

# Watershed and Tree Canopy Association in Austin, TX



Final Presentation

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# Introduction

- ▶ Impermeable surfaces:
  - ▶ Contribute to runoff increasing flooding
  - ▶ Eliminate some natural processes
  - ▶ Can transport urban–source pollutants directly to streams
- ▶ The Austin Urban Forestry Program is interested in tree canopy coverage and its relationship to the surrounding environment, particularly water quality
- ▶ They are concerned with prioritizing future tree planting

# Objectives

- ▶ Develop an adjustable, replicable model
  - ▶ Delineating watersheds from EII points
  - ▶ Clipping associated canopy coverage to watersheds
  - ▶ Accounting for urban structures and natural phenomenon hindering future planting
  - ▶ Calculating percent canopy coverage for every watershed
  - ▶ Calculating percent canopy coverage for the “plantable” area
  - ▶ Produce statistics to aid the City of Austin in prioritizing future land management and enable further analysis

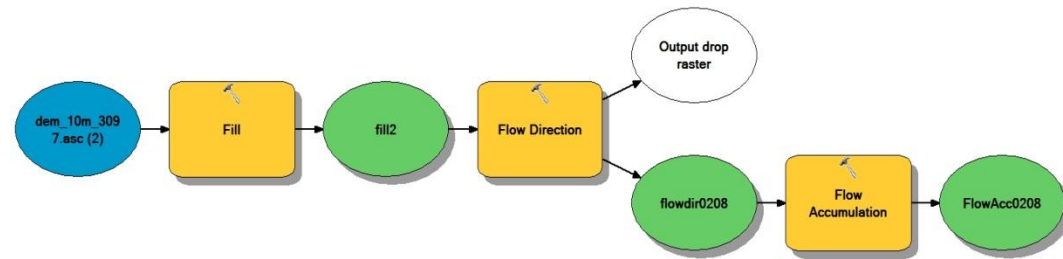
# Methods

## Developing DEM's

- ▶ The DEM's downloaded from (TNRIS)
- ▶ Mosaicked the rasters
- ▶ Clipped Raster

