Every Yard Counts!
How Everyone in the Community Benefits from Quality Landscapes

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USDA Forest Service, Pacific NW Research

Peak to Prairie Landscape Symposium
Colorado Springs, CO
March 2012
## Ecosystem Services

<table>
<thead>
<tr>
<th>Supporting Services</th>
<th>Regulating Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrient cycling</td>
<td>Air quality regulation</td>
</tr>
<tr>
<td>Soil formation</td>
<td>Climate regulation (global, regional, and local)</td>
</tr>
<tr>
<td>Primary production</td>
<td>Water regulation</td>
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<tr>
<td></td>
<td>Erosion regulation</td>
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<tr>
<td></td>
<td>Water purification and waste treatment</td>
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<tr>
<td></td>
<td>Disease regulation</td>
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<td></td>
<td>Pest regulation</td>
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<td></td>
<td>Pollination</td>
</tr>
<tr>
<td></td>
<td>Natural hazard regulation</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Provisoning Services</th>
<th>Cultural Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food (crops, livestock, wild foods, etc...)</td>
<td>Aesthetic values</td>
</tr>
<tr>
<td>Fiber (timber, cotton/hemp/silk, wood fuel)</td>
<td>Spiritual and religious values</td>
</tr>
<tr>
<td>Genetic resources</td>
<td>Recreation and ecosystem</td>
</tr>
<tr>
<td>Biochemicals, natural medicines, pharmaceuticals</td>
<td></td>
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<tr>
<td>Fresh water</td>
<td></td>
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</tbody>
</table>
City-wide View of the Urban Forest
Human Dimensions of Urban Forestry and Urban Greening

featuring research on peoples' perceptions and behaviors regarding nature in cities

Projects Director
Kathleen L. Wolf, Ph.D.
i-Tree Suite of Software
Reducing Stormwater Runoff

Image courtesy of the Center for Urban Forest Research
Conserving Energy

Image courtesy of the Center for Urban Forest Research
Reduced Urban Heat Island Effect
STRUCTURE

FUNCTION

VALUE

MANAGEMENT

photo credits: Seattle i-Tree Training by Al Zelaya
Home & Neighborhood View
In the native garden (above), California native cultivars replicate the drought-tolerant chapparal of the Santa Monica Mountains and use 77 percent less water than required by conventional turf and exotic plants from the Eastern United States and Europe in the traditional garden (right).
The Numbers Speak for Themselves

Traditional Landscape

- 57,000 Gallons of Water
- 670 Pounds of Yard Waste
- 80 Hours of Maintenance

Sustainable Landscape

- 6,000 Gallons of Water
- 250 Pounds of Yard Waste
- 15 Hours of Maintenance

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ONE TREE CAN MAKE A DIFFERENCE.
WHERE WILL YOU PLANT YOURS?

TreeBaltimore
Tree Benefit Calculator for street trees

Understanding This Tool:
The Tree Benefit Calculator allows anyone to make a simple estimation of the benefits individual street-side trees provide. This tool is based on i-Tree's street tree assessment tool called STREETs. With inputs of location, species and tree size, users will get an understanding of the environmental and economic value trees provide on an annual basis.

The Tree Benefit Calculator is intended to be simple and accessible. As such, this tool should be considered a starting point for understanding trees' value in the community, rather than a scientific accounting of precise values. For more detailed information on urban and community forest assessments, visit the i-Tree website.

National Tree Benefit Calculator

Thank you for choosing this site to calculate the economic and ecological benefits of your tree.

Find your climate zone to get started:

Enter your zip code below:

-OR-

Select a zone from the map

The National Tree Benefit Calculator was conceived and developed by Casey Trees and Davey Tree Expert Co.
This 30 inch Western red cedar provides overall benefits of: $262 every year.

While some functional benefits of trees are well documented, others are difficult to quantify (e.g., human social and communal health). Trees' specific geography, climate, and interactions with humans and infrastructure is highly variable and makes precise calculations that much more difficult. Given these complexities, the results presented here should be considered initial approximations—a general accounting of the benefits produced by urban street-side plantings.

Benefits of trees do not account for the costs associated with trees' long-term care and maintenance.

If this tree is cared for and grows to 35 inches, it will provide $288 in annual benefits.
This 28 inch Lodgepole pine provides overall benefits of: $105 every year.

While some functional benefits of trees are well documented, others are difficult to quantify (e.g., human social and communal health). Trees’ specific geography, climate, and interactions with humans and infrastructure is highly variable and makes precise calculations that much more difficult. Given these complexities, the results presented here should be considered initial approximations—a general accounting of the benefits produced by urban street-side plantings.

Benefits of trees do not account for the costs associated with trees’ long-term care and maintenance. If this tree is cared for and grows to 33 inches, it will provide $70 in annual benefits.
Research Review and Summaries

Sponsors:
University of Washington
USDA Forest Service, U&CF Program
NGO partners

thanks to U of WA students:
Katrina Flora
Mary Ann Rozance
Urban Green :: Public Health & Well Being

> 2,000 articles

% distribution
Local Economics

Trees in cities are not grown and managed for products that can be bought and sold on markets, but they do provide many intangible services and functions! This article serves two purposes. First, it introduces valuation methods that are used to convert intangible benefits to dollar sums. Then, it shows how nonmarket valuations can support local decision-making.

Fast Facts

- The presence of larger trees in yards and as street trees can add from 3% to 15% to home values throughout neighborhoods.
- Averaging the market effect of street trees on all house values across Portland, Oregon yields a total value of $1.35 billion, potentially increasing annual property tax revenues $15.3 million.
- A study found 7% higher rental rates for commercial offices having high quality landscapes.
- Shoppers claim that they will spend 9% to 12% more for goods and services in central business districts having high quality tree canopy.
- Shoppers indicate that they will travel greater distance and a longer time to visit a district having high quality trees, and spend more time there once they arrive.
1. Community Economics

% distribution
Side Bar: Forest Econ 101
Economic Value of Urban Green Challenges!

