Urban & Community Forestry!

Denver, CO
Population 682,545

Campo, CO
Population 109

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Urban Forestry

Urban Forestry is the planning, establishment, protection and management of trees and associated plants, individually, in small groups, or under forest conditions within cities, their suburbs, and towns. (As defined by the Cooperative Forestry Act of 1978)

Urban Forestry is where trees and people live together in a community. (As defined by…Keith)
Urban Forestry

- Agronomy
- Forestry
- Horticulture
- Arboriculture
- Plant Science

Urban Forestry

--The care and management of tree populations in urban settings by an urban forester

--The planting, care and study of trees
Urban Forestry

• Communities too……Have Forests

• Trees appear along streets and greenways; in backyards, open spaces and parks and the WUI. These forests enhance the quality of human life by:
  • purifying air
  • modifying temperature extremes
  • sequestering carbon
  • stormwater mitigation/water quality improvement
  • reducing noise pollution
  • improving aesthetic appeal
  • raising real estate values
  • And much more!

• The majority of Colorado’s community trees have been planted by people and require special care

• Community trees, if properly planted and cared for can become very valuable assets to a community
Air and Water Quality

Vegetated buffers and detention systems clean stormwater run-off before it enters the river.

This tree gives back $2085 worth of benefits for the next 15 years.
Economic Engine
Health and Wellness

Stress reduction
Green environments reduce stress, making people productive at work and happier at home.
A Neighborhood Builder and Crime Fighter


Early colonial villages in New England were built around a village green which served to muster militia and keep livestock during times of attack, not necessarily to grow trees and lawns.
What about the great Frontier?

- In 1872 J. Sterling Morton first proposed a tree-planting holiday to be called “Arbor Day.” It was estimated that more than one million trees were planted in Nebraska on the first Arbor Day.
In 1910, the City of Colorado Springs, CO City Council created a Department of Forestry, a tree ordinance and a city forester position. It was the first such department west of the Mississippi River.

The position of City Forester, and thereby, the Department of Forestry, originated upon passage of ordinance #818 on August 3, 1910. However, a forester was not appointed until March 19, 1911, at which time Mr. Fred P. McKown became the first City Forester; a post he held for the next 47 years until his retirement on December 28, 1958.

In his first annual report to the city government, Mr. McKown noted that he had inventoried 1,229 street trees. (This compares with over 100,000+ street, park, drainage, alley, and regional park trees that are now the city forester’s responsibility!)

Upon his retirement, Mr. McKown recalled that when he took office, a large majority of trees in the city were either boxelder or cottonwood. He further noted that a trend in planting developed toward silver maple, American elm and green ash. Thereafter and in the 1950’s, American linden and Norway maple gained popularity.
History of Urban Forestry

1960’s-1970’s: Nation deals with Dutch Elm Disease Epidemic giving birth to many urban and community forestry programs across the U.S.

1977: The Arbor Day Foundation starts certifying the first-ever Tree City USA communities
- Tree Board or Professional Tree Care Manager
- Tree Ordinance
- Budget per capita
- Arbor Day Observance and Proclamation

1978: Cooperative Forestry Assistance Act
- Created a formal program around Urban Forestry
1990 Farm Bill
Major legislative provisions governing urban forestry were passed in the 1990 Farm Bill. To receive increased funding for urban forestry programs each state was required to
- Form a tree council (Colorado Tree Coalition)
- Hire or appoint a statewide urban forestry coordinator
- Enhance volunteer opportunities in urban forestry
Threats to the Urban Forest

- Aging urban forests
- Development Pressures
- Climatic Changes
- Insect/Disease Pressures
Threats to the Urban Forest

Aging urban forests
Threats to the Urban Forest

Development Pressures

Figure 1.22 Revised tree impacts resulting from the modified Alison Road alignment and relocated Royal Randwick Racecourse stop location.
Threats to the Urban Forest

