Progress Report

Date: April 2, 2012
To: Urban Forestry Program and Urban Forestry Board, City of Austin, Texas
From: ACWQ
CC: Dr. Yongmei Lu; Urban Forestry Program and Urban Forestry Board
Subject: Progress Report: Austin Tree-Canopy Resource, Phase II

Purpose

This progress report details the work that has been completed, what is in progress, and what is scheduled to be completed since the Urban Forestry Program accepted the proposal of Austin Canopy and Water Quality for the Austin Tree Canopy Phase II Project.

Background

When people look at a tree, they do not realize the all the parts can have. The canopy of the tree is one of the most important elements not only to the tree, but the environment around it. The Austin Urban Forestry Program approached Austin Canopy and Water Quality seeking information about this relationship. As GIS analysts and environmental researchers the team at ACWQ possesses the skills and knowledge needed to complete the task.

Project Description

The objective of ACWQ is to determine the percentage of tree canopy coverage within the stream reach buffers. After completing this task the team will create a tool, which will cumulatively add the percentages of tree canopy through the stream system in order to establish a relationship between tree canopy and water quality. Time permitting ACWQ will clip water quality data(Inorganic Nitrogen,Turbididty/Clarity/, and Water Temperature), impervious cover, soil, habitat type, street and trail density, toxic release inventory sites, population and housing density, and floodplain/priority woodlands data to the buffer layer, watershed area, and the City of Austin neighborhood boundaries.

Work Completed

We have completed all of our initial research. All datasets located in table 1 have been downloaded. A methodology for extracting the quantity and distribution of tree canopy data located within the creek buffer has been completed. We have determined the quantity and distribution of tree canopy within each individual watershed as well as the entire study area. The creek flow direction has been developed using the digital elevation model. We have established a website template. We have kept track of our methodology thus far, tracking what steps we took to accomplish the tasks we have completed.

Table 1 - Data sets and their source

Data Set	Source
Tree Canopy	City of Austin (COA)
Watershed	City of Austin (COA)
Streams & Creeks	City of Austin (COA)
County Lines	City of Austin (COA)
City boundary	City of Austin (COA)
Digital Elevation Model (DEM)	City of Austin (COA)
Water Quality Data	City of Austin (COA)
Water Quality Data Sampling Sites	City of Austin (COA)
EII REACH Watersheds	COA Urban Forestry Program
Soil Type	USDA Natural Resources Conservation Services
Habitat (Eco Regions)	Texas Parks & Wildlife (TPWD)
Hydrology	Texas Parks & Wildlife (TPWD)
Impervious Cover	United States Geological Survey (USGS)
National Hydrography Dataset	United States Geological Survey (USGS)

