Watershed and Tree Canopy Association in Austin, TX

Project Proposal

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February 2013
San Marcos, TX

Introduction

- The City of Austin Urban Forestry Program is interested in tree canopy and water quality in their jurisdiction
- The client would like help in prioritizing future tree plantings, as well as exploring the relationship between canopy cover to water quality

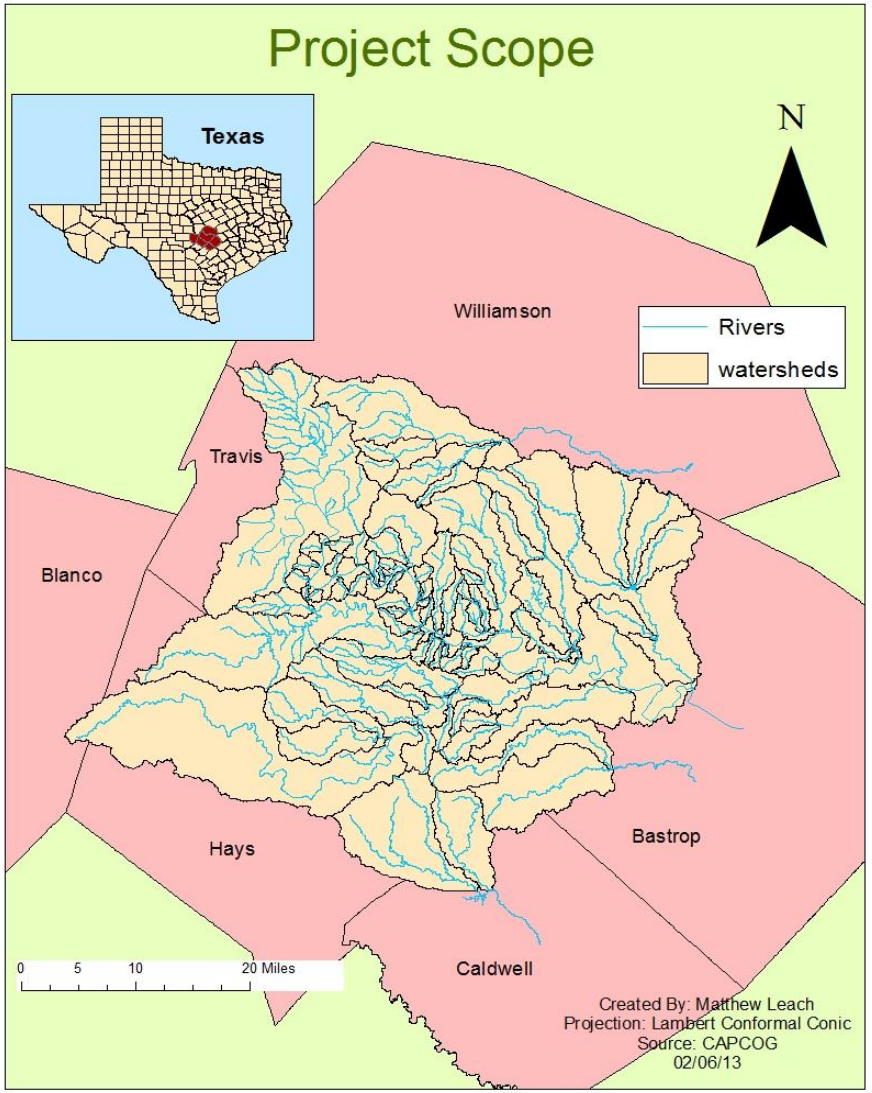
Objectives

- Create a model that can be replicated and modified by the client
- Start with a pilot project creating a watershed from one water quality sampling point that can be applied to the other watersheds as time allows
- Calculate tree canopy coverage in watersheds

Scope

- Greater Austin Area
- Surrounding counties that watersheds extend into

- Temporal: Tree canopy data is from 2006 but model can be updated as new data becomes available



Literature Review

- Trees in urban areas may make an impact on water quality on a watershed level
- Tree canopy and water quality can be examined by creating watersheds for sampling points from DEMs
  - "GIS-Based Hydrologic Modeling: The Automated Geospatial Watershed Assessment Tool" by S.N. Miller et al. December 2005
  - "A GIS Based Watershed Analysis System for Tillamook Bay, Oregon" May 1999 by Patrice Melancon et al. for University of Texas at Austin

DATA

Data	Source	Type
Digital Elevation Model	TNRIS	Raster
Watershed Network	Created with GIS	Raster
Tree Canopy Coverage (2006)	City of Austin	Polygon
Environmental Integrity Index (EII) Water Quality Stations	City of Austin	Point
Watershed Boundaries	City of Austin	Polygon

Projection: Lambert Conformal Conic

METHODOLOGY

- Stage 1 (Literature Research)
  - Research previous studies related to watershed modeling & tree canopy coverage
- Stage 2 (Acquisition of Data)
  - Gathering of datasets and importing them into ArcMap 10

- Stage 3 (Implementation of Techniques)
  - Pilot project of one watershed to develop a model for delineating a hydrology network
    - Fill sinks in data
    - Create flow direction raster
    - Create flow accumulation raster
    - Associate output to single Ell water station point
  - Associate upstream canopy coverage to an Ell station
  - Replicate the process for additional watersheds

- Stage 4 (Examination of Results)
  - Determine percentage of canopy coverage per watershed

- Stage 5 (Finalization of Results)
  - Preparing results in a report for the City of Austin's Urban Forestry Program

Image from city-data.com

Budget

Data Collection			
	Total Hours (10 hours/week * 4 weeks * 4 consultants)	160	
	Hourly Rate	$20	
	Total		$3,200
Data Analysis			
	Total hours (10 hours/week * 5 weeks * 4 consultants)	200	
	Hourly Rate	$25	
	Total		$5,000
System Management			
	Project Manger		
	Total Hours	50	
	Hourly Rate	$50	
	Total		$2,500
Specialists			
	Graphic Designer		
	Total Hours	10	
	Hourly Rate	$35	
	Total		$350
Equipment Costs			
	Supplies ($200/workstation * 4 workstations)	$800	
	Maintenance ($200/workstation * 4 workstations)	$800	
	Depreciation ($9000 [total value of equipment]/36 (equipment life in months) * 2.5 (months equipment will be in exclusive use of project)	$625	
	Total		$2225
Software Cost			
	Arc GIS 10: ($25,000 ESRI License fee/12 months) * (2.5 months of use)	$5,208	
	Adobe Illustrator	$599	
	Total		$5,807
Total Cost			$19,082

Timeline

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11
Dates	*18-Feb.*	*25-Feb.*	*4-Mar*	*11-Mar.*	*18-Mar.*	*25-Mar.*	*1-Apr.*	*8-Apr.*	*15-Apr.*	*22-Apr.*	*29-Apr.*
Literature Review											
Data Collection											
Data Processing and Data Analysis											
Data Interpretation											
Final Deliverables											

Final Deliverables

- Detailed Final Report including model
- Professional Poster for display in Geography Department
- CD containing:
  - All Data
  - Metadata
  - Proposal, Progress, and Final reports
  - Poster
  - PowerPoint presentations
  - Instructions on how to use CD

Conclusion

- Provide the COA Urban Forestry Program with a usable model to associate tree canopy coverage, watersheds, and sampling points
- Enable further research into water quality factors and land management best practices

Questions