Climatic Changes

Slumgullion Pass, July 2015

Windsor Tornado, May 2008

Fall 2014
Polar Vortex
A Major Threat to our Urban Forests

Emerald Ash Borer was detected in the Detroit, MI area in 2002 and was first found in Colorado in the Fall of 2013
Attack of the Green Reaper

No EAB Were Harmed During Filming (photo by Russell Carr)
Known Distribution of EAB

Cooperative Emerald Ash Borer Project
Initial county EAB detections in North America

Map Key
- Initial county EAB detection
- Federal EAB quarantine boundaries
- State quarantine—generally infested area
- State quarantine (MI)
- Onondaga Indian Reservation
- National Forests
- Canadian EAB regulated areas

Disclaimer: These data and all the information contained therein have been compiled by the U.S. Department of Agriculture and its partners, and are subject to federal, state, and local laws and regulations. This information is provided for informational purposes only and is not intended to be used for legal purposes. This information is not subject to the Freedom of Information Act (5 U.S.C. 552), the Privacy Act of 1974, or the Environmental Protection Act (42 U.S.C. 7401 et seq.). This information is provided for informational purposes only and may not be used for any other purpose without the express written consent of the U.S. Department of Agriculture.
Economic Impact in Urban Areas

- $10.7 billion in Midwestern and eastern states for treatment, removal and replacement of more than 17 million ash trees on developed land ([www.emeraldashborer.info](http://www.emeraldashborer.info))
- In Ohio a loss of $3 billion in property value and ecological services (Herms, Ohio State U.)
- The city of Columbus, OH has spent about $4.5 million to remove 17,000 ash trees since 2011. (2015 Columbus Dispatch article)
- The Iowa Department of Natural Resources estimates a $2.5 billion impact to higher energy expenses, rising stormwater retention costs and reduced property values from the loss of millions of ash trees
EAB Impacts in Colorado

- EAB-infested urban areas in midwestern states typically include less than 5-percent ash.
- Many Colorado community forests include more than 15-percent ash.
Denver Metro Total Trees and 15% Ash

Numbers shown are estimates of total ash based on 15% factor

~1.45 Million Ash
## Ash Canopy Loss Impacts

<table>
<thead>
<tr>
<th></th>
<th>Annual Benefit</th>
<th>15% Service Loss</th>
<th>Balance</th>
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<tr>
<td>CO2 Storage and avoidance</td>
<td>$1,722,719</td>
<td>$258,408</td>
<td>$1,464,311</td>
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<tr>
<td>Rain fall interception</td>
<td>$90,980,000</td>
<td>$13,647,000</td>
<td>$77,333,000</td>
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<tr>
<td><strong>Property value</strong></td>
<td>$436,500,000</td>
<td>$65,475,000</td>
<td>$371,025,000</td>
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<tr>
<td>Energy saved</td>
<td>$21,786,677</td>
<td>$3,268,000</td>
<td>$18,518,677</td>
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<td><strong>Totals</strong></td>
<td>$550,989,396</td>
<td>$82,648,409</td>
<td>$468,340,987</td>
</tr>
</tbody>
</table>
Tree Removal/Replacement Estimates

- Tree removals ($300/tree) = $432 million
- Tree replacements ($400/tree) = $576 million
- Additional costs
  - Pesticide treatment, wood disposal
  - Landscape watering, property value
Dutch Elm Disease

American elms
- 50,000 American elms across Colorado prior to introduction
- 30,000 (60 percent) American elms removed between 1973 - 2012
- Management = prompt tree removal and proper wood disposal
EAB to DED Scale

Ash to Elm Comparison

Metro Denver Ash

American Elms before Dutch Elm Disease
Solutions

- Strategies to reduce risk and improve preparedness
  - Conduct tree inventories
  - Develop management plans
  - Identify high value trees
  - Implement municipal codes and county resolutions to enforce sanitation of infested material and promote diversity of plantings
URBAN FOREST MANAGEMENT
TREE INVENTORY
TREE INVENTORY

Urban Forest Management Objectives

- safety
- uneven-aged trees
- species diversity
- achieve healthy forest at least cost
- begin this process with inventory
TREES INVENTORY - WHY?

