Urban Tree Shade Analysis: A Visual Proposal


Sustainable Solutions of Central Texas

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Introduction

**Objective:** To create tree shade indices for the City of Austin's streets and sidewalks.

Index: A number giving the magnitude of a physical property or another measured phenomenon in terms of a standard

Background: Sustainable Solutions of Central Texas (SSOCT) has extensive experience using Geographic Information System (GIS) technology for similar projects.
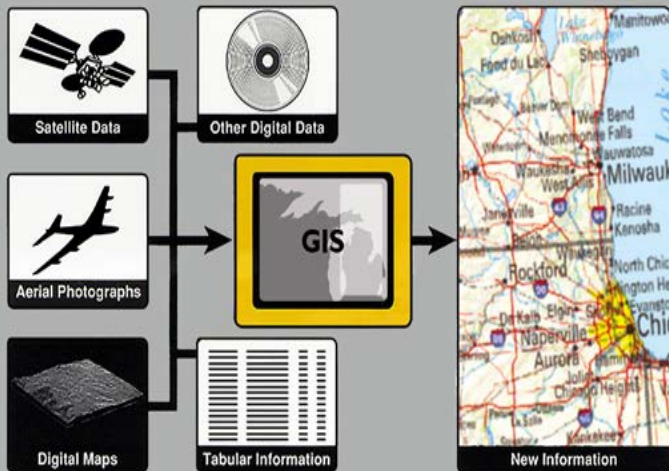
Motivation for Research: An increase in tree shade can increase the livability of an area. Tree shade might have an effect on road maintenance intervals, available moisture levels in soil, and crime rate.

Data
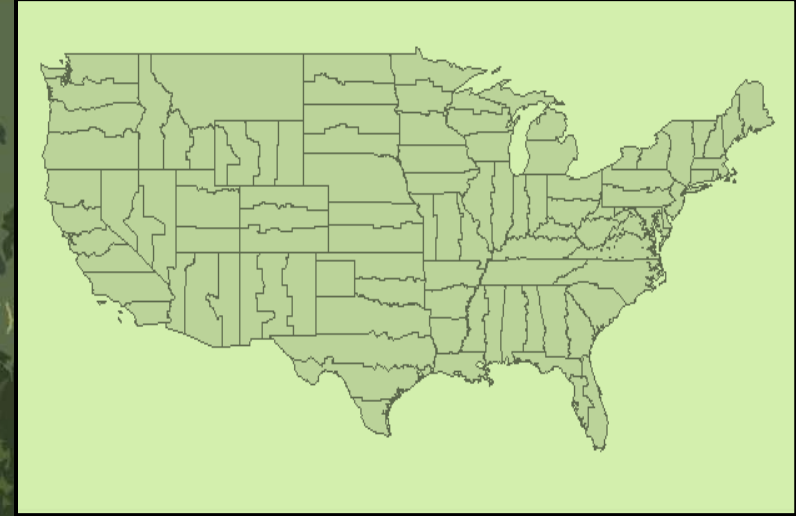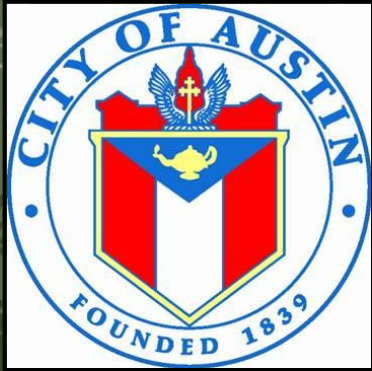
Coordinate System: The City of Austin uses the NAD 1983 Texas South Central FIPS 4203 State Plane coordinate system, therefore SSOCT will be using the same.

Data Layer	Source
Streets	City of Austin
Sidewalks	City of Austin
Tree Canopy	City of Austin
Watersheds	City of Austin
Planning Neighborhoods	City of Austin
COA Extra Territorial Jurisdiction	City of Austin

Methodology

Streets — Sidewalks → Join → Streets and Sidewalks

Neighborhoods — Canopy — Watersheds — Streets and Sidewalks

Streets and Sidewalks → Clip → N S/SW, N Canopy

Neighborhoods — Canopy → Clip

Canopy — Watersheds → Clip → W Canopy

Watersheds — Streets and Sidewalks → Clip → W S/SW

N S/SW, N Canopy → Join → Canopy & Streets/Sidewalks Neighborhoods → Clip → Final Layer → Select by attribute → % Canopy within Street & Sidewalk