## Hydrologic Model

- ▶ Filled DEM
- ▶ Flow Direction
- ▶ Flow Accumulation



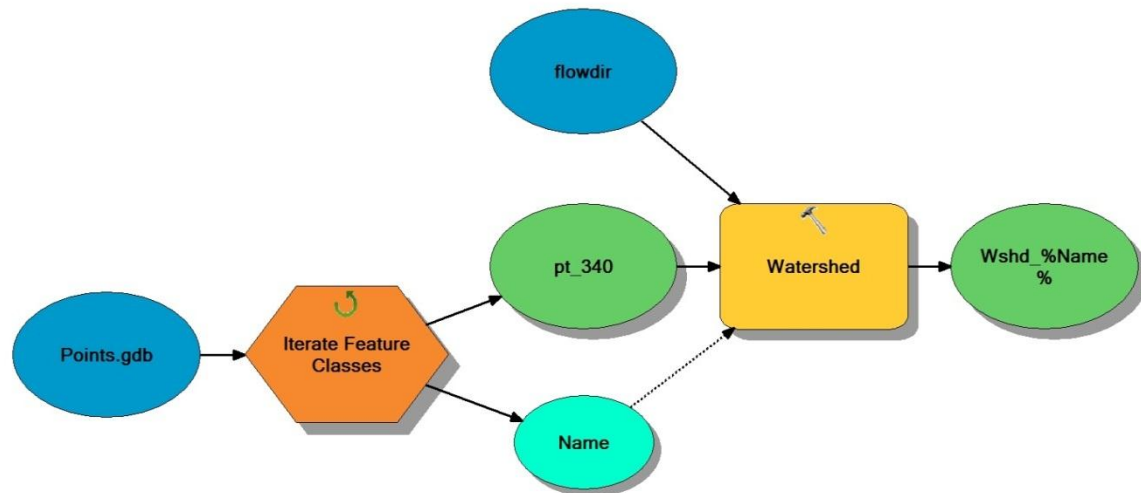
# Methods

## EII Station Integrity

- ▶ Built a stream network
- ▶ EII Stations
- ▶ Points geodatabase

## Building Watersheds

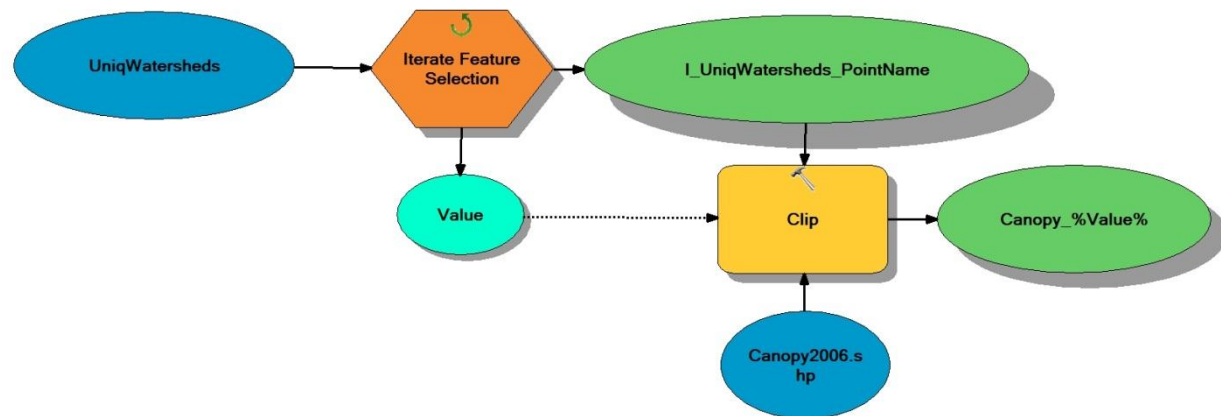
- ▶ Watershed delineations
- ▶ Iterator
- ▶ Raster to Polygon



# Methods

## Tree Canopy Overlay

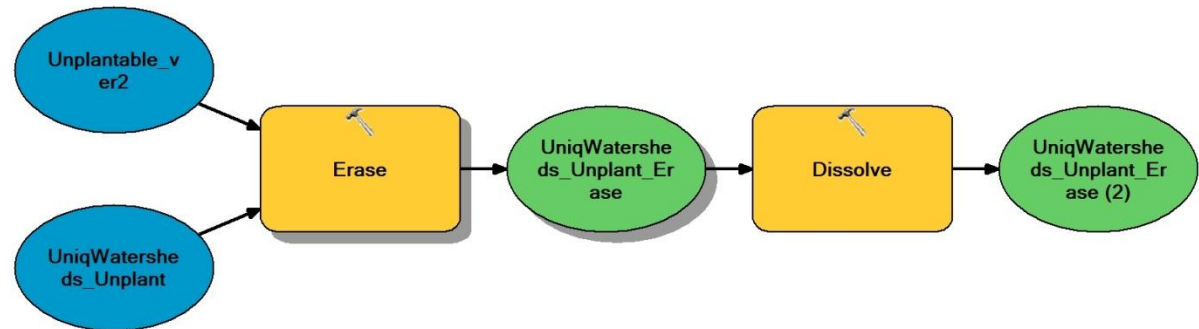
- ▶ Re-projected watershed polygons
- ▶ Polygon watersheds merged into one shape file
- ▶ Iterated Clip
- ▶ Canopy Calculations



