Tree Stewardship and Planting Tips

Case Western Green Bag Lunch, September 21, 2017
The Cleveland Tree Plan

Summary

Table 1. Cleveland’s Urban Tree Canopy (UTC) Compared to Other Cities

<table>
<thead>
<tr>
<th>Location</th>
<th>UTC</th>
<th>Year</th>
<th>UTC Goal</th>
<th>Goal Target Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pittsburgh, PA</td>
<td>40%</td>
<td>2011</td>
<td>60%</td>
<td>20-year plan (2031)</td>
</tr>
<tr>
<td>Cincinnati, OH</td>
<td>48%</td>
<td>2011</td>
<td>Increase</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Louisville, KY</td>
<td>37%</td>
<td>2013</td>
<td>40%</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Washington, DC</td>
<td>35%</td>
<td>2009</td>
<td>40%</td>
<td>20-year plan (2029)</td>
</tr>
<tr>
<td>Boston, MA</td>
<td>29%</td>
<td>2006</td>
<td>49%</td>
<td>10-year plan (2016)</td>
</tr>
<tr>
<td>Lexington, KY</td>
<td>25%</td>
<td>2013</td>
<td>30%</td>
<td>ongoing</td>
</tr>
<tr>
<td>New York, NY</td>
<td>24%</td>
<td>2006</td>
<td>30%</td>
<td>2036</td>
</tr>
<tr>
<td><strong>Cleveland, OH</strong></td>
<td><strong>19%</strong></td>
<td><strong>2013</strong></td>
<td><strong>-</strong></td>
<td><strong>2036</strong></td>
</tr>
<tr>
<td>Chicago, IL</td>
<td>17%</td>
<td>2007</td>
<td>25%</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Indianapolis, IN</td>
<td>14%</td>
<td>2008</td>
<td>19%</td>
<td>10 year plan (2018)</td>
</tr>
</tbody>
</table>

![Figure 1. Cleveland tree canopy projection if no action is taken.](image)
The Cleveland Tree Plan

Why Trees?

Over 100 years trees appreciate

Other infrastructure depreciates

Breakdown of tree benefits

Cumulative US Dollars ($)

Year

2015 2029 2043 2057 2071 2085 2099 2113

Stormwater  Air Quality  CO2  Winter Savings  Summer Savings  Total

Written Down Value

Useful Life

New Asset  Rapid Deterioration  Acquiescence
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Why Trees?

In Cleveland that means $28 million in annual benefits

- 1.8 billion gallons of rainwater every year (value: $11 million).

- Saves residents and business owners $3.5 million in energy costs each year.
The Cleveland Tree Plan

Why Trees?

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- 1.8 billion gallons of rainwater every year (value: $11 million).
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Table 3. Annual Tree Benefits

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Quantity</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>STORMWATER: Reduction of Runoff</td>
<td>1,792,333,232</td>
<td>gals.</td>
<td>$10,753,999</td>
</tr>
<tr>
<td>ENERGY: Savings from Avoided Cooling</td>
<td>31,677,030</td>
<td>kWhs</td>
<td>$3,484,473</td>
</tr>
<tr>
<td>PROPERTY: Increases in Property Values</td>
<td>-</td>
<td>$</td>
<td>$4,469,333</td>
</tr>
<tr>
<td>HEALTH: Less Incidents of Adverse Health</td>
<td>1,204</td>
<td>incidents</td>
<td>$6,871,291</td>
</tr>
<tr>
<td>AIR: Carbon Monoxide (CO) Removed</td>
<td>12,740</td>
<td>lbs.</td>
<td>$8,471</td>
</tr>
<tr>
<td>AIR: Nitrogen Dioxide (NO₂) Removed</td>
<td>116,690</td>
<td>lbs.</td>
<td>$34,684</td>
</tr>
<tr>
<td>AIR: Ozone (O₃) Removed</td>
<td>493,610</td>
<td>lbs.</td>
<td>$1,217,940</td>
</tr>
<tr>
<td>AIR: Sulfur Dioxide (SO₂) Removed</td>
<td>54,640</td>
<td>lbs.</td>
<td>$7,616</td>
</tr>
<tr>
<td>AIR: Dust, Soot, Other Particles Removed (PM₁₀)</td>
<td>150,900</td>
<td>lbs.</td>
<td>$471,292</td>
</tr>
<tr>
<td>Carbon Sequestered</td>
<td>41,683</td>
<td>tons</td>
<td>$807,130</td>
</tr>
<tr>
<td><strong>Total Annual Benefits</strong></td>
<td><strong>$28,156,229</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon Storage Over Canopy's Lifetime</td>
<td>1,292,522</td>
<td>tons</td>
<td>$25,027,531</td>
</tr>
<tr>
<td><em>(not an annual benefit)</em>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Benefits Overall</strong></td>
<td><strong>$53,183,760</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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The Way Forward: Action Steps