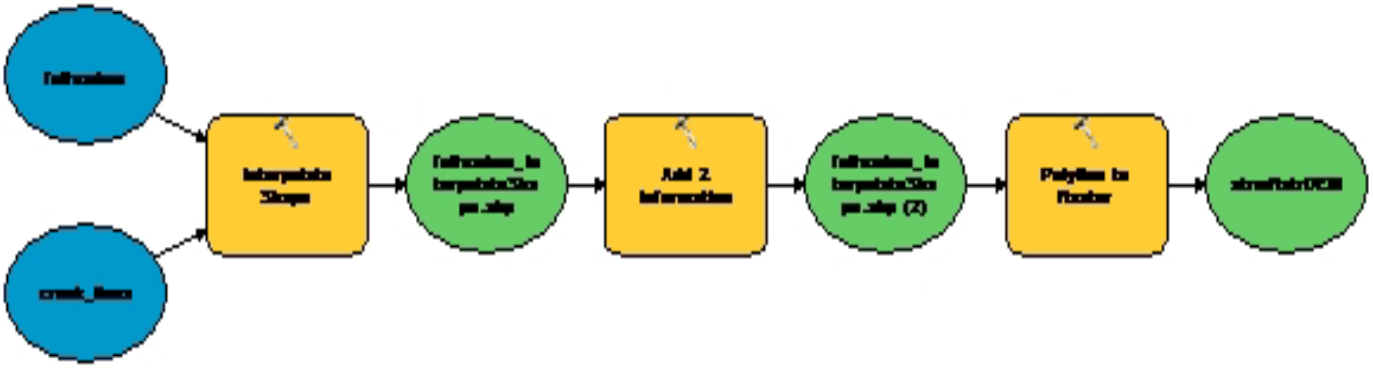


Table 2. Stream Flow Direction Model

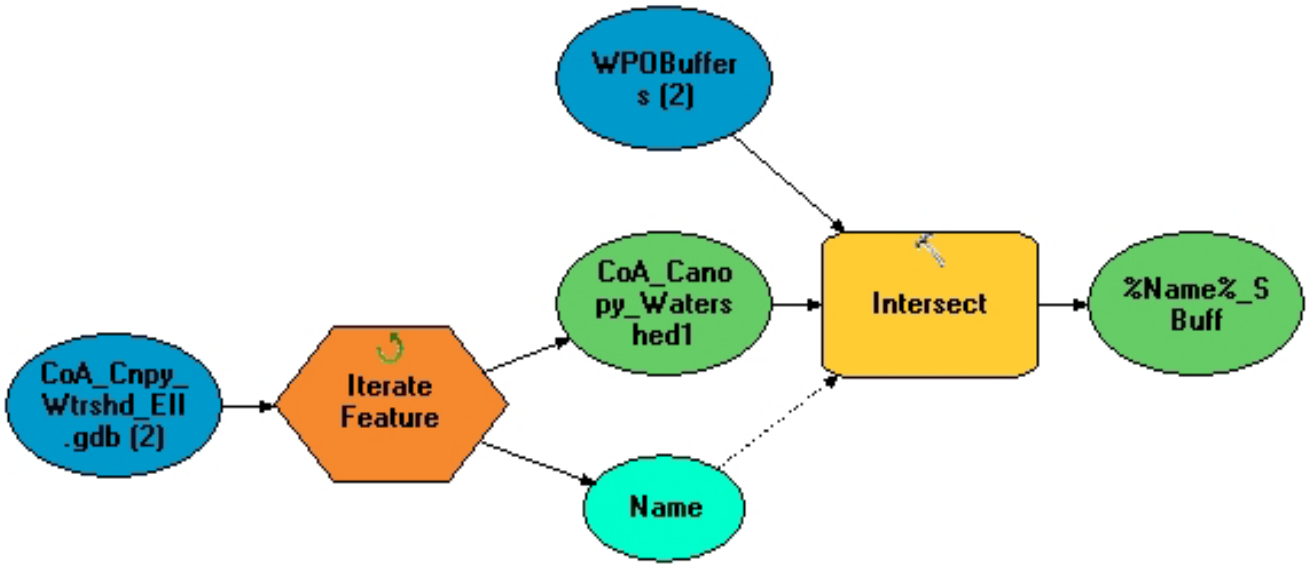