# Methods

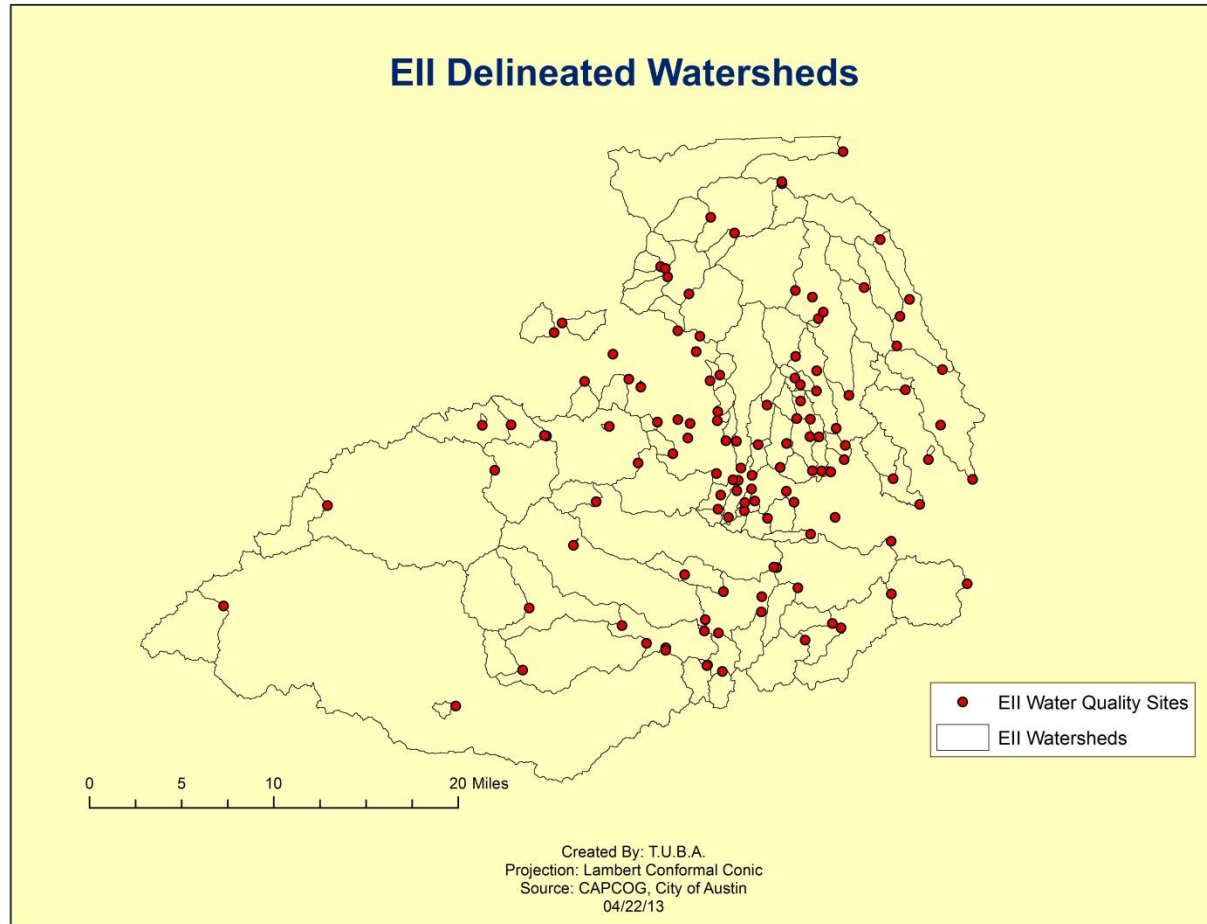
## Erasing Unplantable Layer

- ▶ Unplantable Layer
- ▶ Watershed layer
- ▶ Erase unplantable
- ▶ Dissolve
- ▶ Calculations