❖ Action #8: Institute policy changes supportive of urban forestry
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The Way Forward: **Action Steps**

- Action #9: Plant with a purpose: trees for neighborhood equity
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How Can You Make a Difference?  ❖ Select Qualified Arborists
Tree Steward Training
Tree Steward Program

Curriculum focused on:
• Urban Forestry
• Tree Biology
• Tree Identification
• Tree Stress
• Root and Soil Management
• Planting, Pruning and Care
• Community Forestry
Tree Steward Program

Process (four parts)
Classroom Parts I&II (curriculum)
Outdoor Parts III&IV (planting/care)
Tree Steward Program

Learning Objectives

1. Increased awareness of trees and the benefits they provided

2. Basic ability to plant and care for trees in the community

3. Willingness to organize and participate in community forestry events
Regional Initiatives and Partnerships

Cleveland Tree Plan

Cleveland Tree Coalition

Public/Private Grants and Partnerships

Alliance For Community Trees

American Forests
Planting

• Inspect your trees before planting!

• Tree planting is short

• Tree lives are long

• Do it right the first time - tag your trees!
Plant Selection

• Match the tree to the site

• Select healthy/quality trees

• Inspect the root ball
Plant Selection

• Inspect branches, trunk, and roots

• Look for circling roots

• These can lead to girdling roots
Plant Selection

• Inspect branches, trunk, and roots

• Look for circling roots

• These can lead to girdling roots
Plant Selection

- Inspect branches, trunk, and roots
- Look for circling roots
- These can lead to girdling roots
Plant Selection

- Inspect structure (central leader)
- Look for pests/diseases
- No injuries to trunk or root collar
Stock Type

• Bare root

• Pro: small/light/ see all roots

• Con: dry out easily/dormant planting season
Stock Type

• Containerized/container grown

• Pro: easy to move/ relatively light

• Con: Substrate grown/ circling or girdling roots
Stock Type

• Containerized/container grown
• Often have excessive or defective roots
• Substrate grown
Stock Type

- Balled and Burlapped (B&B)
- Pro: soil-based root ball
- Con: heavy/lose 90% of roots/deep roots/hidden issues
Stock

- Balled and Burred (B&B)
  - Pro: soil-based
  - Con: heavy/ball roots/deep root issues
Stock Type

- Balled and Burlapped (B&B)
- Pro: soil-based root ball
- Con: heavy/lose 90% of roots/deep roots/hidden issues
Stock Type

• Balled and Burlapped (B&B)

• Pro: soil-based root ball

• Con: heavy/lose 90% of deep roots/hidden issues
Planting Techniques

- Locate utilities
- Above and below ground
- Practice ‘Right Tree Right Place’
Planting Techniques

- Shallow/Wide planting hole

3x widest dimension of root ball.