Table 3. Buffered Canopy Model

Figure 1A. Tree Canopy Located in Study Area

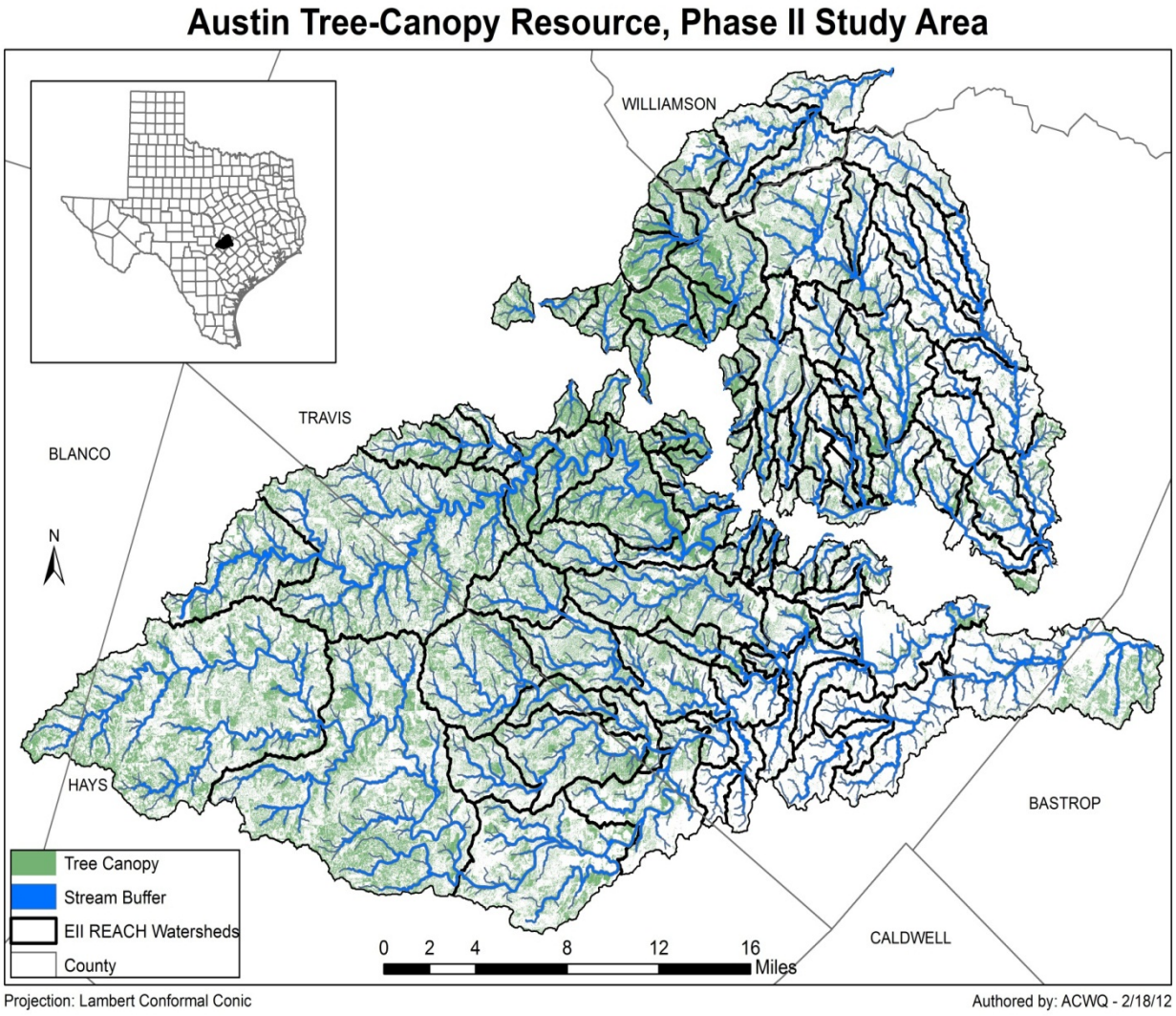


Figure 2. Tree Canopy Located