Urban Forests

trees, forests, management, health, and services

TreeKeeper Training

Trees Atlanta Kendeda Center
August 15, 2009

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Urban Forestry South
Athens, GA

Presentation to Trees Atlanta TreeKeepers on August 15, 2009 at the Kendeda Center.

This presentation focuses on an overview of urban forestry and urban forest management, challenges in urban settings, and the environmental services that we can expect if we work diligently.

Presentation Objectives

- Understand the concept of urban forestry & urban forest management
- Understand the environmental services that urban forests provide in urban settings
- Look at Atlanta's tree canopy – Identify threats & stressors
- Understand how urban environments affect trees

The audience (students) will understand these four key ideas…

Presentation Agenda

- The setting – Piedmont Crescent
- Urban forestry, urban forest management, arboriculture
- Essential environmental services
- Tree canopy, threats, and stressors
- Healthy trees in urban settings – the basics

To meet these objectives, the presentation will discuss and present these five basic elements…

Piedmont Crescent

- 2007-2008 regional study
  - American Forests
  - http://www.youtube.com/watch?v=r6p_f6IOeDY
- Concepts
  - Human Network
    - Migration
  - Transportation
  - Gray & Green Co-existence

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A recent study by American Forests focused on the role human settlement had (has) on the development, and use of the region.

This historic human impact (migration, transportation) is still influencing our decisions, and more importantly, these patterns are still playing out in our day-to-day problems, management, and decisions.

- density
- sprawl (transportation)
- landuse
- water
- environmental justice
- environmental degradation

The *nature & human network* concept being proposed calls for a closer connection between our objectives, planning and decisions, and the natural setting that we live in. Urban forestry is one component of that concept.

Urban Forests & Forestry

- Trees – woody plants, single or multiple stem with some minimum size
- Forests – aggregations or collections of trees; may or may not be directly tied to the landscape (e.g. bottomland hardwoods); may or may not be natural; often implies management for wood products

A few definitions…

- trees are defined within your own management context
- forests are defined within your management setting

Urban Forests & Forestry

- Urban Forests – forests in our urban and developed areas
- UF Management – discipline that sets goals/objectives, assesses the components (inventory), identifies needs, and creates a means for attaining the desired outcomes (product or service related)

More definitions…

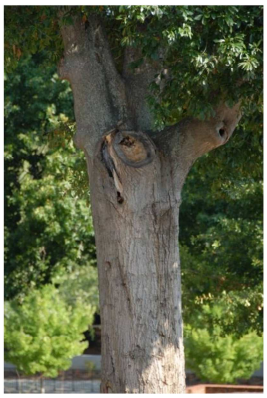
• an urban forest exists within *developed* areas (human settlement), and within managed landscapes (i.e. not natural)

• community forestry – typically European concept of more traditional forest management within urbanized areas

• urban forest (UF) management – a *planned* approach

Urban Forests & Forestry

- Arboriculture - the science and art of caring for trees (culture)



- **Urban forestry provides arboriculture with context…**
- **Arboriculture is the *means* to urban forestry's *ends*…**

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More definitions…

• arboriculture – the culture of trees (plant, prune, assess, treat, remove, plant)

Benefits of Trees

- Benefits - usually implies that we are receiving something that we are not entitles to…
- Service – something produced and consumed

The standard dictionary definitions of these words are revealing!

Environmental Services

- Benefits Listed
  - http://www.treesatlanta.org/BenefitsofTrees.aspx
- Environmental
  - Air (carbon)
  - Water (quality and quantity)
  - Soil (erosion, heavy metals, OM)
  - Temperature (health & energy implication)
  - Biodiversity
  - Noise abatement

See URL for nice discussion.

More recently (last 10 years) speaking more of *services* provided by the urban forest

Environmental Services

- Environmental
  - Air (carbon)
  - Water (quality and quantity)
- Social
  - Human interaction (crime, self-esteem)
- Human Health
  - Physical
  - Psychological

Short list of the important *services*; they encompass three areas:

- the physical environment
- societal (the community)
- human health impacts

Tree Canopy

- What's the big deal?
  - Leaves!
- The picture in Atlanta, at the interface, and exurban counties
  - http://narsal.uga.edu/atl_landcover/landcover.html (1992-2001)
  - http://narsal.uga.edu/glut.html (1991 - 2005)
  - http://narsal.uga.edu/urbancanopy/urbancanopy.php (1991 - 2001)

Why be concerned about canopy?

• an index and the basis for nearly all services and benefits

Most recent analysis of the Atlanta area (and statewide) tree canopy

Tree Canopy

- Tools to monitor the changes
  - Forest
    - Canopy measurement
      - NAIP aerials; GIS Clearinghouse
    - Leaf Area Index (LAI)
    - Vegetation change
    - Policy
  - Tree
    - Adopt, follow, and encourage *standards*
    - Observe

Monitoring canopy and more importantly, canopy change.