# Methods

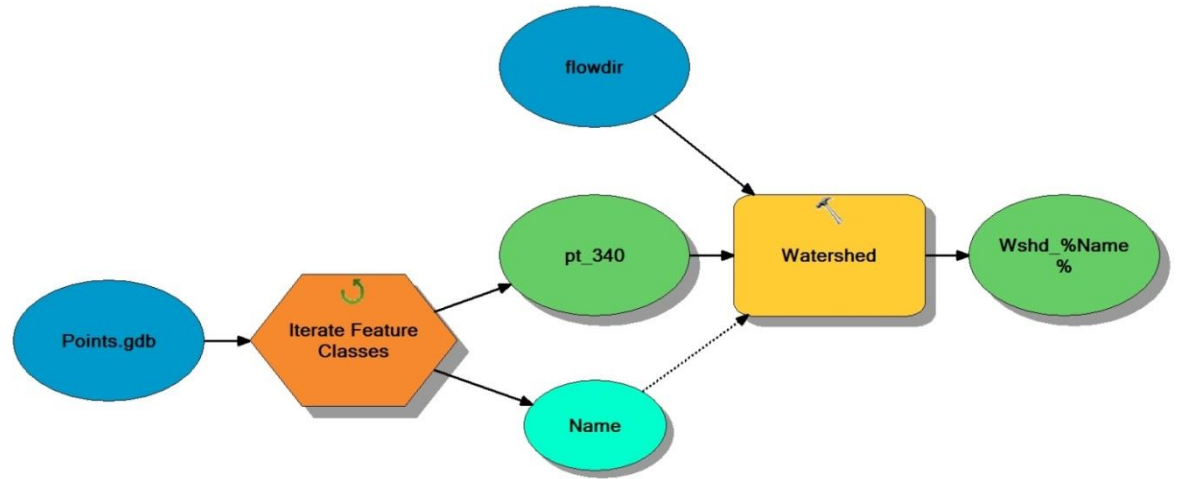
- ▶ Created tools to analyze water quality in Austin





