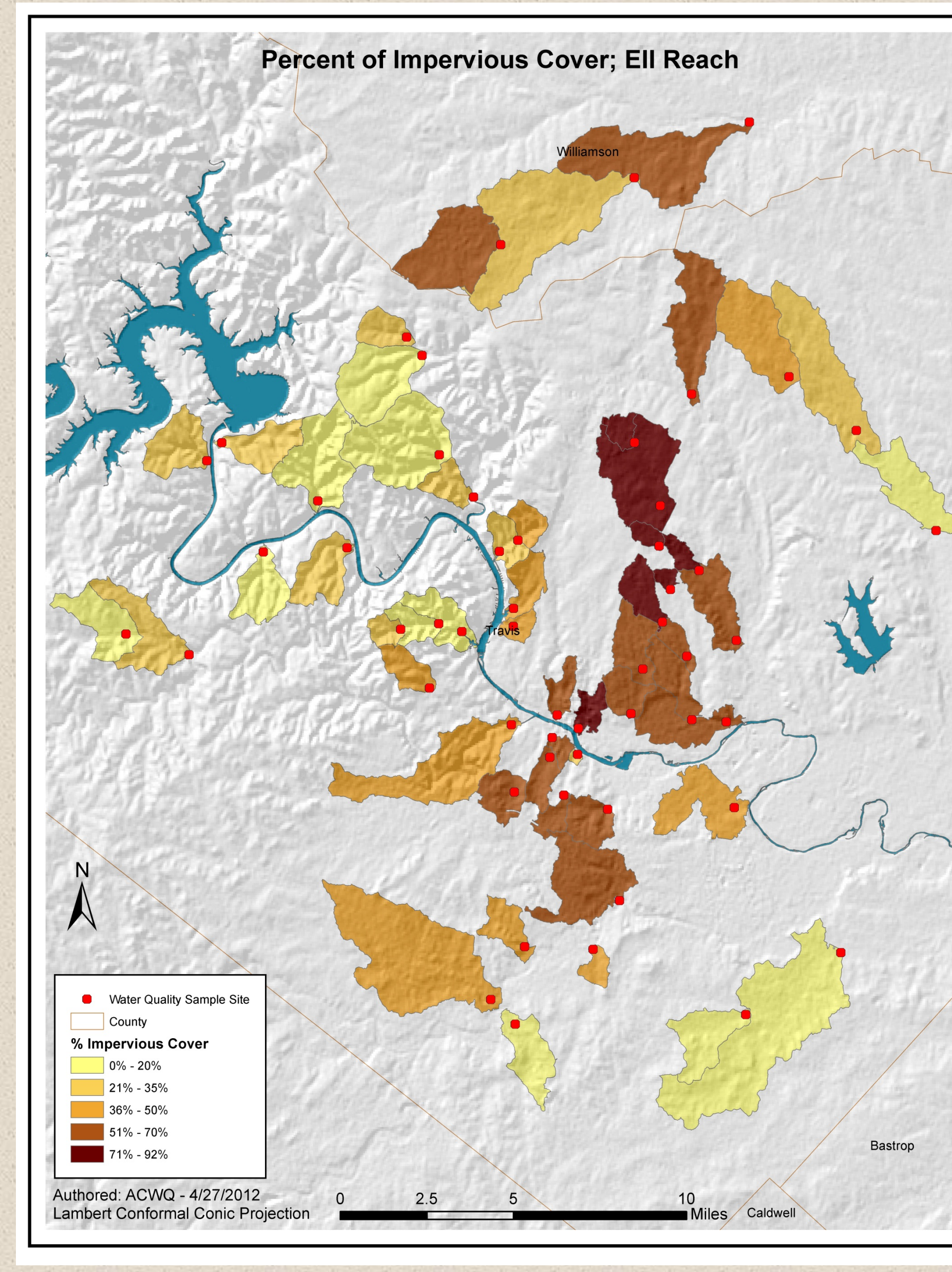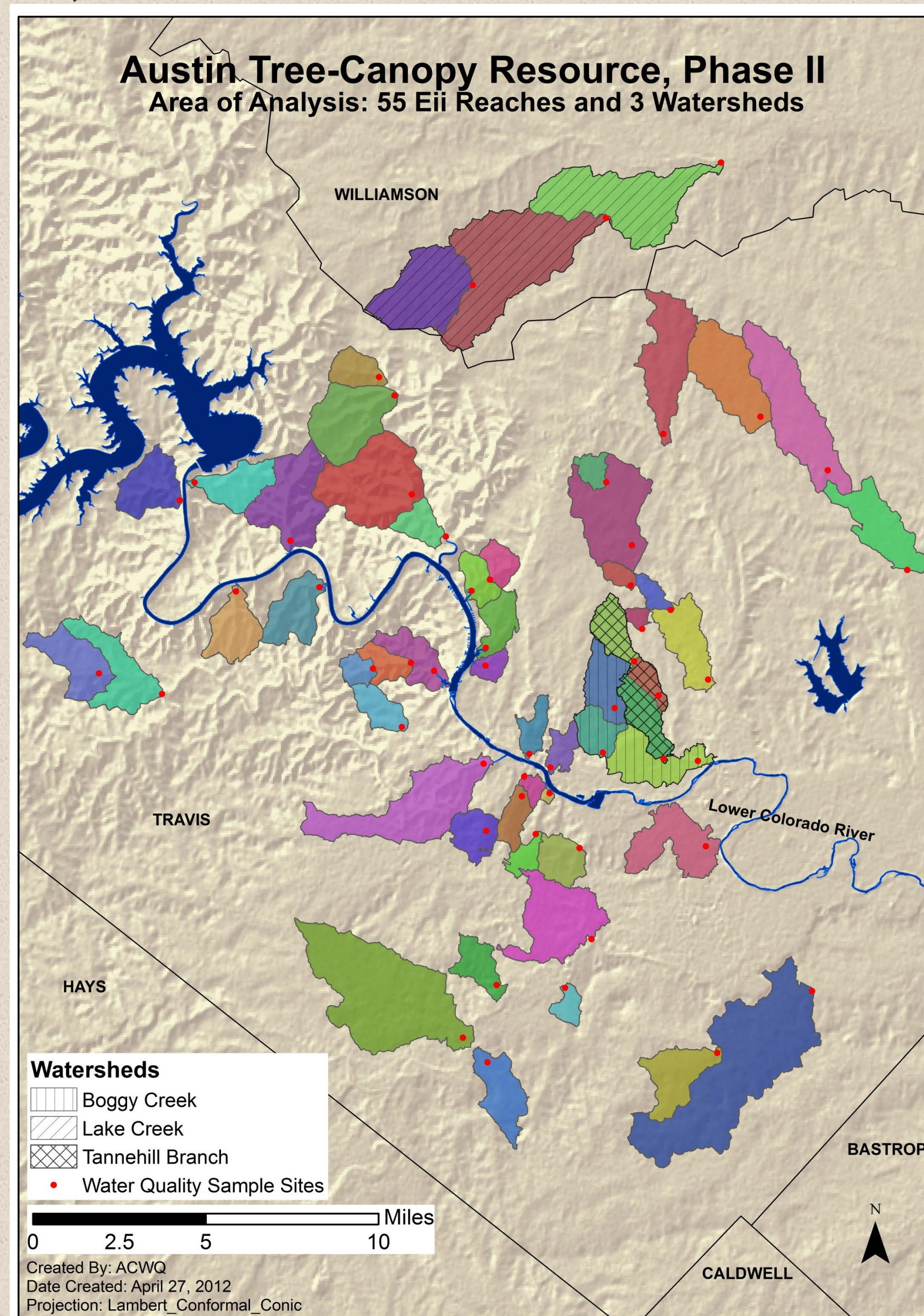ACWQ successfully calculated percentages
- Percentage of canopy and impervious cover for the 55 Eii reaches, 3 watersheds, COA and 300ft buffer; in addition, ACWQ analyzed the associated water quality.

However, a direct relationship between tree canopy, impervious cover and water quality was unable to be established.
- The results were inconclusive in that there may be a high percentage of impervious cover with good water quality in one reach but another reach may have a low percentage of impervious cover and bad water quality. The percentages for tree canopy offer the same results.

Austin Tree-Canopy Resource, Phase II
Tannehill Branch, Canopy Within WPO Buffer

Austin Tree-Canopy Resource, Phase II
Tannehill Branch, Canopy Within 300ft Buffer

Tannehill Branch, Impervious Cover Within WPO Buffer

Tannehill Branch, Impervious Cover Within 300ft Buffer

Overall the goals of the project were met. The use of GIS in ACWQ's analytical process was essential in that it allowed the successful calculation of percentages for canopy and impervious cover.

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