within Stream Buffer

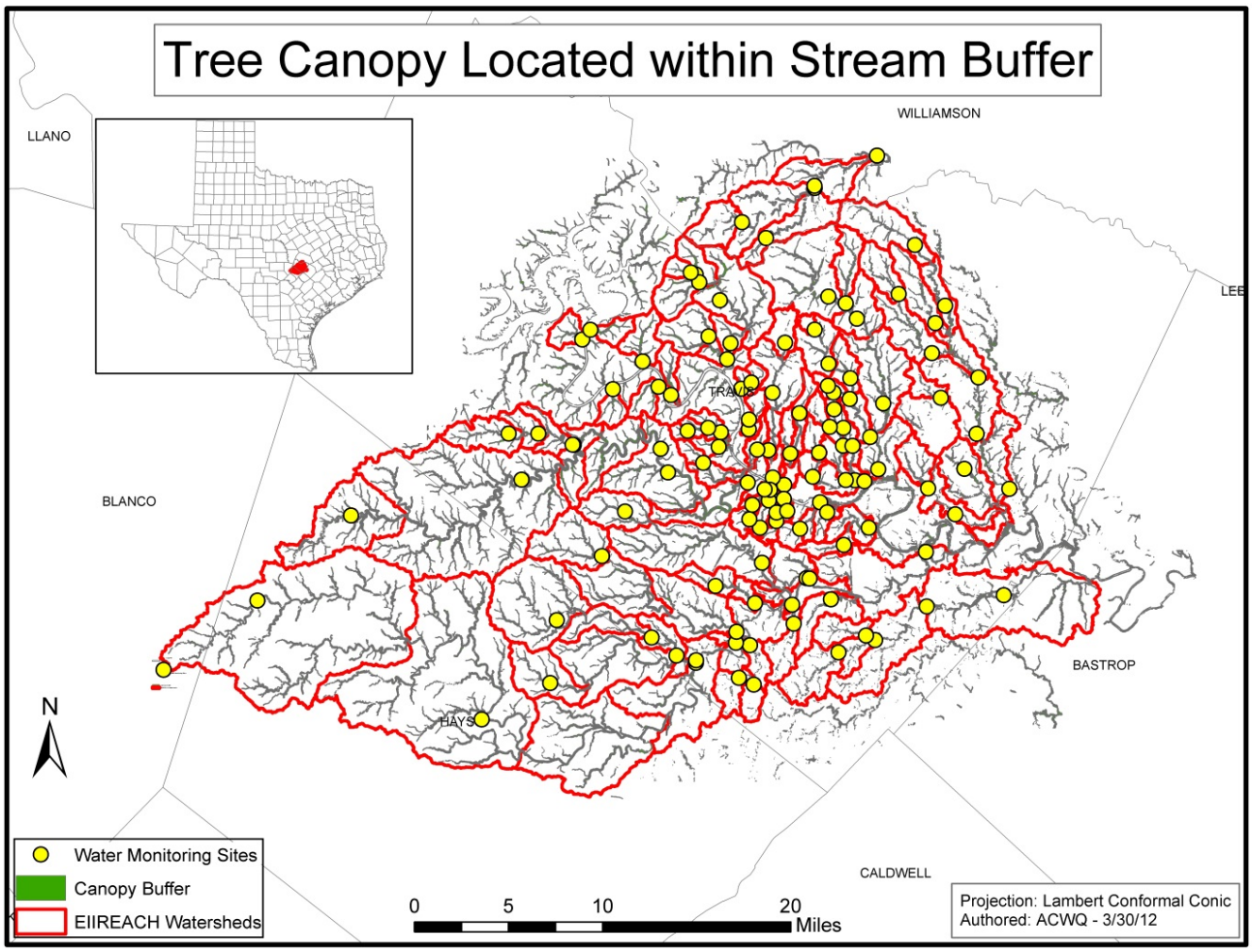


Figure 2. City Limits

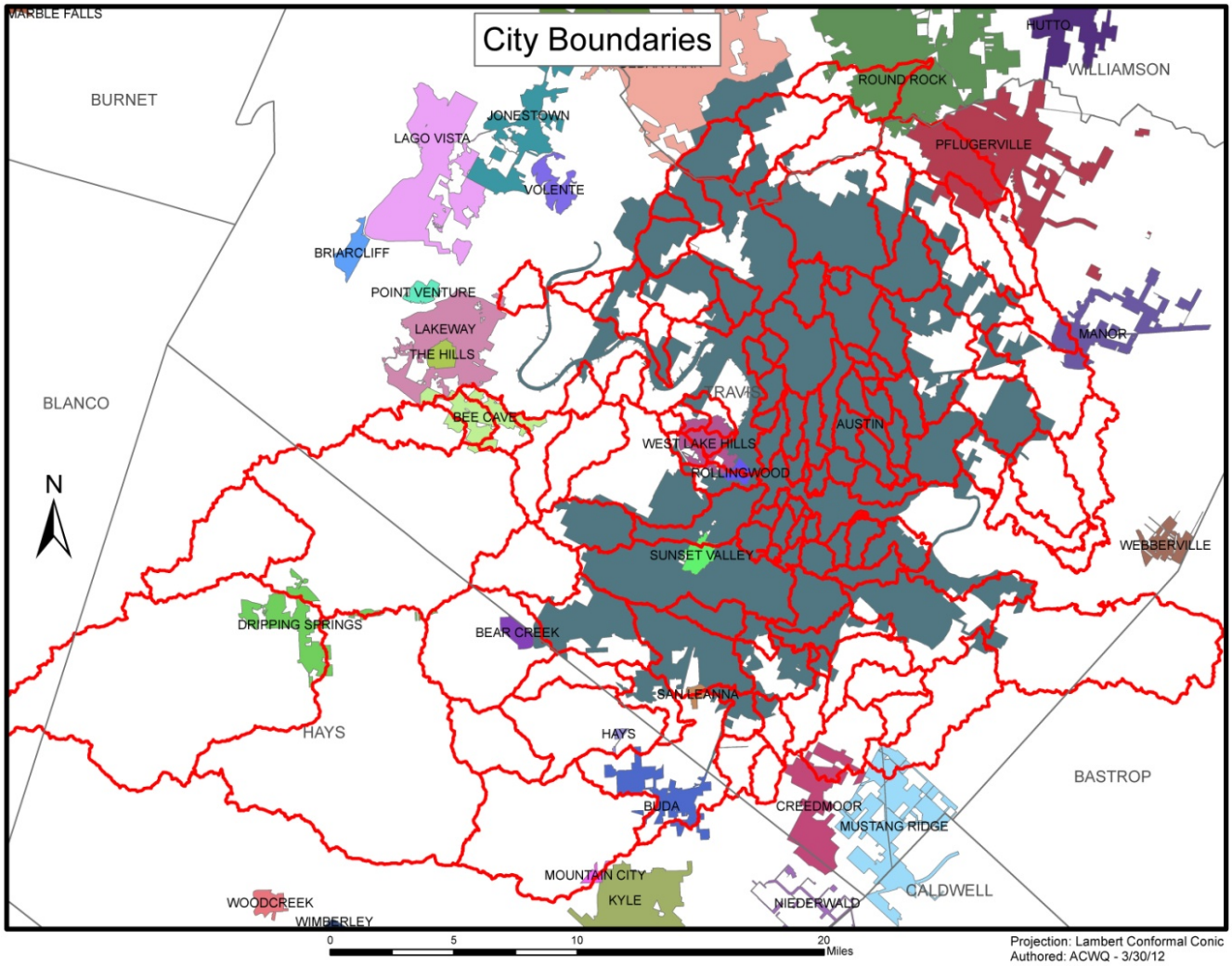