An index to assess UF management success.

Tree canopy:

- at the forest level
  - percent
  - LAI (“rates” the canopy; i.e. not all canopy is created equal)
- over time (temporal)
- at the community legal level
- at the tree level

Tree Canopy

Calculating Canopy

- Define & measure area
- Select sample points
- Calculate factor
- Canopy – Yes/No
- Do the math

- Percent canopy

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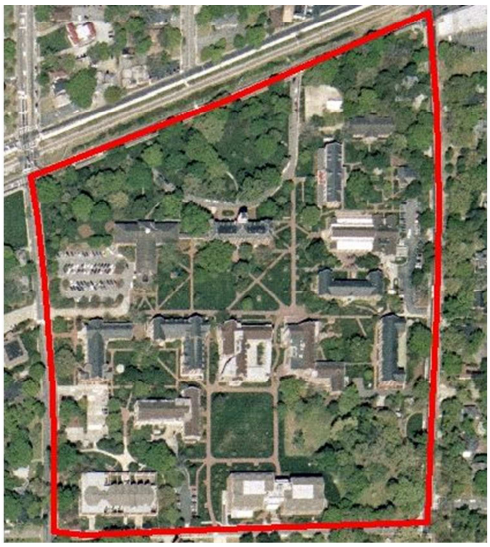
A simple, and effective way to monitor canopy change over time; five steps.

Tree Canopy

Calculating Canopy

- **Define & measure area**
- Select sample points
- Calculate factor
- Canopy – Yes/No
- Do the math

- Percent canopy



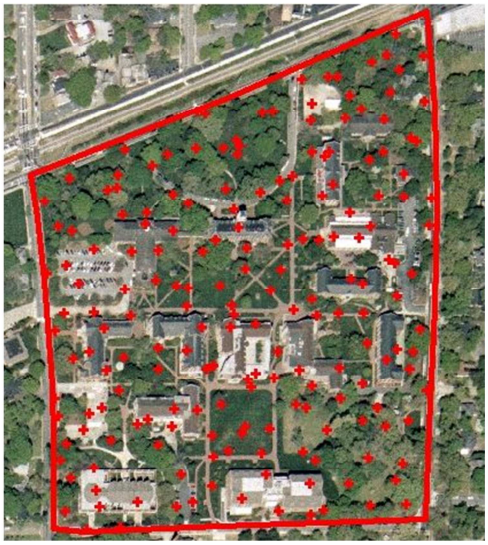
Delineate the area of interest (AOI).

Tree Canopy

Calculating Canopy

- Define & measure area
- **Select sample points**
- Calculate factor
- Canopy – Yes/No
- Do the math

- Percent canopy



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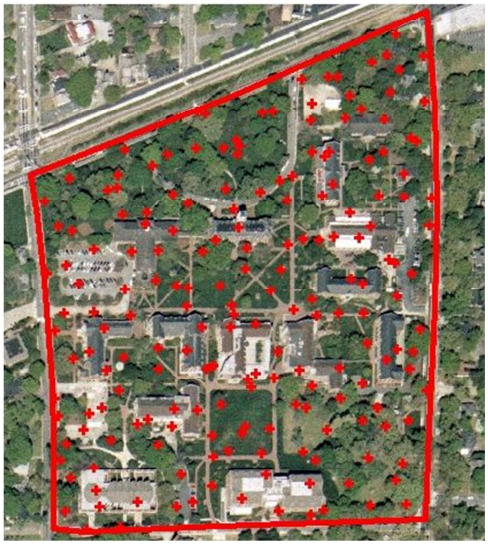
Randomly select canopy assessment points (GIS approach).

Tree Canopy

Calculating Canopy

- Define & measure area
- Select sample points
- **Calculate base**
  - **190 points**
- Canopy – Yes/No
- Do the math

- Percent canopy



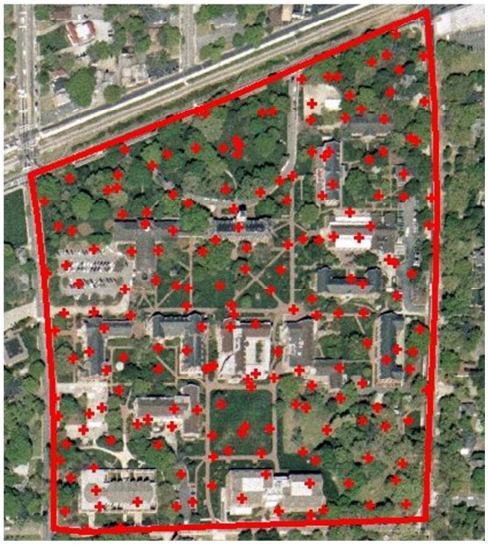
Count number of assessment points (the base number in the math section).