- Identify the tree resource accurately
- Ensure quality management of the tree resource
  - management plans based on facts
  - reduce public risk
  - manage toward a stronger forest
- Develop internal and external support
TREE INVENTORY

WHAT DATA TO COLLECT?

• Management unit
• Species
• Diameter (DBH)
• Condition
• Location info
  • Placement within the landscape
  • Site
  • Contribution
• Management need
• Special comments
TREE INVENTORY
WHAT TO DO WITH DATA?

• Develop a comprehensive forest management plan
• Reports
  - tree risk
  - forest health and condition
  - species diversity
  - size class distributions
  - pruning rotation development
  - vacant planting sites
  - valuation
  - future projections
## Westminster Tree Growth Rate Study

### Overall Results

<table>
<thead>
<tr>
<th>Species</th>
<th>Growth Rate (average dbh inches per year)</th>
<th>Growth Rate (average dbh inches per 16 year period)</th>
<th>Sample Size (N=number of trees)</th>
</tr>
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<tbody>
<tr>
<td>Cottonwood</td>
<td>0.64</td>
<td>10.2</td>
<td>271</td>
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<tr>
<td>Silver maple</td>
<td>0.49</td>
<td>7.8</td>
<td>42</td>
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<tr>
<td>Blue spruce</td>
<td>0.47</td>
<td>7.6</td>
<td>133</td>
</tr>
<tr>
<td>Catalpa</td>
<td>0.44</td>
<td>7.0</td>
<td>9</td>
</tr>
<tr>
<td>White oak</td>
<td>0.43</td>
<td>6.9</td>
<td>31</td>
</tr>
<tr>
<td>Austrian/Ponderosa pine</td>
<td>0.43</td>
<td>6.9</td>
<td>503</td>
</tr>
<tr>
<td>Linden</td>
<td>0.43</td>
<td>6.8</td>
<td>104</td>
</tr>
<tr>
<td>Ash</td>
<td>0.42</td>
<td>6.7</td>
<td>270</td>
</tr>
<tr>
<td>Russian-olive</td>
<td>0.40</td>
<td>6.4</td>
<td>43</td>
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<tr>
<td>Red oak</td>
<td>0.40</td>
<td>6.3</td>
<td>54</td>
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<tr>
<td>Crabapple</td>
<td>0.39</td>
<td>6.2</td>
<td>100</td>
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<tr>
<td>Honeylocust</td>
<td>0.37</td>
<td>5.9</td>
<td>216</td>
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<tr>
<td>White fir</td>
<td>0.37</td>
<td>5.9</td>
<td>11</td>
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<tr>
<td>Norway maple</td>
<td>0.33</td>
<td>5.3</td>
<td>80</td>
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<tr>
<td>Hackberry</td>
<td>0.32</td>
<td>5.2</td>
<td>34</td>
</tr>
<tr>
<td>Red maple</td>
<td>0.30</td>
<td>4.8</td>
<td>14</td>
</tr>
<tr>
<td>Pinyon</td>
<td>0.23</td>
<td>3.7</td>
<td>19</td>
</tr>
<tr>
<td>Hawthorn</td>
<td>0.17</td>
<td>2.7</td>
<td>41</td>
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</tbody>
</table>
TREE INVENTORY
WHAT TYPE?