Figure 3. Tree Canopy Located within Watershed

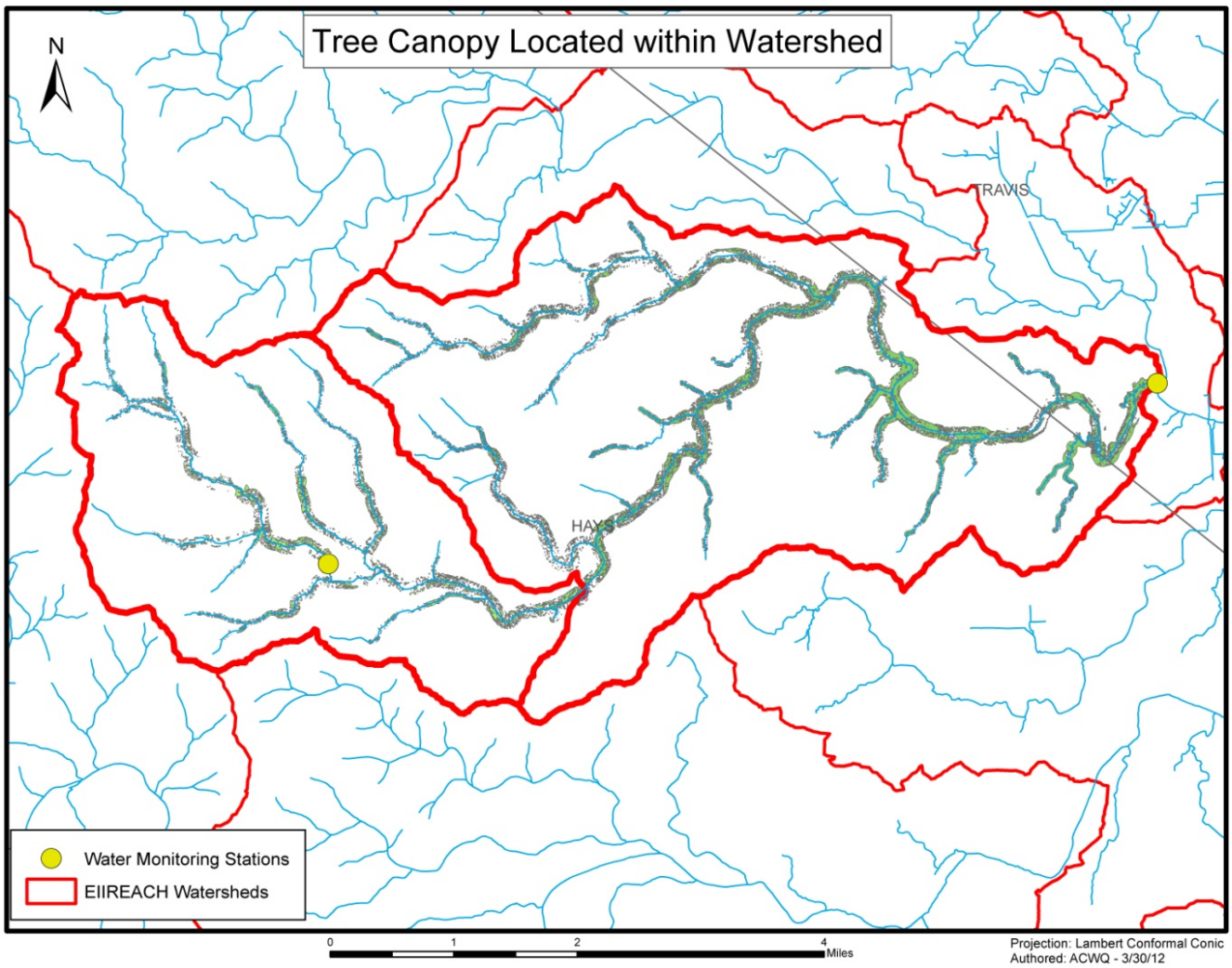


Figure 4. Stream Flow Direction

