Tree Ordinances as Predictors of Canopy Coverage

Andrew Koeser, BCMA, Ph.D.
University of Florida IFAS – Gulf Coast REC
Trees Provide Benefits

- Reduce surface flood water run-off
- Increase property values
- Provide shade & reduce ambient temperature
- Provide habitats for wildlife
- Lower levels of noise & dust
- Produce oxygen & reduce carbon dioxide
- Provide sense of place & community
- Encourage walking
- Reduce stress
Benefits Linked to Leaf Area
Canopy Coverage
Urban Tree Canopy
Urban Forest
Tree Ordinance
City of Atlanta

Understanding the requirements & your options

FREE with registration at treesatlanta.org
Tues., May 17, 2016 | Doors open at 6 pm with refreshments; Program starts at 6:30 pm

City of Hickory
Landscape Ordinance
And Tree Preservation Handbook
## TREE REMOVAL PERMIT

### Property Owner:

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
</table>

### Property Owners

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Phone</th>
<th>Email</th>
</tr>
</thead>
</table>

### Site Information

- Site plan showing location of the tree(s) to be removed
- Soil type and depth
- Site plan showing location of the tree(s) to be retained
- Site plan showing location of the tree(s) to be retained
- Site plan showing location of the tree(s) to be retained
- Site plan showing location of the tree(s) to be retained

### TO BE COMPLETED BY DEPARTMENT OF DEVELOPMENT SERVICES

- Site plan showing location of the tree(s) to be removed
- Site plan showing location of the tree(s) to be retained
- Site plan showing location of the tree(s) to be retained
- Site plan showing location of the tree(s) to be retained

**APPROVED**

<table>
<thead>
<tr>
<th>Action Notes &amp; Decision:</th>
<th></th>
</tr>
</thead>
</table>

**Date Approved**

**Date Denied**

**City & Zoning Manager**
Sen. Greg Steube declares war on local tree regulations

Senate bill would abolish tree protection laws in every Florida city

In 2000, a year in which Florida earned a reputation for divisive elections and razor-thin margins, 76 percent of Jacksonville voters came together in favor of one thing: citywide tree protection.

In 2000, a year in which Florida earned a reputation for divisive elections and razor-thin margins, 76 percent of Jacksonville voters came together in favor of one thing: citywide tree protection.

In January, the will of those voters could be undone by the Florida Legislature.

A bill proposed by Sarasota Republican Senator Greg Steube would eliminate local tree protection laws across the state – including in Jacksonville.
CS/SB 574: Tree and Vegetation Trimming and Removal

GENERAL BILL by Community Affairs; Steube

Tree and Vegetation Trimming and Removal; Providing that local governments are liable for electric utility restoration costs under certain conditions; prohibiting local governments from requiring permits or other approvals for vegetation maintenance and tree pruning or trimming within an established right-of-way managed by a water management district, water control district, or special district exercising chapter 298 powers, etc.

Effective Date: 7/1/2018

Last Action: 3/10/2018 Senate - Died in Environmental Preservation and Conservation

Bill Text: Web Page | PDF

Senate Committee References:
1. Community Affairs (CA)
2. Environmental Preservation and Conservation (EP)
3. Rules (RC)
DEFEND FLORIDA TREES

IT'S TIME TO PROTECT OUR LOCAL LAWS
OPPOSE HOUSE BILL 521 AND SENATE BILL 574 THAT WILL DEVASTATE COMMUNITIES

Florida HB 521 (Edwards) and SB 574 (Steube) would prevent local governments from protecting trees. These bills are a direct assault on the local democratic process and overrule established local laws.
Management affects canopy?
Keir Hamilton – Impact of Tree Protections on Municipal Canopy Coverage
Municipal Tree Care and Management in the United States:

A 2014 Urban & Community Forestry Census of Tree Activities
2014 Survey

- 109 questions
- Sent to 1727 communities (50 States)
- 87 in FL communities
- Truncated 53 question sent to non responders as follow-up
- 4 FL communities interviewed by authors
- 43 FL communities total
Survey Results

- 61% Trees in R.O.W. under community care
- > ¾ -1 or more ISA Certified Arborist
- > 2/3 – Government organized tree board
- > ¾ - Tree preservation ordinances
Survey Results

- > 50% Heritage or significant tree ordinances
- > 50% Removal permits on private property
- Majority had inventory but only 1/3 up to date
- < 50% Canopy coverage goals
Estimation of urban tree canopy cover using random point sampling and remote sensing methods

Ebadat G. Parmehr, Marco Amati, Elizabeth J. Taylor, Stephen J. Livesley

Landscape and Urban Planning

Tree and impervious cover in the United States
David J. Nowak, Eric J. Greenfield

Evaluating The National Land Cover Database Tree Canopy and Impervious Cover Estimates Across the Conterminous United States: A Comparison with Photo-Interpreted Estimates
David J. Nowak · Eric J. Greenfield
### Interpreter Agreement