W Canopy, W S/SW → Join → Canopy & Streets/Sidewalks Watersheds → Clip → Final Layer → Select by attribute → % Canopy within Street & Sidewalk

Budget

Sustainable Solutions of Central Texas – Project Budget

| Personnel	Hours	Total Hours	Hourly Rate	Total
Data Collection (1)	30.00	30.00	$30	$900.00
Data Analysis (1)	50.00	50.00	$45	$2,250.00
Project Manager	80.00	80.00	$80	$6,400.00
Assistant Manager	80.00	80.00	$60	$4,800.00
Total Personnel Cost				$14,350.00
Equipment	**Description**	**Cost**		**Total**
Supplies	3 workstations	$200.00	-	$600.00
Maintenance	3 workstations	$100.00	-	$300.00
Depreciation*				$277.00
Total Equipment Costs				$1,177.00
Data				**Total**
Purchased	-	-	-	$0.00
Software License	-	-	-	$0.00
Total Data Cost	-	-	-	$0.00
Total Expenses				
				$15,527.00

*Depreciation is based on value of all equipment ($4,000) over the life of the equipment (36 months) for time used (2.5 months).

Timeline

Activity	Initiation Date	Completion Date
Form teams	August 29	August 29
Data collection	August 31	September 21
Data pre-processing	September 12	October 5
Clipping layers into manageable forms	September 28	October 12
Data interpretation	October 12	October 17
Analysis of tree shade indices	October 17	November 14
Create website	November 14	December 5
Prepare final deliverables	December 5	December 12

Expected Findings and Implications

Expected Findings: The SSOCT is expecting to create tree shade indices on a block by block scale. The average tree shade will also be displayed by neighborhoods and watersheds.
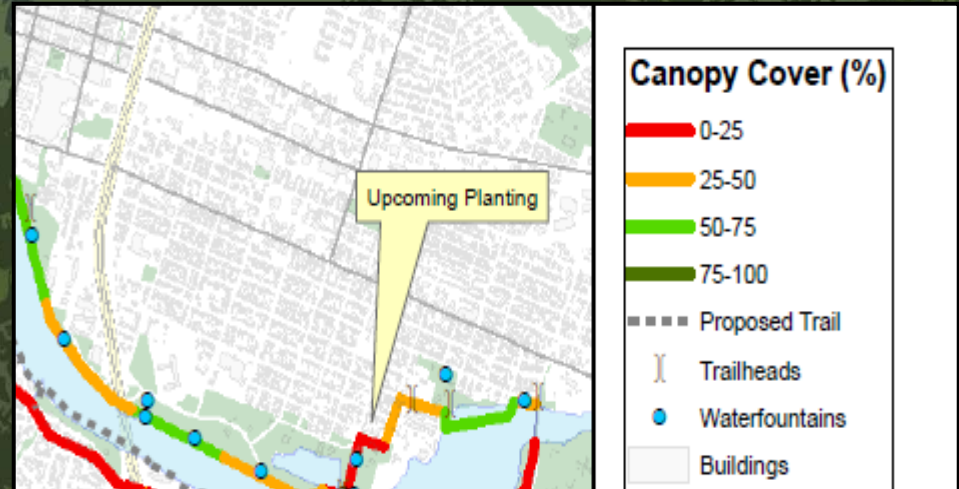
Implications: The newly created data will be used to identify possible correlations with road maintenance intervals, available moisture levels in soil, and crime rates. The Data will also be used to promote tree growth and Maintenance.

Study Limitations

Limitations: One limitation that the SSOCT has recognized is that tree shade varies throughout the day due to earth's rotation. Using only tree canopy data, our analysis will be limited to tree shade indices occurring specifically at solar noon. Another limitation relates to the fact that trees are planted, removed, and grow over time. Our analysis will be based on and limited to 2006 tree canopy data.

Final Deliverables

- Detailed final report (2 copies)
- Professional poster for display in the Geography Department
- Website (strictly for project display)
- CD (2 copies) containing
  - All data
  - Metadata
  - Proposal, Progress, and Final reports
  - Poster
  - Power Point presentation
  - Instructions on how to use CD (readme file)

Conclusion

By December 12th 2011, SSOCT will have completed and will be ready to submit its tree shade analysis for the City of Austin. Shade indices will be displayed by watersheds and by neighborhoods, including a more detailed view at a block by block scale.

References

Sample Shade Indices Image: Mast, Gregory

Questions?

Thank you all for paying attention. Feel free to ask any questions you might have.