



# Developing and Managing an Urban Forestry Program for Public Works



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## Today's Moderator...



**Jennifer Gulick**  
Davey Resource Group  
Walton, KY



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## Today's Speakers...



**Rachel Barker**  
Deputy Director Public Services  
City of Columbus, GA



**Keith Cline**  
Program Manager  
Urban and Community Forestry  
U.S. Forest Service  
Washington DC



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## Today's Speakers...



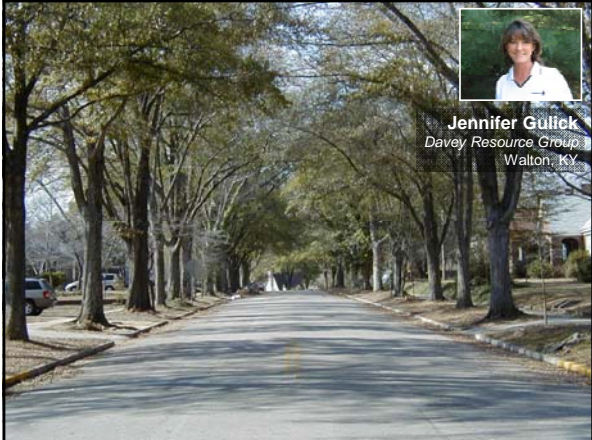
**Gene Hyde**  
City Forester  
City of Chattanooga, TN




**Andy Hillman**  
City Forester  
City of Ithaca, NY




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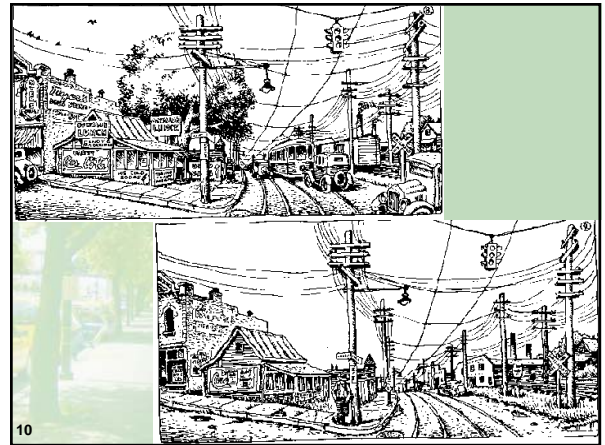
**Jennifer Gulick**  
Davey Resource Group  
Walton, KY



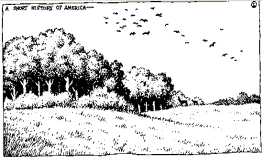
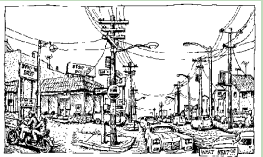
By: Robert Crumb



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**Our Cities Are Still Part of a Natural System**

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## So What!?!



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## Trees are Infrastructure



- Roads
- Sidewalks
- Water
- Power
- Sewer
- Communication
- TREES

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## The Benefits of Urban Forests

- Energy Conservation
- Stormwater Capture
- Carbon Sequestration
- Ozone Reduction
- Oxygen Production
- Real Estate Value
- Quality of Life



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## Trees and Energy Conservation



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## Stormwater Runoff

- Impervious surfaces like parking lots, roads and rooftops cause rain to run off, greatly increasing storm water management costs.



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## Stormwater Runoff

- Trees intercept rain and slow runoff. Greenspaces capture water, filter it and slowly release water, thereby reducing stormwater management costs.



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## Carbon Sequestration

- For every ton of wood produced, about 1.8 tons of carbon dioxide is removed from the atmosphere.



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## Trees & Ozone

- Vehicle emissions and increased temperatures from urban heat islands cause increased ground level ozone



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## Trees & Air Quality

- Trees help to cool urban heat islands to reduce the formation of smog and ozone, and absorb many air pollutants.



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## Quality of Life



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I get it! Now, where can I get help?