- Hard copy/paper
- Computer - what software program?
  - ArborAccess
  - ArborPro
  - ArborSoftWorx Municipal
  - TreeWorks
  - MCTI
  - Trees in the Hood
  - TreeKeeper
  - Tree Plotter
  - TreeSavvy
  - TreeTown
  - TRiM: Tree Risk Management
  - TRIMS Tree Inventory
  - UFIS
  - Etc.
- GPS/GIS - spatially based
- i-Tree
- Canopy Analysis

www.itreetools.org
Spatial Inventories
i-Tree Inventories

Table 4. Summary of annual environmental and aesthetic benefits by the more common tree species. Species that do not make up more than 0.4% of the population are included in “other street trees.”
UTC Studies

Figure 12 Urban tree canopy cover percentages for each city

Table 26 Existing UTC benefits by city/county

<table>
<thead>
<tr>
<th>Name</th>
<th>UTC</th>
<th>Energy saved (Cooling)</th>
<th>CO2 storage</th>
<th>CO2 Eq per year</th>
<th>Cooling CO2 saved</th>
<th>Total CO2</th>
<th>Air Quality (pollution removed per year)</th>
<th>Rainfall Interception</th>
<th>Property values</th>
<th>Total Benefit</th>
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<tbody>
<tr>
<td>Cities</td>
<td></td>
<td>%</td>
<td>MWt</td>
<td>s</td>
<td>ton</td>
<td>t</td>
<td>ton</td>
<td>s</td>
<td>ton</td>
<td>s</td>
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<tr>
<td>Arvada</td>
<td>19.0</td>
<td>10,269</td>
<td>1,293,654</td>
<td>92.1</td>
<td>4.1</td>
<td>40.9</td>
<td>5,780</td>
<td>97,388</td>
<td>5,744</td>
<td>97,840</td>
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<td>Aurora</td>
<td>11.9</td>
<td>21,611</td>
<td>2,989,305</td>
<td>164.6</td>
<td>7.2</td>
<td>71.7</td>
<td>20,698</td>
<td>304,979</td>
<td>20,595</td>
<td>105,061</td>
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<td>Boulder</td>
<td>27.4</td>
<td>12,412</td>
<td>1,548,815</td>
<td>92.9</td>
<td>4.1</td>
<td>40.5</td>
<td>11,830</td>
<td>118,301</td>
<td>11,834</td>
<td>118,342</td>
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<tr>
<td>Broomfield</td>
<td>28.7</td>
<td>297</td>
<td>35,817</td>
<td>5.0</td>
<td>0.1</td>
<td>1.4</td>
<td>282</td>
<td>2,815</td>
<td>282</td>
<td>2,817</td>
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<tr>
<td>Centennial</td>
<td>8.2</td>
<td>3,391</td>
<td>406,766</td>
<td>33.3</td>
<td>1.4</td>
<td>10.0</td>
<td>3,217</td>
<td>32,167</td>
<td>3,218</td>
<td>32,183</td>
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<td>Cherry Hills Village</td>
<td>24.6</td>
<td>11,545</td>
<td>1,385,168</td>
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<td>4.2</td>
<td>41.5</td>
<td>10,549</td>
<td>105,468</td>
<td>10,553</td>
<td>105,525</td>
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<td>Commerce City</td>
<td>37.4</td>
<td>1,035</td>
<td>124,184</td>
<td>30.4</td>
<td>1.4</td>
<td>13.5</td>
<td>582</td>
<td>5,914</td>
<td>583</td>
<td>5,930</td>
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<td>Denvers</td>
<td>4.7</td>
<td>1,487</td>
<td>178,450</td>
<td>23.6</td>
<td>0.9</td>
<td>3.3</td>
<td>1,410</td>
<td>14,103</td>
<td>1,411</td>
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<td>Denver</td>
<td>19.7</td>
<td>56,573</td>
<td>6,776,758</td>
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<td>14.0</td>
<td>142.3</td>
<td>53,563</td>
<td>535,631</td>
<td>53,577</td>
<td>535,772</td>
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<td>Edgewater</td>
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<td>56,413</td>
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<td>0.9</td>
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<td>4,495</td>
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<td>0.9</td>
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<td>3,267</td>
<td>31,669</td>
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<td>31,676</td>
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<td>Erie</td>
<td>4.5</td>
<td>530</td>
<td>63,545</td>
<td>10.3</td>
<td>0.4</td>
<td>4.5</td>
<td>502</td>
<td>5,024</td>
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<td>20,229</td>
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<td>0.1</td>
<td>1.4</td>
<td>259</td>
<td>2,525</td>
<td>253</td>
<td>2,527</td>
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<td>Frederick</td>
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<td>29</td>
<td>4,482</td>
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<td>0.1</td>
<td>0.8</td>
<td>37</td>
<td>370</td>
<td>37</td>
<td>371</td>
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<td>Glendale</td>
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<td>23</td>
<td>2,709</td>
<td>1.1</td>
<td>0.1</td>
<td>0.6</td>
<td>21</td>
<td>214</td>
<td>21</td>
<td>215</td>
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<td>Golden</td>
<td>21.9</td>
<td>2,136</td>
<td>256,282</td>
<td>28.3</td>
<td>1.3</td>
<td>13.0</td>
<td>2,026</td>
<td>20,257</td>
<td>2,027</td>
<td>20,270</td>
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<td>Greenwood Village</td>
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<td>1,524</td>
<td>182,859</td>
<td>32.4</td>
<td>1.4</td>
<td>14.0</td>
<td>1,496</td>
<td>14,956</td>
<td>1,497</td>
<td>14,970</td>
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<td>Lafayette</td>
<td>16.4</td>
<td>1,744</td>
<td>209,294</td>
<td>21.3</td>
<td>0.9</td>
<td>8.0</td>
<td>1,654</td>
<td>16,543</td>
<td>1,655</td>
<td>16,552</td>
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<td>Lakewood</td>
<td>20.6</td>
<td>11,896</td>
<td>1,422,721</td>
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<td>5.5</td>
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<td>4,814</td>
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<td>4,604</td>
<td>46,041</td>
<td>4,606</td>
<td>46,061</td>
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</table>
Denver 2013 Canopy Cover