#### 2010 Joint Meeting of the Forest Inventory and Analysis (FIA) Symposium and the Southern Mensurationists

**REPEATABILITY IN PHOTO-INTERPRETATION OF TREE CANOPY COVER AND ITS EFFECT ON PREDICTIVE MAPPING**

Thomas A. Jackson, Gretchen G. Moisen, Paul L. Patterson, and John Tipton

| • 90% agreement threshold (Jackson et al., 2010) |
| • Assessed by at least 2 interpreters |
| • 94.9% to 99.5% agreement |
| • AVG 97% agreement on all communities |
| • All cities surpassed 90% threshold |
Deerfield Beach 17.6%

Gainesville 63.3%

Project Average 33.7 (±1.5%)
Gainesville
63.3%

Urban Tree Canopy Coverage

- 18% - 28%
- 29% - 36%
- 37% - 63%

City of Gainesville Urban Forest Ecological Analysis 2016
Andreu et al., 2017

<table>
<thead>
<tr>
<th>Imagery Source</th>
<th>1996</th>
<th>2006</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landsat</td>
<td>58%</td>
<td>46%</td>
<td>47%</td>
</tr>
<tr>
<td>NAIP</td>
<td>-</td>
<td>50%</td>
<td>54%</td>
</tr>
</tbody>
</table>

Table 6. Tree canopy cover by year for Gainesville measured using remote sensing.
Urban Tree Canopy Coverage

- 18% - 28%
- 29% - 36%
- 37% - 63%

Tampa
32.8% – 38.6%

Table 8. Citywide tree cover 2006-2016.

<table>
<thead>
<tr>
<th>Year</th>
<th>Tree Canopy</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>31.7%</td>
<td>CI = 29.6 - 33.8 %</td>
</tr>
<tr>
<td>2011</td>
<td>34.4%</td>
<td>CI = 32.2 - 36.5 %</td>
</tr>
<tr>
<td>2016</td>
<td>32.3%</td>
<td>CI = 30.9 - 33.7 %</td>
</tr>
</tbody>
</table>

City of Tampa Tree Canopy and Urban Forest Analysis
2016

Landry et al., 2018
So Does Management Affect Canopy?
<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTC²</td>
<td>Response variable, percent (%) of the city covered by tree canopy</td>
</tr>
<tr>
<td>Housing density y</td>
<td>Housing units per square km</td>
</tr>
<tr>
<td>Median home value y</td>
<td>Median value ($ USD) of resident-owned housing units</td>
</tr>
<tr>
<td>House percent since 2010 y</td>
<td>Percent of total housing units constructed after 2010</td>
</tr>
<tr>
<td>House percent since 2000 y</td>
<td>Percent (%) of total housing units constructed after 2000</td>
</tr>
<tr>
<td>House percent since 1990 y</td>
<td>Percent (%) of total housing units constructed after 1990</td>
</tr>
<tr>
<td>Maintains Rights-of-ways (ROW) x</td>
<td>Who is responsible for maintaining trees in rights-of-way (e.g., street trees between the sidewalk and curb/alley trees)</td>
</tr>
<tr>
<td>ISA Certified Arborist - yes x</td>
<td>Community employs at least one International Society of Arboriculture (ISA) Certified Arborist credential holder</td>
</tr>
<tr>
<td>Four-year degree - yes x</td>
<td>Community employs at least one person with a four-year degree related to tree care</td>
</tr>
<tr>
<td>Tree board - yes x</td>
<td>Community has a government-authorized board to help develop/administer tree management policy</td>
</tr>
<tr>
<td>Tree preservation ordinance xw</td>
<td>Community has an ordinance requiring the preservation of trees during development</td>
</tr>
<tr>
<td>Removal permit ordinance xw</td>
<td>Community has an ordinance restricting tree cutting on private property</td>
</tr>
<tr>
<td>Heritage tree ordinance xw</td>
<td>Community identified and preserves heritage/significant trees</td>
</tr>
<tr>
<td>Tree inventory - yes x</td>
<td>Community has a record of public trees within its jurisdiction</td>
</tr>
<tr>
<td>Canopy goal - yes x</td>
<td>Community has a goal for enhancing or maintaining % tree canopy coverage</td>
</tr>
</tbody>
</table>

²Source: Aerial Imagery UTC analysis
³Source: U.S. Census Bureau (2018)
⁴Source: Hauer and Peterson (2016)
⁵Source: Municipal ordinance publishing websites: American Legal Publishing Corporation 2018; Municode 2018
## Housing Density

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>P value</th>
<th>95% CI Lower</th>
<th>95% CI Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>37.2696</td>
<td>4.1194</td>
<td>&lt;0.0001</td>
<td>28.9303</td>
<td>45.6089</td>
</tr>
<tr>
<td>Housing density</td>
<td>-0.0021</td>
<td>0.0008</td>
<td>0.0116</td>
<td>-0.0038</td>
<td>-0.0005</td>
</tr>
</tbody>
</table>