SECTION VIEW
Planting Techniques

• Too deep!
Planting Techniques

• Too deep!
Planting Techniques

• Root flare near grade
Planting Techniques

- Root flare near grade
Planting Techniques

• Do not over-dig!
Planting Techniques

- Remove planting materials
Planting Techniques

• Correct root defects
Planting Techniques

• Correct root defects
Planting Techniques

- Check drainage/no gravel (perched water table)
Planting Techniques

- Fill in with site soil
- 2-3x root ball
Planting Techniques

• Top-dress with compost/woodchips
Planting Techniques

• Top-dress with compost/woodchips
Transplanting

- Root pruning
- Trees can be hardened off to help acclimation
- Drum lace large root balls

Photos courtesy GardenWeb and Tree PGH
Table 2. Examples of recommended minimum root ball sizes for field-grown nursery trees. The European standard is based on trunk circumference (cm). The American standard (ANSI Z60.1) is based on trunk diameter. Some values have been rounded to merge the two standards into one table. Smaller root balls recommended in the European standard may be explained by frequent transplanting during nursery production and measurement higher on the trunk.

<table>
<thead>
<tr>
<th>Maximum Trunk Size</th>
<th>Times Transplanted(^3)</th>
<th>Minimum Root Ball Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Caliper(^1)</td>
<td>Girth(^1,2)</td>
</tr>
<tr>
<td></td>
<td>in</td>
<td>cm</td>
</tr>
<tr>
<td>--------------------</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>1.0</td>
<td>2.5</td>
<td>3.1</td>
</tr>
<tr>
<td>1.5</td>
<td>3.8</td>
<td>4.7</td>
</tr>
<tr>
<td>2.0</td>
<td>5.1</td>
<td>6.3</td>
</tr>
<tr>
<td>2.5</td>
<td>6.4</td>
<td>7.9</td>
</tr>
<tr>
<td>3.0</td>
<td>8.0</td>
<td>9.8</td>
</tr>
<tr>
<td>4.0</td>
<td>9.6</td>
<td>11.8</td>
</tr>
<tr>
<td>4.5</td>
<td>11.1</td>
<td>13.8</td>
</tr>
<tr>
<td>5.0</td>
<td>12.7</td>
<td>15.7</td>
</tr>
<tr>
<td>6.5</td>
<td>15.9</td>
<td>19.7</td>
</tr>
<tr>
<td>7.5</td>
<td>19.1</td>
<td>23.6</td>
</tr>
</tbody>
</table>
Transplanting

- **Tree spade** used for digging
- Take care when transporting
- Protect your investment
Transplanting

- Tree spade used for digging

- Take care after planting
Early Care

• Planting is just the start!
• Transplant shock can cause increased mortality

• Just add water!
Be sure to repeat
Early Care

- Fertilization
- Mulching
- Staking or Guying
Early Care

- Fertilization
- Mulching
- Staking or Guying
Early Care

- Tree wrap
- Root collar guards

Photos of wraps/guards courtesy A.M. Leonard
Early Care

- Tree wrap
- Root collar guards

Photos of wraps/guards courtesy A.M. Leonard
Early Care

• Pruning

• Yes, just a small amount at planting

• Include dead or broken branches too

Photos courtesy Dr. Ed Gilman
Early Care

- Pruning
- Yes, just a small amount at planting
- Include dead or broken branches too
Early Care

- Use ANSI A300 for **planning specifications**
- Tree planting best management practices too!
- Include detailed drawings too
Central leader. (See crown observations details).

Trunk caliper shall meet ANSI B260 current section for root ball size.

Root ball modified as required.

Round-topped soil berm 4” high x 8” wide above root ball surface shall be constructed around the root ball. Berm shall begin at root ball periphery.

Finished grade.

Modified soil. Depth varies. (See soil preparation plan).

Existing soil.

Bottom of root ball rests on existing or recompacted soil.

Top of root ball shall be flush with finished grade.

Prior to mulching, slightly tamp soil around the root ball in 6” lifts to brace tree. Do not over compact. When the planting hole has been backfilled, pour water around the root ball to settle the soil.

4” layer of mulch. No more than 1” of mulch on top of root ball. (See specifications for mulch).

Notes:
1. Trees shall be of quality prescribed in crown observations and root observations details and specifications.
2. See specifications for further requirements related to this detail.

TREE w/ BERM (EXISTING SOIL MODIFIED)
Tree Planting & Establishment
January 31, 2017
The Ohio Tree Care Conference
Tree Planting & Establishment

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Happy Planting!

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http://www.holdenarb.org/resources/communityforestry.asp