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## Project Background

- National Urban & Community Forestry Council Grant:  
*“Urban Forest Management and Public Works: Improving Communication and Building Capacity”*
- Partners:




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## Process & Products

- Literature Review
- Model City Identification
- Urban Forestry Components
- Best Management Practices Guides
- Outreach
  - Webcasts, Presentations at APWA Congress, and State meetings, SMA educational programs, BMP guides and information



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**Rachel Barker**  
Deputy Director Public Services  
City of Columbus, GA



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## Urban Forest Management Plans

- All communities manage urban trees




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## Urban Forest Management Plans

- Levels
  - Young
  - Growing
  - Mature




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## Tree Inventories



- “Windshield”
- Partial
- Complete




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## “Windshield Inventory”

- Urban Forester knows what they got out there
  - Planting spaces
  - Problem trees and areas
  - Routinely and systematically monitor trees in community

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## Partial Inventory

- 100% of the public trees in a specific area
  - Historic areas
  - Transportation corridors
  - Wards or Zones



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## Complete Inventory

- A 100% inventory of all public trees and potential planting sites
  - Located and assessed
  - GIS/GPS option




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## Inventory Completion Options

- In house
  - 
  - 
  - 
- Consultant
  - 
  - 
  - 



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## Software programs to manage inventory data

- Variety of programs available
- Work orders
- Report generation, etc.




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## Tree Maintenance Plan

- Tree Maintenance
  - Removal and pruning prioritized
  - Stump grinding
  - Fertilization
  - Insect and disease treatment
  - Grate and guard repair
  - Mulching
  - Watering





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## Tree Planting Plan

- Planting locations identified - inventory data
- Species options
- Maintenance plans for newly establishing trees
- Technical information on proper tree planting techniques




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## Tree Risk Management Plan

- Common goals
- Increase public safety
- Operate more efficiently



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## Tree Risk Management Plan: Increase Public Safety

- Conduct Routine Monitoring
- Conduct Post Storm Inspections





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## Tree Risk Management Plan: Increase Public Safety

- Incorporate the Municipal Arborist in the Plan Review process
- Improve project coordination and implementation with Utilities
- Develop closer involvement of the Municipal Arborist in city Infrastructure improvements (e.g. sidewalks)








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## Polling Question #2

How does your community manage its tree resources both during and after a storm event?

- We pick up debris as quickly as possible – no organized plan and little thought to the post-storm condition of the tree resources.
- We have an organized Emergency Storm Response Plan (ESRP) which includes some elements of involvement by the City Arborist for tree removal and remediation.
- We have a detailed and organized ESRP that does include the City Arborist in all phases of cleanup, tree removal, and remediation.



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## Tree Risk Management Plan: Operate More Efficiently

### Develop an Emergency Storm Response Plan (ESRP)

- Purpose
  - Clarify the roles of personnel
  - Establish uniform operating procedures
  - Track tree damage and follow up maintenance needs





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## Tree Risk Management Plan: Developing the ESRP

### Elements to include:

- Organizational structure and storm responsibilities
- Resource preparedness
- Receiving and dispatching calls
- Prioritizing Ranking of Storm Calls
- Private trees?
- Brush removal and area wide clean up
- Work order processing
- Communications
- Post Storm Tree Assessment
- Evaluation and documentation





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## Tree Board or Advisory Council

- Assisting and advisory
- Education
- Interact with elected officials
- Generate funds



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## Public Relations and Education

- Increase support for program
- Increase understanding
- Confidence
  - Arbor Day events
  - Seminars
  - Youth activities/outreach programs



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## Urban Forest Cost/Benefit Analysis

- Valuable municipal resources
- Justify funding
- Build Public Support
- Quantify the benefits of the urban forest
  - Energy reduction
  - Stormwater management
  - Property values
  - Air Quality
- I-tree suite
- Other publications – Ex. Piedmont Community Tree Guide – Benefits, Costs, and strategic planning