Tree Canopy

Calculating Canopy

- Define & measure area
- Select sample points
- **Calculate base**
  - **190 points**
- **Canopy – Yes/No**
- **Do the math**

- Percent canopy
  - **63 canopy points of 190**
  - **63/190 – 33% canopy**



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Assess each point:

- is it tree canopy (yes/no)

Do the math:

- sum number of canopy points
- divide by base
- express as percentage

Repeat as necessary

Healthy Trees

- An urban forester's guest!
  - Healthy trees = maximum services
  - Strive for efficiency of effort & economics
- In urban areas, intervention
  - Replace natural cycles (nutrient, water, OM)
  - Protect
  - Regenerate
  - Manage risk

Trees, and canopy without health wastes time and money.

In urban forestry, the manager must intervene (i.e. intensive management).

The Urban Setting

- Soil
  - Structure
  - Compaction
  - Contamination
  - Fertility
- Planting Environment (the site)
  - Restrictions (infrastructure)
  - Drainage
- Physical
  - Damage (construction, other)
- Change
  - Constant

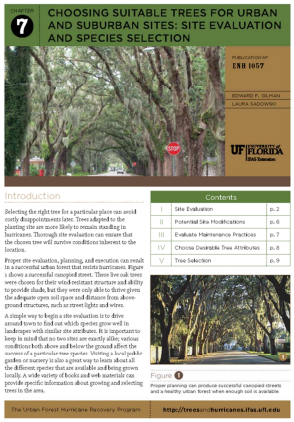
What is so difficult about growing trees in urban areas!

What's easy?

Healthy Trees

Dr. Ed Gilman University of Florida http://hort.ifas.ufl.edu/woody/

1. **Site Evaluation**
2. **Species Selection**
3. **Tree Selection at Nursery**
4. **Planting**
5. First Year Care
6. Annual Care
7. **Young Tree Structural Pruning**
8. **Mature Tree Care**



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Dr. Ed Gilman with the University of Florida (Environmental Horticulture) has developed an excellent series of standards that are applicable throughout the southern region. These include:

- site selection (evaluation)
- species selection
- tree selection
- planting
- young tree structural pruning
- mature tree care (pruning)

To this list we add:

- first season care
    - mulch
    - water
- annual care
    - root collar
    - weed control
    - mulch
    - pH monitoring
    - other soil/site issues

Healthy Trees

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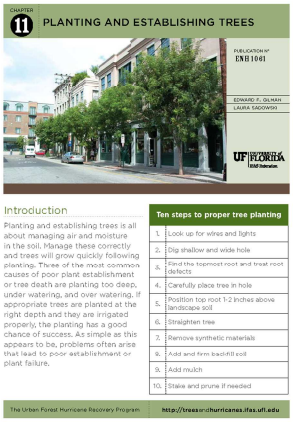

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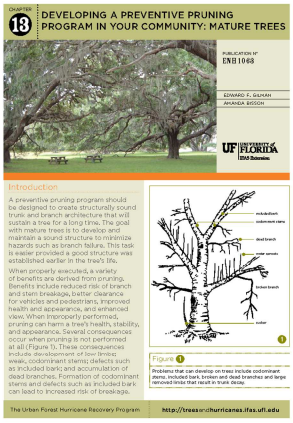

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Dr. Ed Gilman University of Florida
http://hort.ifas.ufl.edu/woody/

Discussion

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www.UrbanForestrySouth.org

www.UFST.org

www.UrbanTreePhenology.org

www.FirePerformancePlantSelector.org

Also, James Urban, Up by Roots 2008

Questions, and comments…

Urban Forests

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UGA Campus, Athens, GA 2009

Campus setting.

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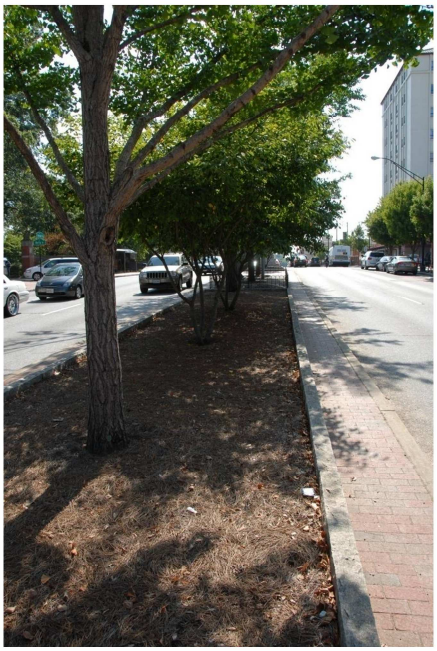
Street trees



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8’ median planting

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Shaded business district.

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Downtown raised planter

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Size/age diversity.

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Replacements & addiitons.

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Construction!

Note rubber protection mats for fire hydrant!

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Shade for construction crews.

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Infrastructure conflicts await.

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Infrastructure conflicts.

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Root collar exposed.

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Planted deep (by 4”)

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UGA Campus, Athens, GA 2009

No root collar exposed.