Is Tree Management Worth the Trouble: Justifying Project Budgets

Kathy Wolf, Ph.D.
Research Social Scientist

University of Washington (Seattle) & USDA Forest Service, Pacific NW Research

Forest Resource Institute
Myrtle Beach, South Carolina
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Rural to Urban Landscape Gradient including interface
## Ecosystem Services Framework

<table>
<thead>
<tr>
<th>Supporting Services</th>
<th>Provisioning Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrient cycling</td>
<td>Food (crops, livestock, wild foods, etc...)</td>
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<tr>
<td>Soil formation</td>
<td>Fiber (timber, cotton/hemp/silk, wood fuel)</td>
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<tr>
<td>Primary production</td>
<td>Genetic resources</td>
</tr>
<tr>
<td></td>
<td>Biochemicals, natural medicines, pharmaceuticals</td>
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<td></td>
<td>Fresh water</td>
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<table>
<thead>
<tr>
<th>Regulating Services</th>
<th>Cultural Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air quality regulation</td>
<td>Aesthetic values</td>
</tr>
<tr>
<td>Climate regulation (global, regional, and local)</td>
<td>Spiritual and religious values</td>
</tr>
<tr>
<td>Water regulation</td>
<td>Recreation and ecotourism</td>
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<tr>
<td>Erosion regulation</td>
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<tr>
<td>Waste purification and waste treatment</td>
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<tr>
<td>Disease regulation</td>
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<td>Pest regulation</td>
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<tr>
<td>Pollination</td>
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<tr>
<td>Natural hazard regulation</td>
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</tbody>
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**Millennium Ecosystem Assessment 2005**
i-Tree Suite of Software ::
U.S. Forest Service
STRUCTURE | FUNCTION | VALUE | MANAGEMENT

Eco (UFORE) | Streets (STRATUM) | Hydro | Vue

photo credits: Seattle i-Tree Training by Al Zelaya
Improving Air Quality

Image courtesy of the Center for Urban Forest Research
Reducing Atmospheric Carbon Dioxide

Image courtesy of the Center for Urban Forest Research
Reducing Stormwater Runoff

Image courtesy of the Center for Urban Forest Research
Conserving Energy

Image courtesy of the Center for Urban Forest Research
Why are city trees & urban greening important?

human health, functioning, & well-being
Research Reviews

Urban Forestry/Urban Greening Research

Green Cities: Good Health

Metro nature - including trees, parks, gardens, and natural areas - enhance quality of life in cities and towns. The experience of nature improves human health and well-being in many ways. Nearly 40 years of scientific studies tell us how. Here's the research...

RESEARCH THEMES
- Livable Cities
- Place Attachment & Meaning
- Community Building
- Community Economics
- Social Ties
- Crime & Fear
- Reduced Risk
- Wellness & Physiology
- Active Living
- Healing & Therapy
- Mental Health & Functioning

www.greenhealth.washington.edu

first phase: June 2010
summaries complete: June 2012
additional products
Research Reviews

sponsors:
University of Washington
USDA Forest Service, U&CF Program
ARRA funding
NGO partners
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.\(^1,2\) 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.\(^9\)

- A study found 7% higher rental rates for commercial offices having high quality landscapes.\(^14\)

- Shoppers claim that they will spend 9% to 12% more for goods and services in central business districts having high quality tree canopy.\(^34\)

- 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.\(^36\)
1. Community Economics

% distribution
City Trees & Nature
Community Economics

- Residential real estate values - 3-7% with trees in yard
- Residential real estate values - 5-20%, proximity to natural open space
- Commercial property rental rates - 7%
- Increased rent values – ROW & yard trees (Donovan 2011)
- Improved consumer environments in business districts - 9-12% product spending
cubicle farms – efficient?
Attention Restoration Theory
Rachel & Stephen Kaplan U of MI
Workplace Nature Views

- **Well-being**
  - desk workers without view of nature reported 23% more ailments in prior 6 months

- **Job Satisfaction**
  - less frustrated and more patient
  - higher overall job satisfaction and enthusiasm

the
better
office
cubicle!

bottom line =
$$ benefits of trees & nature$$
Trees & Retail Environments Research
Trees & Shopper Environments Research

• Research Questions •
  trees and visual quality?
  trees and consumer behavior?
  trees and product pricing?