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**Keith Cline**  
Program Manager  
Urban and Community Forestry  
U.S. Forest Service  
Washington DC

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## Today's Topics



- *Federal Policies*
- *State Role*
- *Local Public Policy Tools*
  - Tree ordinances
  - Comprehensive plans
  - Zoning ordinances
  - Subdivision regulations
  - Land development regulations
  - Performance standards

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## Federal Policies and Regulations

- Lack of National Urban Tree and Forest Regulation
- Cooperative Forestry Assistance Act of 1978
  - Created Urban and Community Forestry Program
  - Provides Financial, Technical and Educational Assistance to communities

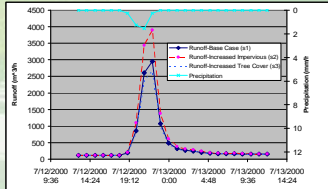


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## Federal Policies and Regulations

- Environmental Regulations
  - EPA clean air standards (Clean Air Act)
    - Trees in State Implementation Plans
  - EPA clean water requirements (TMDL;MS4 regulations – storm water discharge) (Total Max Daily Load)



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## National Initiatives and Policies

- United States Conference of Mayors
  - Climate Protection Agreement
  - 600 U.S. Mayors
  - Pledge to reduce carbon dioxide emissions

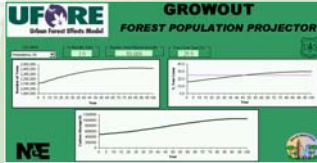


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## National Initiatives and Policies

- Carbon credits and trading



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## State Policies and Regulations

- State enabling legislation
  - Home Rule vs. Dillon Rule
  - Comprehensive Planning
  - Utilities oversight
  - Forestry and Landscape practices



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## State Policies and Regulations

- Environmental Regulations
  - Erosion and sediment control
  - Air and water quality
  - Transportation



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## Local Public Policy Tools

- Tree Ordinances
  - Public and/or private property
  - Simple or comprehensive
  - Recognition of the benefits of trees
  - Trees and development
  - Standards and guidelines for Management

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## Local Public Policy Tools



- Tree Ordinances
  - Street Tree
  - Tree Preservation



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## Local Public Policy Tools

- Tree Ordinances – Lessons learned
  - One size doesn't fit all
  - Stakeholders participation and buy-in
  - Unreasonable = Unworkable/unenforceable
  - Ordinance integration
  - Specifications and Inspections

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## Local Public Policy Tools

- Ordinance Sources
  - Urban Forestry South Expo – [www.urbanforestrysouth.org](http://www.urbanforestrysouth.org)
  - Greenlaws Website – [www.greenlaws.lsu.edu/](http://www.greenlaws.lsu.edu/)
  - Tree City USA Bulletins – [www.arborday.org/programs/treecitybulletinsbrowse](http://www.arborday.org/programs/treecitybulletinsbrowse)
  - On-line ordinance clearing houses

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## Local Public Policy Tools

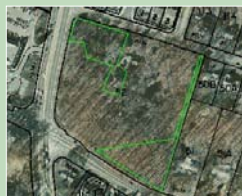
- Comprehensive planning
  - Directs future growth and community development
  - Drives ordinances and policies: land-use planning, zoning ordinances, natural resources, transportation planning
  - Impacts future tree cover



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## Local Public Policy Tools

- Zoning Ordinance, Process
  - Regulation of land-use, land-use classification
  - Point of greatest impact on tree preservation
  - Buffers between land-uses
  - Landscape and tree cover requirements



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## Local Public Policy Tools

- Rezoning Process
  - Change in zoning district
  - Negotiated process
  - Tree issues often a driving force



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## Local Public Policy Tools

- Subdivision Regulations
  - Site plan review
  - Land disturbance
  - Tree cover and tree protection



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## Local Public Policy Tools

- Land Development Regulations
  - Site plan review
  - Landscaping and tree cover requirements
  - Tree protection
  - Erosion and sediment control
  - Storm water management



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## Local Public Policy Tools

- Land Development Regulations
  - Site inspections
    - Landscape
    - Tree protection
    - Erosion and sediment control



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## Local Public Policy Tools

- Performance standards
  - Public facilities manual
  - Landscape requirements and specifications
    - Realistic
    - Some flexibility
    - Industry standards (ANSI Z60.1, Z133.1, A300)
    - Inspection, inspection, inspection

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## Q&A

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## Polling Question #3

How do you accomplish tree care activities (such as pruning) within your community?