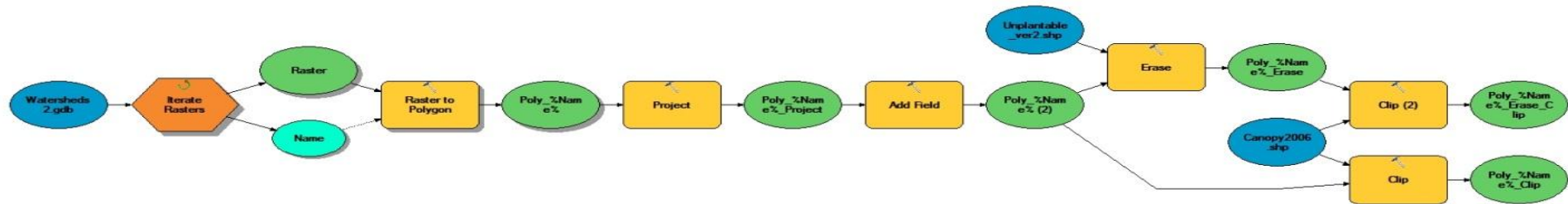
# Results

- ▶ Created a model from the EII water quality sites

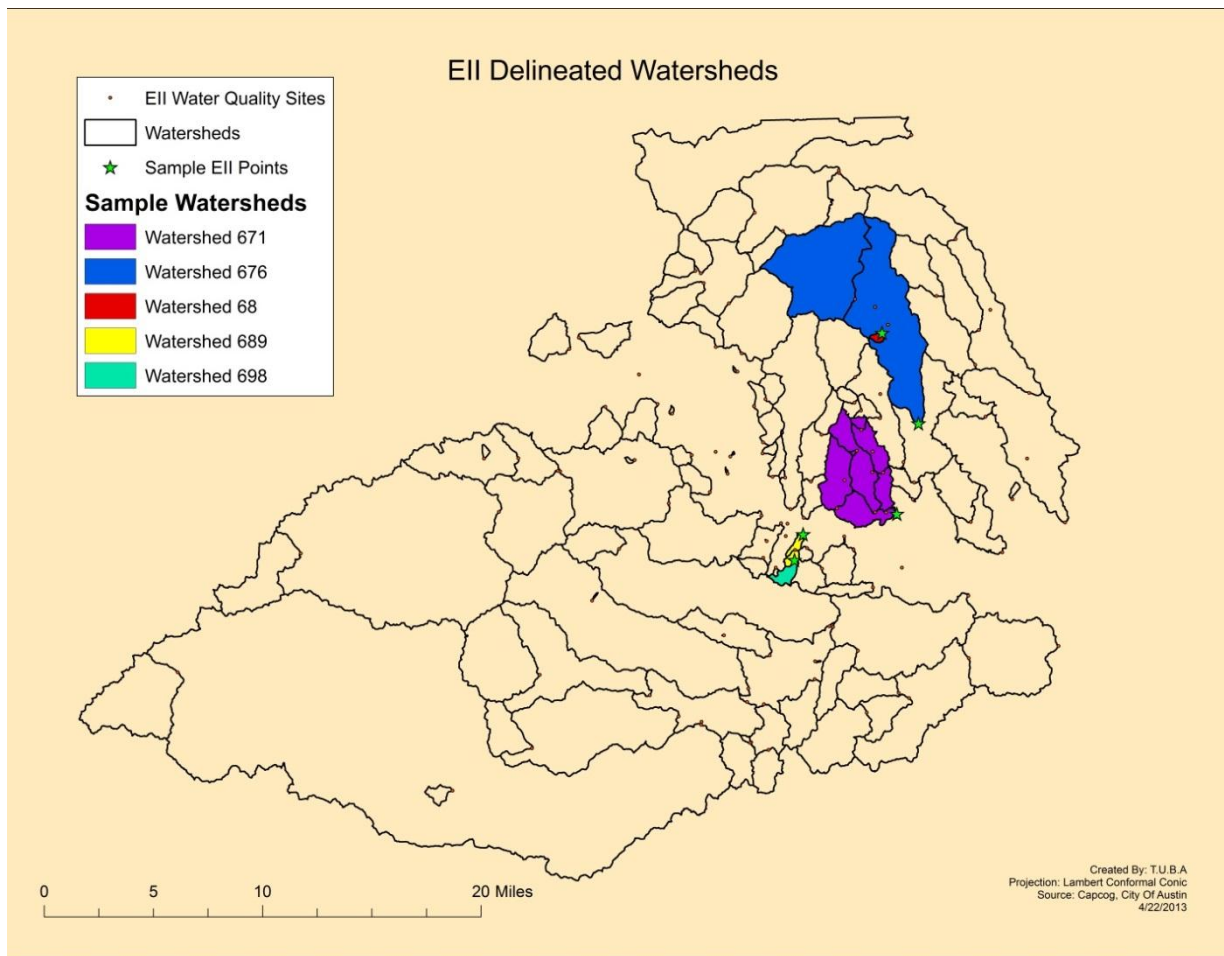


# Results

- ▶ T.U.B.A then clipped the canopy layer to the watersheds and plantable watersheds layers.