• Methods:
  mail out/in surveys
  national or local sample
  residents/nearby city residents

partners: U of Washington, NGOs, business organizations
funded by USDA Forest Service
Nature and Consumer Environments

Shoppers are increasingly interested in the experience of shopping, as well as the goods and services they expect to purchase. A series of studies has investigated associations between the urban forest and people's response to shopping settings.

These studies show that providing for trees in the streetscape is an important investment for a business community. The presence of a quality urban forest positively impacts shoppers' perceptions, and probably, their behavior. Information below includes research studies, reports, and guidelines.

Studies

Trees and Business - Growing Together A National Research Program

Trees provide environmental benefits in cities, but also contribute to urban livability. This research program was sponsored by several regions and communities. The findings have been consistent across large, small, and medium-sized cities. The most positive consumer response is associated with urban forests where overarching tree canopy helps create a "sense of place." The results across several research studies. Details of research found in sections below.

www.naturewithin.info
Methods

surveys

mailings across selected districts

person-to-person contact

interviews
Image Categories (sorted by ratings)

Pocket Parks
mean 3.72
(highest)

Full Canopy
mean 3.63

Scale: 1=not at all, 5=like very much,
26 images
Enclosed Sidewalk 3.32

Intermittent Trees 2.78
No Trees
mean 1.65
(lowest)
(high - 3.72)
1. Place Perceptions
   • Place Character
   • Interaction with Merchants
   • Quality of Products

2. Patronage Behavior
   • travel time, travel distance
   • duration & frequency of visits
   • willingness to pay for parking

3. Product Pricing
   • higher willingness to pay for all types of goods
   • higher in districts with trees – 9-12%
Product Pricing
“Companies stage an experience when they engage customers in a memorable way.”
Bell Town District, Seattle, WA
Austin, TX
2. Active Living :: Public Health

% distribution
Obesity Trends* Among U.S. Adults


(*BMI ≥30, or about 30 lbs. overweight for 5’4” person)

1990

No Data          <10%           10%–14%
15%–19%           20%–24%          25%–29%
≥30%

doubling of U.S. obesity rate since 1980s

1999

2009

Source: Behavioral Risk Factor Surveillance System, CDC.
Age-adjusted % of adults aged ≥20 years who are obese, 2007

Physical Inactivity & Obesity

majority of Americans not active enough
goal-30 minutes per day of moderate activity
to reduce risk factors for chronic diseases
(heart, stroke, cancer, diabetes)
significant costs to national health services

$168 billion medical costs
17% of all U.S. medical costs

CDC 2010
## City Trees & Nature

### Active Living

<table>
<thead>
<tr>
<th>Physical Environment</th>
<th>Positive Elements</th>
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<tbody>
<tr>
<td></td>
<td>higher population density (city core rather than suburbs)</td>
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<tr>
<td></td>
<td>higher housing density</td>
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<tr>
<td></td>
<td>mix of land uses (such as residential and retail)</td>
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<td></td>
<td>street design with more connectivity (rather than cul-de-sacs)</td>
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<td></td>
<td>availability of public transit</td>
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<td></td>
<td>walking and biking infrastructure (such as sidewalks and bike lanes)</td>
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<table>
<thead>
<tr>
<th>Psycho-Social Environment</th>
<th>Positive Elements</th>
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<tbody>
<tr>
<td></td>
<td>safety from crime</td>
</tr>
<tr>
<td></td>
<td>safety from traffic</td>
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<tr>
<td></td>
<td>absence of social disorder</td>
</tr>
<tr>
<td></td>
<td>aesthetics (including trees and landscape)</td>
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<td></td>
<td>educational campaigns (such as Walk-to-School)</td>
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<td>incentive programs (such as work place reimbursement for transit use)</td>
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</tbody>
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*Table 1: Determinants of City Walkability*
parks, open spaces & trails
make room for pedestrians
Nature, Human Health & Walkable Neighborhoods