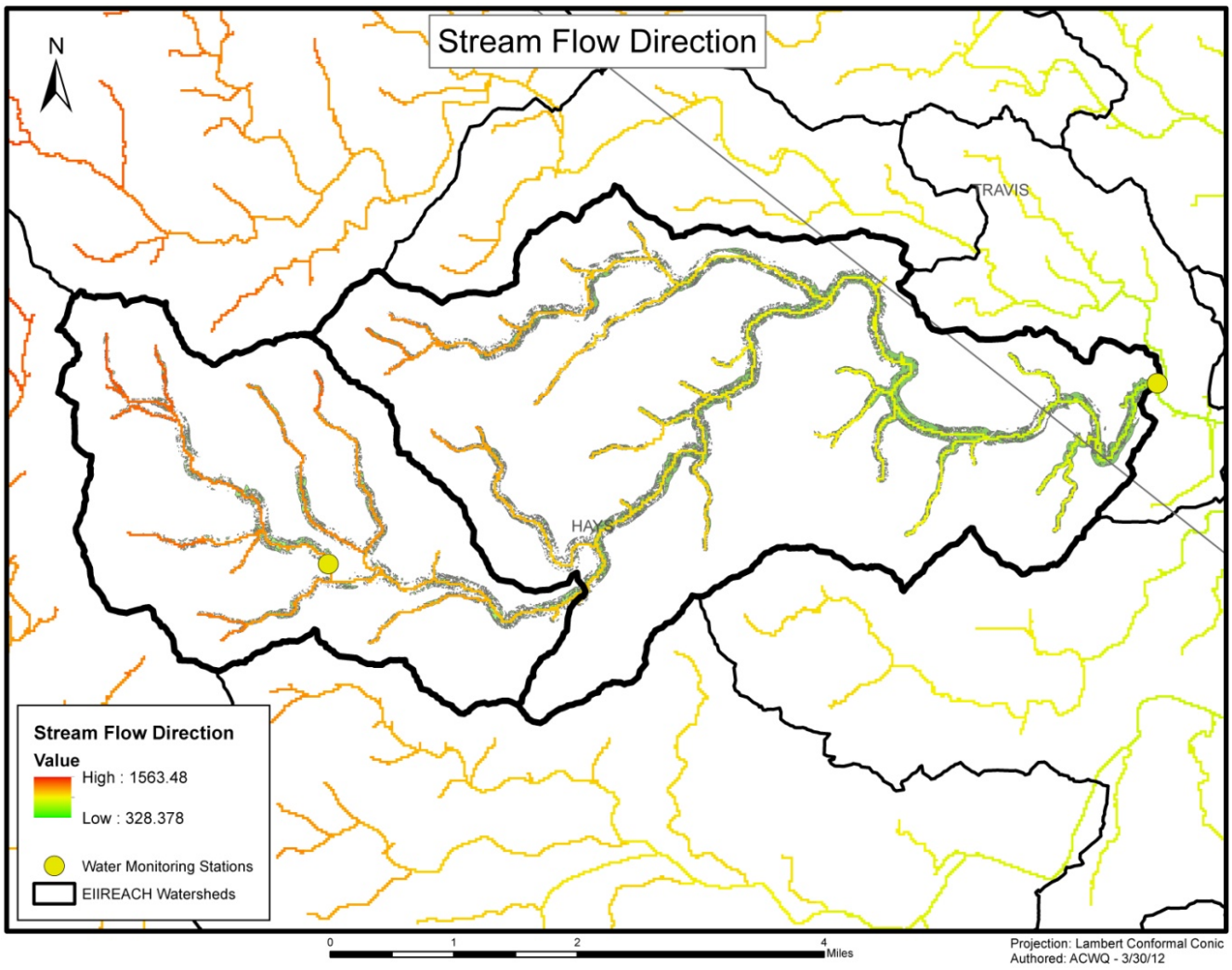


Figure 5. Impervious Cover Within Watershed

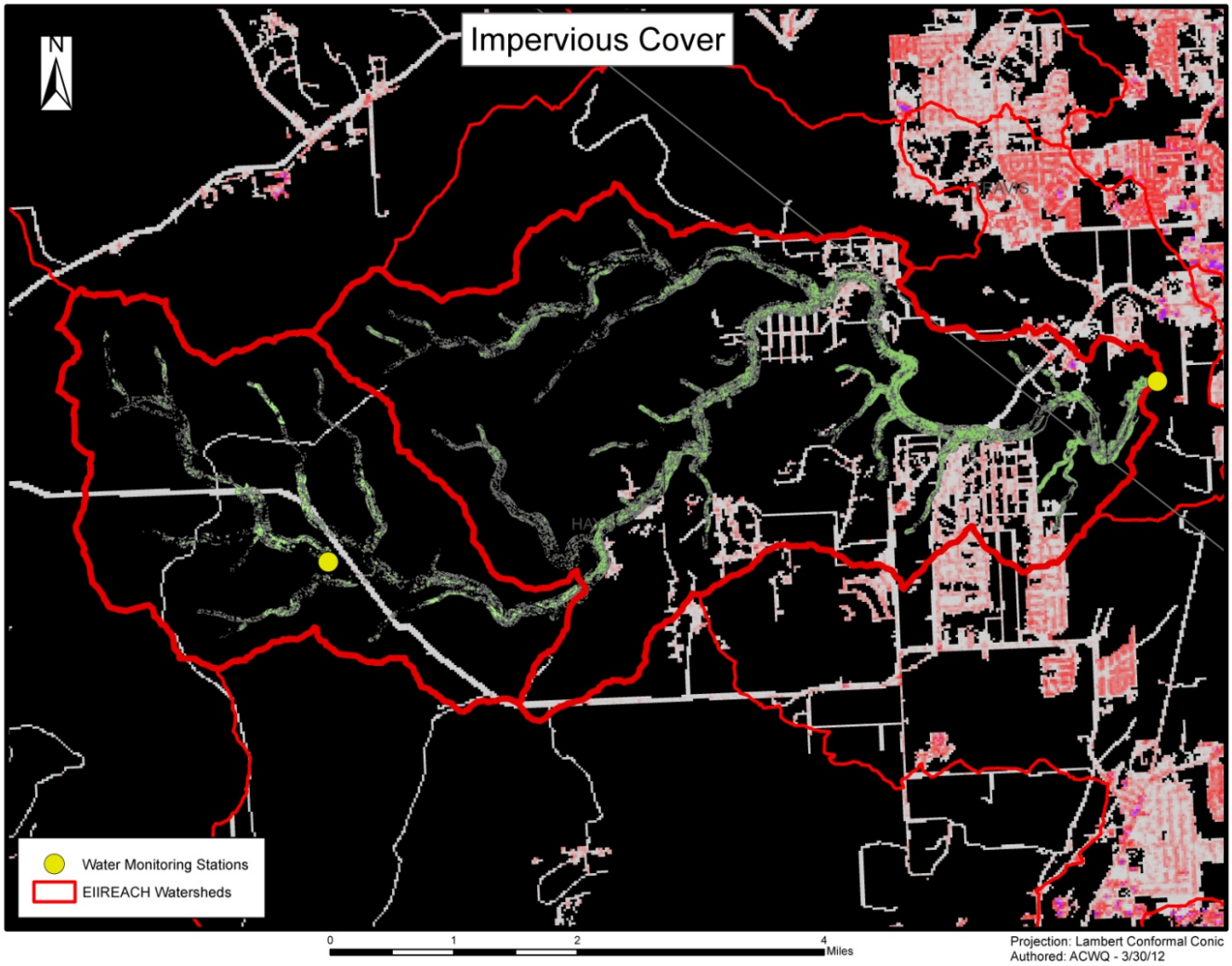


Figure 6. Land Cover within Watershed