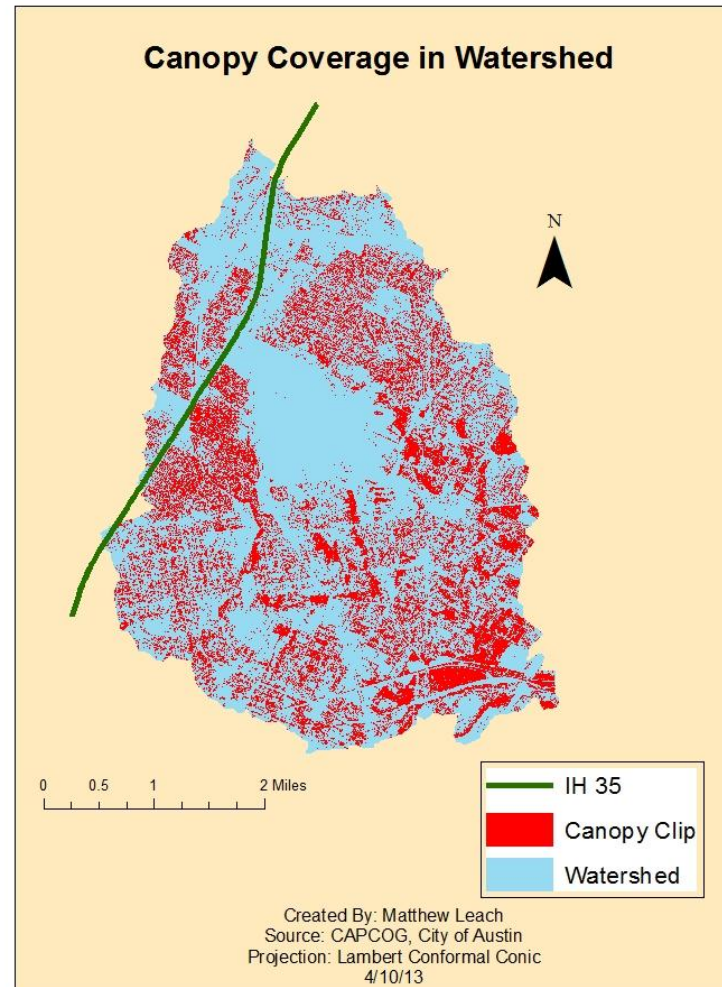


# Results



# Results

- ▶ Creating these layers helped T.U.B.A. find the percent coverage in each watershed.



# Results

- ▶ Below is a sample table of the results from this study.

Point Name	Area of Plantable Watershed (Sq. Ft.)	Area of Full Watershed (Sq. Ft.)	Canopy Coverage Area (Sq. Ft.)	Percent Coverage of Full Watershed	Percent Coverage of Plantable Watershed
Wshd_pt_671	242,848,575.93196	361,580,900.25486	102,818,032.88961	28.4%	42.3%
Wshd_pt_676	635,531,530.59709	893,456,264.82460	250,006,491.85051	28.0%	39.3%
Wshd_pt_68	3,994,021.93092	5,997,456.40123	2,227,740.18991	37.1%	55.8%
Wshd_pt_689	24,236,213.97366	38,818,492.66494	14,650,465.21703	37.7%	60.4%
Wshd_pt_698	12,692,963.68626	20,944,497.31345	5,948,736.57590	28.4%	46.9%

# Deliverables

- ▶ T.U.B.A. has compiled a DVD containing:
  - ▶ All Data
    - ▶ The DEM, fill, flow direction, flow accumulation, unique watersheds, unplantable layer, canopy layer, canopy clips of each watershed, and a table with all of our findings
  - ▶ All models used
    - ▶ The model to create the watersheds, the models for the pilot project, the model used to clip the canopy to each watershed, and the model used to find the plantable area of the watersheds.

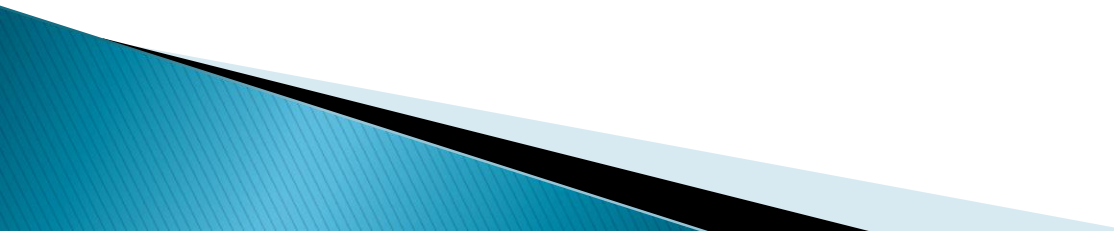
# Deliverables

- ▶ Project Proposal, Progress Report, and Final Report (with corresponding presentations)
  - ▶ Final maps
  - ▶ Poster
  - ▶ Website
- 

# Discussion and Conclusion

- ▶ Four unplantable calculations produced > 100% canopy coverage

Successful completion

- ▶ 121 EII points, 121 watersheds
  - ▶ Project can be replicated, updated, expanded
- 



Trees in Urban Areas



Questions?