Neighborhood Tree Canopy 2013

Average Tree Canopy Coverage

- <15%
- 15% - 25%
- >25%
Heat Island & Planting Areas

Heat Islands & Planting Areas

Colorado State Forest Service

Heat Islands
- Warm
- Hot

Neighborhood Potential Planting Spaces
- <1,000
- 1,000 - 2,500
- 2,500 - 5,000
- >5,000

0 1 2 Miles
Denver’s Game Plan

• Street Tree Performance Goal
  – Provide a tree-canopy cover of 15 percent to 18 percent in urban residential areas and 10 percent in the central business district by 2025.
CO-TreeView Can Help!

http://cotreeview.com/
(use Google Chrome!)
Community Forestry & the Colorado State Forest Service
Conferences/Workshops

• Eastern Community Forestry Conference
• Western Community Forestry Conference
• Greeley Winter Tree Care Conference
• ProGreen Conference
• Front Range Urban Forestry Council
• ISA-RMC Annual Conference
• Arboriculture Workshop near you??
Arbor Day and Tree City USA

- District Assistance helps support 95 Tree City USA’s in Colorado!
  - Applications due by December 31st each year
  - Arbor Day celebrated on the 3rd Friday in April in CO
Benefits of Being a Tree City USA Community

• Brings the community together (Politicians, Business Leaders, Schools, etc.)
• Plant and maintain trees
• Great Public Relations
• Money
• And . . . . . . . .
... You get this really cool flag!!
Colorado Tree Coalition Support

- Educational Programs
- Grants
- 5th Grade Arbor Day Poster Contest
- Champion Tree Program
- ReForest Colorado
- Tree Collections
- Tour de Poudre Bike Ride Fundraiser
- Memberships
- CommuniTree Awards
- Web Site and Newsletter (www.coloradotrees.org)
- Trees Across Colorado Tree Distribution Program
Questions?

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