- **Outcomes: Elderly People & Walking**
  - less illness
  - lower mortality rate

- **Environments: Neighborhood Streets (Tokyo)**
  - tree - lined
  - parks

Takano, Nakamura, Watanabe. 2002. 
Journal of Epidemiology & Community Health
trees & green = health & happiness
3. Healing & Therapy

% distribution
hospital healing gardens: patients; family and friends; professional staff

health care $$ savings
healing gardens
soothing
distracting
calm focus
Urban Trees and Birth Outcomes

“We found that a 10% increase in tree-canopy cover within 50m of a house reduced the number of small for gestational age births by 1.42 per 1000 births. Results suggest that the natural environment may affect pregnancy outcomes and should be evaluated in future research.”

Donovan et al., Health & Place, 2011
Civic Environmental Stewardship?

- Mostly volunteers, including event leaders
- Working on public parks & green belts
- Urban settings
Veteran/Soldier Stewards

- stress disorders
- disengaged (family, community)
- green jobs
- project start – early 2012
Community Priorities?
Design with Dignity!
Hilton Head, South Carolina
We have evidence!
So what?
Green Infrastructure
Pierce County WA, Chambers Creek Properties
Pierce County WA, Chambers Creek Properties - 4 year growth
Partnership for Sustainable Communities
community context and collaboration in transportation design
Complete the Streets!
cars/pedestrians/bikes
multi-modal systems
How About Gardening or Golfing at the Mall?

By STEPHANIE CLIFFORD
Published: February 5, 2012

Cleveland’s Galleria at Erieview, like many malls across the country, is suffering. Closed on weekends because there are so few visitors, it is down to eight retail stores, eight food-court vendors and a couple of businesses like the local bar association.

So part of the glass-covered mall is being converted into a vegetable garden.

“I look at it as space, I don’t look at it as retail,” said Vicky Poole, a Galleria executive. “You can’t anymore.”

Malls, over the last 50 years, have gone from the community center in some cities to a relic of the way people once wanted to shop. While malls have faced problems in the last, the Internet is now nulling even more sales away.
Red Fields – Green Fields
GA Tech U & partner cities

Red Fields to Green Fields is a research effort analyzing the effects of:

- Acquiring financially distressed properties (real estate “in the red”) in major U.S. cities
- Converting them into green space: public parks and adjacent land “banked” for future sustainable development.

The Problem

The Promise
Richard Florida
the Creative Class
An Integrated Approach
ECOSYSTEM SERVICES

All sites CAN provide ecosystem services

BROWNFIELD

GREYFIELD

GREENFIELD

© 2009 Sustainable Sites Initiative
CASE STUDIES

For more information, visit www.sustainablesites.org/cases

pilot sites :: revisiting metrics
EcoDistricts

The EcoDistricts Summit
Accelerating Sustainability at a District Scale
October 25-27, 2010
Portland, Oregon

Produced by the Portland Sustainability Institute, the EcoDistricts Summit is the premier annual conference dedicated to neighborhood-scale sustainability innovation.

- Deepen your understanding of the EcoDistricts Initiative and similar projects around the globe
- Connect with companies, practitioners, and policymakers involved with similar pilot programs and catalytic projects driving urban innovation
- Learn from integrated district-scale sustainability projects
- Explore the topics of district utilities, green buildings, smart grid, transportation, urban habitat, water management, waste management and community development

An Invitation from Mayor Sam Adams
EcoDistrict
Land Use + Trees!
Qingdao EcoBlock: Changing the paradigm for fast-paced Urban Development in China

**GOALS:**
- Mass replicable
- Economically viable
- Resource self-sufficient (water, waste, energy)
- 100% water recycled on site
- 75%+ reduced potable water demand
- 100% on-site renewable energy generation
- Encourage journeys by foot, bicycle and transit
- 60% to 60% site area to be green space

*Proposed Eco-Block*
Trees & Nature Benefits

- messages
- health
- quality of life
- ecosystem services
- public values
Research Reviews

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http://www.greenhealth.washington.edu

summaries complete: June 2012
additional products
study of economic valuation with MSU’s Dr. Grado