- A. Full time in-house staff
- B. Part-time in-house staff
- C. Full Time contractors
- D. Part-time contractors
- E. Some combination of the above
- F. Not at all, that's why I'm sitting through this exercise


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**Gene Hyde**  
City Forester  
City of Chattanooga, TN

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## Crew Size and Configuration

Typically the most optimal size for a tree crew is three people:

1. Crew Leader
2. Trimmer
3. Groundworker



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## Crew Size and Configuration


Sometimes a two-person crew can be utilized:

1. Trimmer
2. Groundworker

A two-man crew is sufficient for ground pruning on small trees.

This configuration will **not** work for standard production work.

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## Supervision (two levels)

- Forestry Supervisor – comparable to a General Foreman (GF) in private industry or a first sergeant in the Army.
- City Forester, Urban Forester, Tree Warden, Community Forester, City Arborist

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## Pruning Maintenance Needs

|                  | 0-6" | 7-12" | 13-24" | 25-36" | 36"+ |
|------------------|------|-------|--------|--------|------|
| Small            | 117  | 29    | 1      | 0      | 0    |
| Med.             | 188  | 165   | 74     | 0      | 0    |
| Large            | 622  | 187   | 172    | 23     | 8    |
| Total Trees      | 927  | 381   | 247    | 23     | 8    |
| Man hrs to prune | 1.0  | 1.4   | 3.5    | 6.3    | 7    |
| Total Time       | 927  | 533   | 865    | 145    | 56   |

Total maintenance hours = 2,470 Divided by 3 = 823 man hrs.  
823 x \$82.42 = \$67,832 to contract out a one-time pruning.

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## Qualifications

Groundworker:

- High School Diploma or GED.
- Ability to perform manual labor.
- Possess a valid drivers license.

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## Duties and Responsibilities

### Groundworker:

- Assists with job site setup.
- Feeds brush into the chipper or stacks brush for pick-up.
- Flags traffic.
- Other tasks as assigned.

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## Expect to Pay for a Groundworker:

- \$21,000 – 32,000/yr.



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## Qualifications

### Trimmer:

- High school diploma or GED.
- Minimum one year experience on a tree crew. Good working knowledge of proper tree care practices.
- Ability to perform rope and saddle work.
- Possess a valid CDL.
- International Society of Arboriculture (ISA) Tree Worker Certification is a plus.

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## Duties and Responsibilities

### Trimmer:

- Performs duties of the crew leader in his/her absence.
- Drives and operates bucket truck, chipper.
- Performs pruning and removal work.
- Helps set up safe work zones.
- Maintains equipment.
- Completes reports, paperwork.
- Communicates with supervisors.

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## Expect to Pay for a Trimmer:

- \$23,500 – 36,100/yr.



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## Qualifications

### Tree Crew Leader:

- High school diploma or GED.
- Minimum one – two years experience as a trimmer or a tree crew leader.
- Good working knowledge of proper tree care practices.
- Possess a valid CDL.
- ISA Certified Arborist status is a plus.

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## Duties and Responsibilities

### Tree Crew Leader:

- Coordinates daily work activities of the crew.
- Ensures work is carried out safely, efficiently.
- Applies various safety standards, organizational policies, and applicable laws.
- Completes paperwork.
- Communicates with higher levels of mgt.
- Performs PR with the general public.

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## Expect to Pay for a Crew Leader:

- \$28,500 – 43,700/yr.