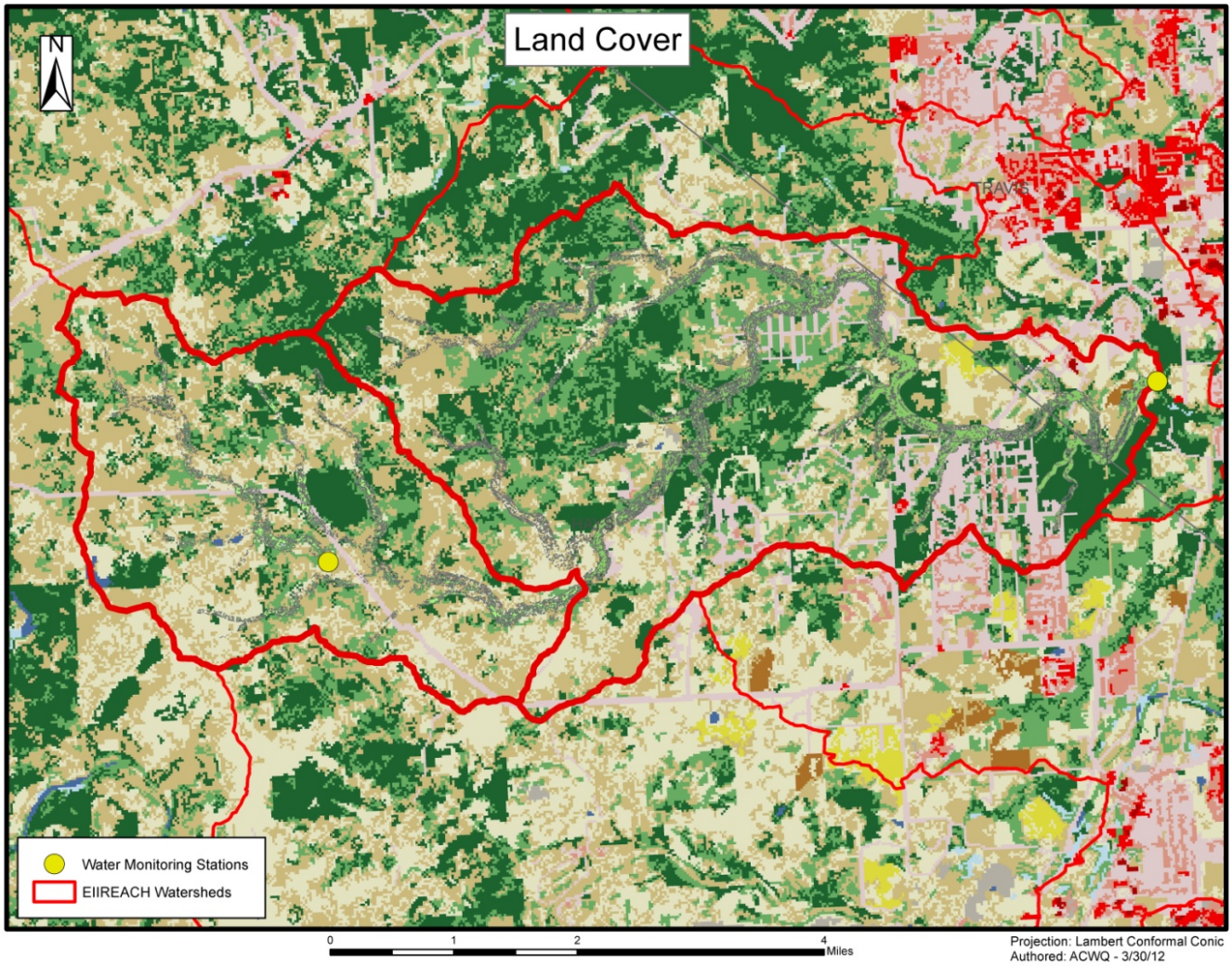
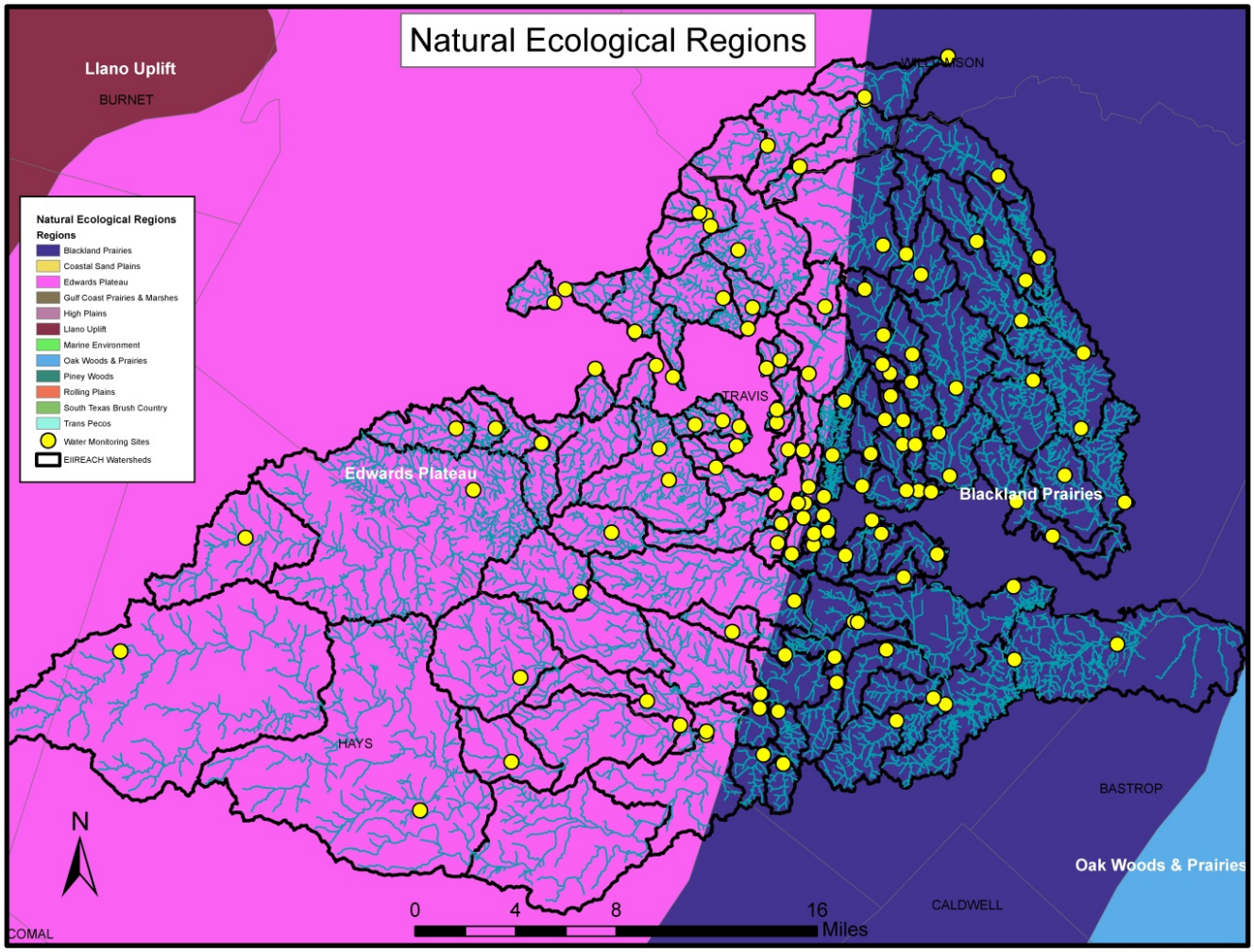
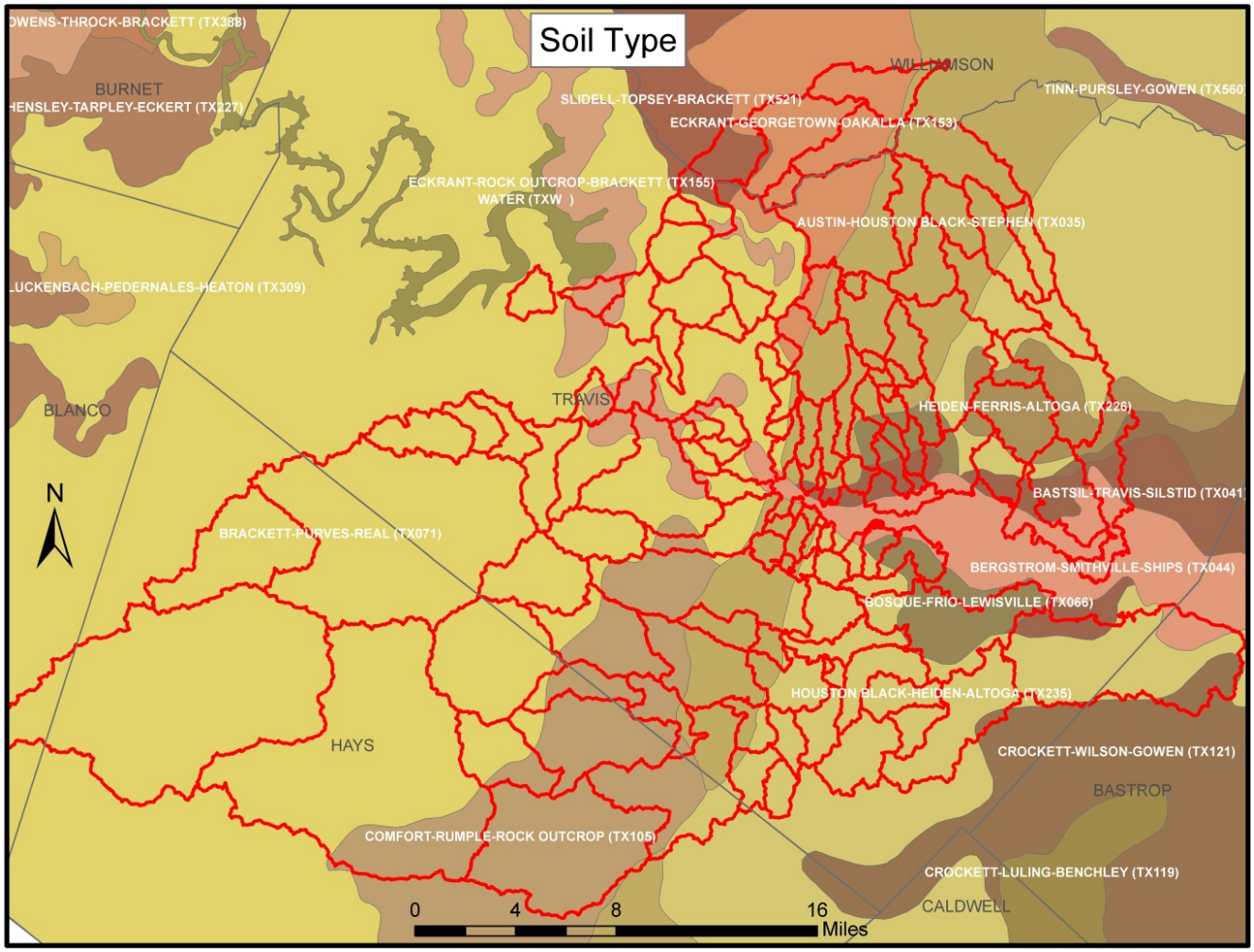