Forest Products Industry
= market goods
excludable
identifiable ownership
expenses-revenues-profits

Trees/Green in Cities
= public goods
non-excludable
multiple “owners”
expenses-returns?-profits?
### Yard & Street Trees

<table>
<thead>
<tr>
<th>Value</th>
<th>Increase</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2%</td>
<td>mature yard trees (greater than 9-inch dbh)</td>
</tr>
<tr>
<td></td>
<td>3%</td>
<td>larger street trees (up to 100’ away)</td>
</tr>
<tr>
<td>3-5%</td>
<td>trees in front yard landscaping</td>
<td></td>
</tr>
<tr>
<td>6-9%</td>
<td>good tree cover in a neighborhood</td>
<td></td>
</tr>
<tr>
<td>10-15%</td>
<td>mature trees in high-income neighborhoods</td>
<td></td>
</tr>
</tbody>
</table>
## Tree Retention In Development

<table>
<thead>
<tr>
<th>Value</th>
<th>Increase</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase</td>
<td>18%</td>
<td>building lots with substantial mature tree cover</td>
</tr>
<tr>
<td></td>
<td>22%</td>
<td>tree-covered undeveloped acreage</td>
</tr>
<tr>
<td></td>
<td>19-35%</td>
<td>lots bordering suburban wooded preserves</td>
</tr>
<tr>
<td></td>
<td>37%</td>
<td>open land that is two-thirds wooded</td>
</tr>
</tbody>
</table>
Parks & Open Space proximate principle

<table>
<thead>
<tr>
<th>Value</th>
<th>Increase</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10%</td>
<td>inner city home located within 1/4 mile of a park</td>
</tr>
<tr>
<td></td>
<td>17%</td>
<td>home near cleaned-up vacant lot</td>
</tr>
<tr>
<td></td>
<td>20%</td>
<td>home adjacent to or fronting a passive park area</td>
</tr>
<tr>
<td></td>
<td>32%</td>
<td>residential development adjacent to greenbelts</td>
</tr>
</tbody>
</table>
Local Government Benefits

Civic Investment – Public Goods like schools, emergency response, roads

- street trees average positive effect on house values
- added up across Portland, Oregon
- yields a total value of $1.35 billion
- potentially increasing annual property tax revenues $15.3 million

Donovan & Butry. 2010
Landscape and Urban Planning
Trees & Crime Reduction

- trees in the public right of way are associated with lower crime rates
  - smaller, view-obstructing trees are associated with increased crime
  - larger trees are associated with reduced crime

Donovan & Prestemon. 2012. Environment and Behavior
why are values greater?
Landscape Preference
studies of the 1970s & 1980s

- people prefer natural over hardscape settings, and preferences are predictors of the use of environments
- nature elements – water, large trees, spatial definition
- residential satisfaction – nearby nature, and nature views from home
spatial configuration – cues to explore
Tree Planting and Neighborliness – 1990s

tree planting, shared goals, social cohesion

resilience development (2000s)
natural & social capital
community gardens - renewal

Parks & People Foundation, Baltimore
“3rd place” & social cohesion
Green & Crime Reduction

- vacant lot greening in Philadelphia (4 sections)
  - consistent reductions in gun assaults across 4 sections
  - consistent reductions in vandalism in 1 section

Nature & Psych Development
children’s play & imagination
Nature Deficits
Richard Louv
School & Learning
College students with more natural views from their dorm windows
  - scored higher on tests of capacity to direct attention
  - rated themselves as able to function more effectively

Green High School Campuses

- cafeteria & classroom window views with greater quantities of trees and shrubs
- positively associated with:
  - standardized test scores,
  - graduation rates
  - %s of students planning to attend a four-year college
  - fewer occurrences of criminal behavior

Matsuoka. 2010. Landscape & Urban Planning
nature recovery & schools

Parks & People Foundation, Baltimore
first phase - reading circle
nature recovery & schools

Parks & People Foundation, Baltimore
Parks & People Foundation, Baltimore

planning skills & efficacy
Place Attachment
personal connection to place & landscape

- individuals may actively steward places that have meaning and are part of place attachment
- residents that are more attached to their community have higher levels of social cohesion and social control, less fear of crime, and display more signals of physical revitalization of the neighborhood

Brown, Perkins, and Brown. 2003
Journal of Environmental Psychology
Social Ties & Community

- people who lacked social and community ties were more likely to die in a 9 year follow-up period, and was independent of self-reported physical health status at the study start
- male heart attack patients classified as being socially isolated and having a high degree of life stress had more than four times the risk of death of the men with low levels of both stress and isolation
Green Relationships
Improve Health & Well Being
Summary

- 40 years of research in social sciences and human dimensions
- Urban nature is profoundly important for human habitat – a wealth of public goods
- More than beauty, aesthetics, and ‘pretty’
- Direct and indirect economic values for
  - Homeowners
  - Neighborhoods
  - Local government
Human Dimensions of Urban Forestry and Urban Greening

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Nature and Consumer Environments
Research about how the urban forest influences business district visitors.

Trees and Transportation
Studies on the value of having quality landscapes in urban roadsides.

Civic Ecology
Studies of human behaviors and benefits when people are active in the environment.

Policy and Planning
Integrating urban greening science with community change.

Urban Forestry and Human Benefits
More resources, studies and links...

Projects Director
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www.naturewithin.info