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## Qualifications

### Forestry Supervisor:

- High School Diploma or GED.
- Five years minimum experience in this field including supervisory experience.
- Possess a valid CDL.
- ISA Certified Arborist.

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## Duties and Responsibilities

### Forestry Supervisor:

- Directs and counsels assigned staff and contract crews.
- Investigates and prioritizes service requests.
- Enters and retrieves data on computer.
- Responds to after hours emergency calls as needed.
- Trains individuals/ crews as necessary.
- Completes forms, prepares reports.
- Coordinates with other organizations.
- Communicates with chain of command.

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## Expect to Pay for a Forestry Supervisor:

- \$30,000 - \$46,000/yr.



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## Qualifications

### Urban Forester:

- Bachelors degree in forestry, horticulture, landscape horticulture or a related field.
- 3-5 years of direct experience in the field.
- Possess a valid drivers license.
- State certified pesticide applicator.
- ISA Certified Arborist with Municipal Specialist designation.

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## Duties and Responsibilities

### Urban Forester:

- Prepares and maintains the street tree plan.
- Prepares an annual tree planting plan.
- Enforces the tree ordinance.
- Plans, conducts public education programs.
- Prepares contracts for tree services.
- Coordinates with other agencies.
- Purchases equipment and supplies.
- Directs work of assigned staff.
- Establishes, maintains records and files.
- Responds to citizen requests about private trees.

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## Expect to Pay for a Forester:

- \$40,000 - \$65,000/yr.



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## Staff Training and Development (need to know stuff)

- ANSI A300 Pruning Standards – ISA availability
- ANSI Z133.1 Safety Requirements - ISA
- MUTCD
- Job site setup
- Flagging
- First Aid, CPR
- Tailgate Safety (70 sessions) – \*TCIA Availability
- Electrical Hazards Awareness Program – \*TCIA
- Arborist Certification Training

\*TCIA = Tree Care Industry Association

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## Consultant vs. In-House Forester

### **In-House Forester/Arborist**

- Deep ties within the community.
- Has or will build “institutional knowledge”.
- Is available at a moment’s notice.

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## Consultant vs. In-House Forester

### **Consultant**

- Usually is very experienced and knowledgeable on a wide array of topics.
- Can be less expensive over the long haul.

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## Contractual vs. In-House Crews

### **Benefits of a contractor:**

- Pay only for work performed. 98% of money paid goes to work done.
- Not necessary to purchase equipment. A bucket and chipper will cost \$140,000.
- Won't get bogged down in employee problems.
- Is better for production work such as over the road pruning.
- More control over personnel.

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### Expect to Pay for a Contractor:

- \$82.42/ hr. for a three man crew, 75' Bucket truck, and chipper.



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### Expect to Pay for a Contractor:

\$20.40/hr. for a Crane Truck. This truck has a 65' boom and an 8 ton lifting capacity



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### Contractual vs. In-House Crews

#### Benefits of an In-House Crew:

- More flexible for other work assignments.
- Is better for fine pruning/delicate work.
- More control over training and specializations

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### Expect to pay an in-house crew:

|  |              |
|--|--------------|
| 75' Bucket Truck<br>(10 years, fuel, maint., etc.) | \$11.00/hr   |
| Chipper  | 6.62         |
| Crew* (does not include fringes)                   | <u>40.00</u> |
| Total cost per hour                                | \$57.60      |

\*Non-Union Wages

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### Polling Question #4



What is your annual expenditure for tree planting and maintenance?

- A. less than \$1 per capita
- B. \$1 - \$2 per capita
- C. \$2 - \$3 per capita
- D. more than \$3 per capita
- E. nobody knows

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**Andy Hillman**  
City Forester  
City of Ithaca, NY

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## Identify Funding Sources

- Tree planting grants
- Public awareness and volunteer training grants
- Local measures
  - Assessment districts
  - Parcel tax
- Other revenue sources
  - Carbon dioxide emission reduction credits
  - Shade tree programs for energy conservation
  - Stormwater management
  - Air pollution mitigation



## Urban Forest Management Plans

- Provide the best SERVICE possible
  - Most efficient use of resources
  - Maximize net benefits of trees
  - Increase customer Satisfaction
  - Cornerstone of compelling case for program funding



## State of the Urban Forest Report

### The Tree Resource

- Management Costs
- Annual Benefits
- Management Implications
  - Resource complexity
  - Resource extent
  - Maintenance needs
- Demonstrate what you have to lose!