Figure 7. Natural Ecological Regions



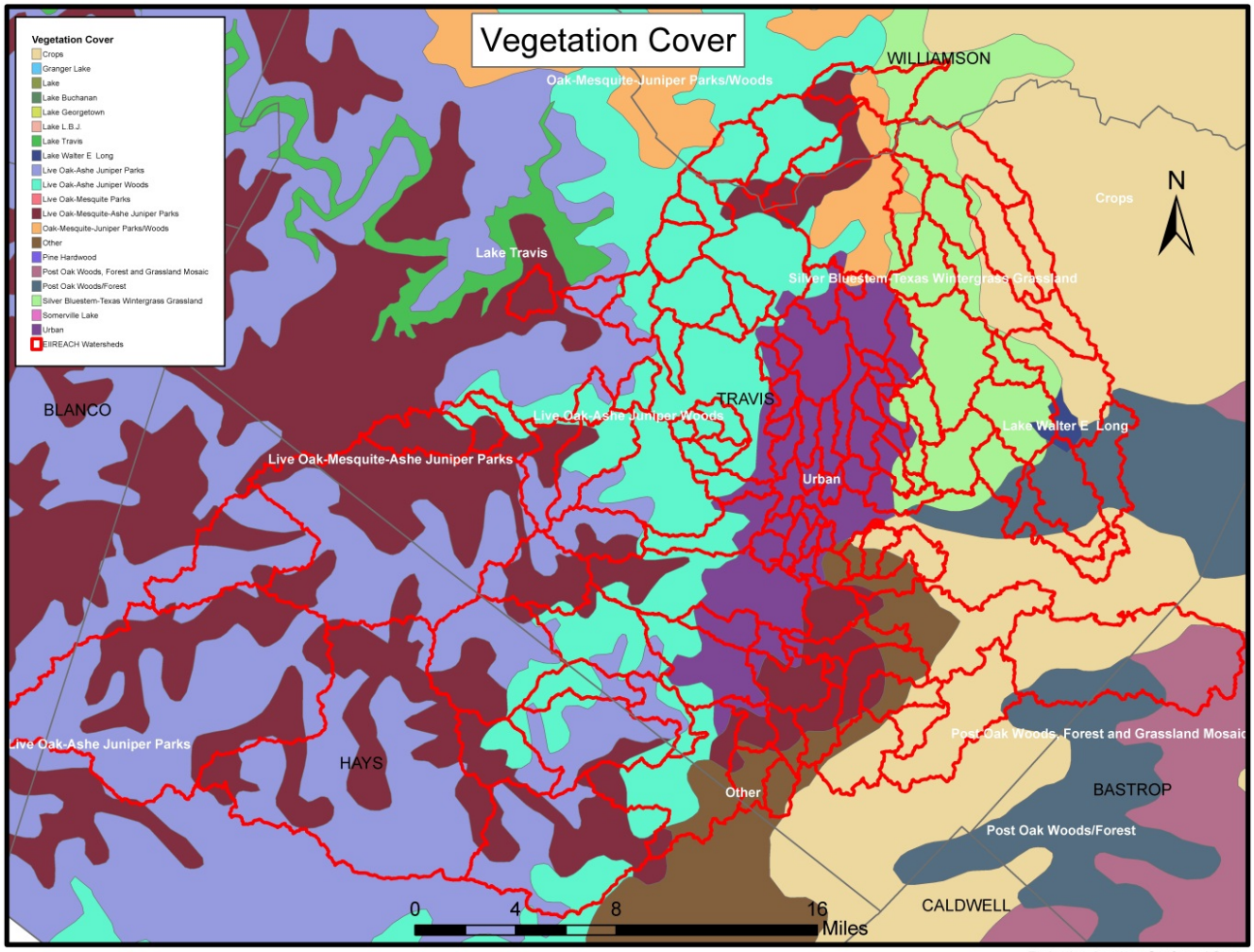
Projection: Lambert Conformal Conic
Authored: ACWQ - 3/30/12

Figure 8. Soil Type



Projection: Lambert Conformal Conic
Authored: ACWQ - 3/30/12

Figure 9. Vegetation Cover



Work in Progress

The work that is currently in progress involves locating the USGS Water Quality Data, Street and Trail Density, Toxic Release Inventory Sites, and Population and Housing datasets. A major aspect of our project is currently underway involves creating an algorithm to calculate total canopy coverage upstream of water monitoring stations. We are reviewing the USGS' National Hydrography Data set so that a network of streams can be developed and the cumulative tree canopy information can be extracted upstream of each water quality station. Another piece of the project currently underway involves developing the website that will feature all aspects of the project.

Problems

We have had trouble locating the USGS Water Quality Data, Street and Trail Density, Toxic Release Inventory Sites, and Population and Housing datasets.

After developing a successful methodology for several aspects of the project we found that our method was soon going to run into a wall as users were not going to be able to identify stream segments, for referencing the quantity and distribution of tree canopy located within the stream buffer. We found that the creek layer did not include unique feature information in the attribute table. Establishing an algorithm that will develop a river network is a priority for successful completion of the project.

The buffered streams provided, extend beyond the watershed layer we were given. We thought we would include this excess area as it contributes to certain water quality stations but wanted to clarify that it was something you wanted us to do, or should we exclude it from our study area and only use the data that is solely inside the watershed?

We received communication from Tom Hayes to Include USGS water quality datasets and delineate boundaries for sub-watersheds specific to each USGS monitoring station. Also Tom Hayes has asked us to use USGS sampling stations although we have been using the City of Austin's sampling sites, do we now use USGS sampling stations or continue using the City of Austin's sampling sites? We wanted to clarify, how far upstream of every sampling station should we include in determining water quality per sampling site i.e. until we reach another sampling station; to clarify does this he mean all the branches above the water quality station, two miles above (or some arbitrary distance upstream), or just until it hits another sampling station?

Work to be Completed

During the data interpretation of Phase IV we will revisit the research to make the final inferences/interpretations of the results found. Download USGS Water Quality Data, Street and Trail Density, Toxic Release Inventory Sites and Population and Housing. We need to organize the water quality data to just include: total inorganic N, turbidity/clarity, and water temperature (those parameters important and chosen by the client).

Create an algorithm to calculate total canopy coverage upstream of sampling sites and the total canopy coverage upstream of water station (cumulatively). Include USGS data to water quality data. Delineate boundary shapefiles for the sub-watersheds specific to each USGS monitoring station. Create a technical connection between the Creek Lines layer and the Canopy Coverage i.e. as the buffer layer does not contain qualitative data of the creeks. Clip all of the data requested (impervious cover, soils, habitat types, street and trail density, Toxic Release Inventory (TRI) sites, populations and housing density, and floodplain /priority woodlands.) by COA Neighborhood, Buffer Layer, and Watershed Area. Water quality data needs to be edited and joined with the water quality monitoring stations dataset. Dissect the buffer layer to create a unique field that will allow us to union creek segments.

Complete all final deliverables: final cd with data, metadata, powerpoint presentations, memos, proposal, progress, and final reports; references; maps; website and final professional poster to be displayed in Evans Liberal Arts Building

Timeline

Proposed Timeline

Austin Tree-Canopy Resource, Phase II										
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10*
	27-Feb	5-Mar	12-Mar	19-Mar	26-Mar	2-Apr	9-Apr	16-Apr	23-Apr	30-March to May 4
Data Collection										
Data Processing										
Data Analysis										
Data Interpretation										
Model Development										
Website Development										
Prepare Final Deliverables										
Final Deliverables										
*Week 10 begins March 30th and ends May 4th for project purposes; we will submit Final Deliverables to you on Friday, May 4, 2012.										

Current Timeline

Austin Tree-Canopy Resource, Phase II										
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10*
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Summary of Project

Overall the progress of the team has slowed as further clarification is needed on several issues. Once feedback is provided, the team is confident that we will be able to move forward and complete the project by the May 4th deadline.