- *Negative relationship* is both intuitive and in line with past research.
Heritage Tree Ordinance

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>P value</th>
<th>95% CI Lower</th>
<th>95% CI Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>37.2696</td>
<td>4.1194</td>
<td>&lt;0.0001</td>
<td>28.9303</td>
<td>45.6089</td>
</tr>
<tr>
<td>Heritage tree</td>
<td>6.7207</td>
<td>3.2827</td>
<td>0.0476</td>
<td>0.0751</td>
<td>13.3664</td>
</tr>
</tbody>
</table>

- 6.7% increase in canopy when in place
- Protect large trees during development
- Important in rapidly-urbanizing areas
- Ensure large areas of canopy stay intact
- Large stature trees genetic lottery winners
Big Trees Bring Benefits

- Large trees = greater canopy & benefits
- Represent small fraction of forest population
- Live oak & Laurel oak account for 27% of leaf area
- Only represent 11% population
- Largest % of trees found in highest DBH classes

2016 i-Tree Eco study Tampa, FL

**Figure 13.** Diameter (DBH) distribution of trees (without mangroves) with number of species present in each DBH class.

**Figure 17.** Percent leaf area and population percentage by species.
State tree bill stalls but not chopped yet

BY KEVIN WADLOW
FEBRUARY 06, 2018 07:31 PM

Native trees provide shade in a Key Largo shopping center. Local requirements to protect native trees could be curtailed under a proposed state law. KEVIN WADLOW KEYNTER

A Florida Senate bill seeking to prohibit local regulation of trees on private property stalled Tuesday but the controversial proposal could still take root.

The Senate’s Community Affairs Committee ran out of time at its Tallahassee session Tuesday to consider SB 574, which seeks to prevent local governments statewide from enacting laws that affect trees on private property.
Conclusions

• Many ecosystem services linked to tree canopy coverage
• Large trees contribute more than smaller sized trees
• Ordinances enacted to protect trees often controversial (private property)
• Measurable impacts associated with some form of tree protection
Questions ?
Extra slides
Sen. Greg Steube declares war on local tree regulations

Sarasota Republican files bills to abolish tree protection boards

Sen. Greg Steube, R-Sarasota, wants to take a chain saw to local tree ordinances.

Steube's SB 574 would overturn municipal rules on the "trimming, removal or harvesting of tree and timber on private property." It would nullify tree ordinances statewide, including those protecting Tallahassee's iconic canopy roads.

"There is not one good thing that will come out of this bill," said Ann Billingsmaier, an arborist and activist devoted to keeping Tallahassee shady. Billingsmaier wrote the city's first tree ordinance and was a three-term chair of the Canopy Roads Citizens Committee.

"This is a very shortsighted proposal that flies in the face of any logic or environmental health," said Billingsmaier.

Steube stumbled onto the tree issue when he built a three-car garage in Sarasota County. He told the Herald-Tribune he was irked when he found out he had to pull a permit to clear the lot and then pay to have the debris hauled away.

Senate bill would abolish tree protection laws in every Florida city

In 2000, a year in which Florida earned a reputation for divisive elections and razor-thin margins, 76 percent of Jacksonville voters came together in favor of one thing: citywide tree protection.

In 2000, a year in which Florida earned a reputation for divisive elections and razor-thin margins, 76 percent of Jacksonville voters came together in favor of one thing: citywide tree protection.

In January, the will of those voters could be undone by the Florida Legislature.

A bill proposed by Sarasota Republican Senator Greg Steube would eliminate local tree protection laws across the state – including in Jacksonville.
Senate bill would abolish tree protection laws in every Florida city

In 2000, a year in which Florida earned a reputation for divisive elections and razor-thin margins, 76 percent of Jacksonville voters came together in favor of one thing: citywide tree protection.

Author: Anne Schindler
Published: 7:50 PM EST December 11, 2017
Updated: 7:50 PM EST December 11, 2017

In 2000, a year in which Florida earned a reputation for divisive elections and razor-thin margins, 76 percent of Jacksonville voters came together in favor of one thing: citywide tree protection.

In January, the will of those voters could be undone by the Florida Legislature.

A bill proposed by Sarasota Republican Senator Greg Steube would eliminate local tree protection laws across the state – including in Jacksonville.
City, county officials warn of bill stripping local control of protecting trees

City and county officials are worried a proposed state bill stripping them of the ability to protect trees could have a devastating effect on the urban forest.

By Steven Lemongello · Contact Reporter
Orlando Sentinel
Canopy Coverage Results

- 17.6% in Deerfield Beach (S. Florida)
- 63.3% in Gainesville
- 35.7% in Tampa
- 33.7% (± 1.5%) AVG
- 97% AVG interpreter agreement
Urban Trees = Public Assets?

Photo credit: Gitta Hasing