## Stretch Your Budget

- Youth Employment Service (free teen workers)
- Volunteers (Citizen Pruners, Ithaca Tree Works Tree Planting Program)
- Court Ordered Community Service
- Over Two Decades Of Success With Unionized Workforce



## City of Ithaca Department of Public Works Citizen Pruner Program – 15 Years Old



## City of Ithaca Department of Public Works Youth Horticultural Apprentice Program 10 Years Old





## The Campaign

What is the **VALUE** of a tree?






## Minnesota Arbor Day




## The Benefits of the Urban Forest

The trees of Minneapolis are THE growing capital asset that benefits everyone in the City.





The State of the Minneapolis Urban Forest

### The **Benefits** of the Urban Forest

**Each year Minneapolis street trees provide:**

- \$6.8 million in energy savings
- \$9.1 million in reduced storm water runoff
- \$7.1 million increased property value
- Plus improvements to air quality

**\$24.9 million TOTAL value each year!**





### Summary of Street Tree Values


for City of North Vancouver citywide street tree collection

- \$501,000 / year
- \$94 / tree / year
- Over 50 years:
  - \$25 million
  - \$4,700 / tree




## Think Outside The Bark!

- Assess the resource
- Develop a plan
- Quantify the ecosystem services
- Leverage volunteers, youth workers, grants
- Bundle the package
- Justify the urban forestry budget

**Jennifer Gulick**  
Davey Resource Group  
Walton, KY




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## Polling Question #5

How would you describe your current urban forestry program?

- A. NONE - What program?!
- B. DEFICIENT - Reactive maintenance only  
(little or no planting; no dedicated staff/funding/ordinance)
- C. ADEQUATE - Basic maintenance and planting services provided  
(some dedicated funding; 1 or more arborists)
- D. GOOD - Well established program  
(funding, staffing, ordinance in place)



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## Why Is Urban Forest Management Important?

- Investment in community's future
- Public safety and municipal liability
- Efficient operations
- Improve the environment



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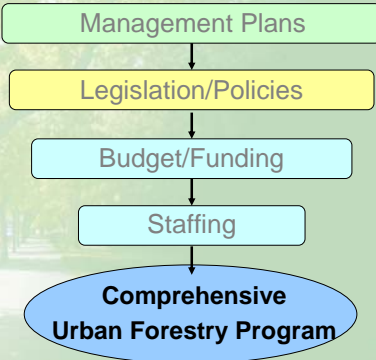
## Tree Management is Similar to Traditional Infrastructure Management

- Create & Record Service Requests
- Track Work Histories
- Create Benchmark / Gauge Progress
- Prepare Contract Specs
- Compare In-House & Contractor Performance
- Prioritize Maintenance
- Forecast Trends & Plan for the Future




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## Urban Forest Management BMPs



```

graph TD
    A[Management Plans] --> B[Legislation/Policies]
    B --> C[Budget/Funding]
    C --> D[Staffing]
    D --> E([Comprehensive Urban Forestry Program])
  
```



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## For More Information

- American Public Works Association  
— [www.apwa.net](http://www.apwa.net)
- Society of Municipal Arborists  
— [www.urban-forestry.com](http://www.urban-forestry.com)
- Davey Resource Group  
— [www.davey.com](http://www.davey.com)
- National Urban & Community Forestry Advisory Council  
— <http://www.treelink.org/nucfac/>



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# Final Q&A



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## Today's Speakers...



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## Today's Speakers...



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## Today's Speakers...



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