Research on Trees, Nature, & Public Benefits
Be Green, Be Well!

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South Florida Tree Summit
Miami, Florida
May 2012
Growing a healthy urban forest that provides a minimum of 30% tree canopy coverage and the maximum social, economic, and environmental benefits to the region.
An Integrated Approach
Evidence-based Metrics

HUMAN HEALTH & WELL-BEING

SOILS

MATERIALS

VEGETATION

HYDROLOGY
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).
Sustainable Sites Initiative :: SITES Case Studies

landscape function comparison

The Numbers Speak for Themselves

Traditional Landscape

Sustainable Landscape

<table>
<thead>
<tr>
<th>Water</th>
<th>Yard Waste</th>
<th>Maintenance Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>57,000 Gallons</td>
<td>670 Pounds</td>
<td>80 Hours</td>
</tr>
</tbody>
</table>

Consumption for one year based on 2005-2006 data.

<table>
<thead>
<tr>
<th>Water</th>
<th>Yard Waste</th>
<th>Maintenance Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>6,000 Gallons</td>
<td>250 Pounds</td>
<td>15 Hours</td>
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Why are city trees & urban greening important?

human health, functioning, & well-being

collaboration opportunities!
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
Research Reviews

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

**First phase:** June 2010

**Summaries complete:** Sept 2012

**Additional products**

[www.greenhealth.washington.edu](http://www.greenhealth.washington.edu)
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.
Urban Green :: Human Health & Well Being

> 2,100 articles

% distribution
Urban Forest Health Benefits

Metro Nature Trees Parks Gardens Enhances Quality Of

Green Cities_Good Health

Green Cities: Good Health
What science tells us

www.greenhealth.washington.edu

Produced by the University of Washington, College of the Environment - School of Forest Resources
Funded by the USDA Forest Service, Urban and Community Forestry Program

Uploaded by klora24 on Nov 3, 2011
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
Nature & the Workplace

cubicle farms . . . efficient?
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 influences shoppers’ perceptions, and probably, their behaviors. The information below includes research studies, booklets to help create and sustain beautiful streetscapes.

Studies

Trees and Business - Growing Together A National Research Program

Trees provide environmental benefits in cities, but also contribute to the economic growth of districts. These findings have been consistent across large, small, and medium-sized cities. The most positive consumer response is associated with urban forest where overarching tree canopies create a "green" streetscape environment. The results of research found in sections below.

Kathleen L. Wolf, Ph.D.
Research Coordinator
University of Washington
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%
“Companies stage an experience when they engage customers in a memorable way.”
2. Active Living :: Public Health

% distribution
Obesity Trends* Among U.S. Adults
(*BMI ≥30, or about 30 lbs. overweight for 5’4” person)

1990

1999

2009

doubling of U.S. obesity rate since 1980s

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>Positive Elements</th>
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<tr>
<td><strong>Physical Environment</strong></td>
</tr>
<tr>
<td>higher population density (city core rather than suburbs)</td>
</tr>
<tr>
<td>higher housing density</td>
</tr>
<tr>
<td>mix of land uses (such as residential and retail)</td>
</tr>
<tr>
<td>street design with more connectivity (rather than cul-de-sacs)</td>
</tr>
<tr>
<td>availability of public transit</td>
</tr>
<tr>
<td>walking and biking infrastructure (such as sidewalks and bike lanes)</td>
</tr>
<tr>
<td><strong>Psycho-Social Environment</strong></td>
</tr>
<tr>
<td>safety from crime</td>
</tr>
<tr>
<td>safety from traffic</td>
</tr>
<tr>
<td>absence of social disorder</td>
</tr>
<tr>
<td>aesthetics (including trees and landscape)</td>
</tr>
<tr>
<td>educational campaigns (such as Walk-to-School)</td>
</tr>
<tr>
<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*

encourage daily moderate activity
parks, open spaces & trails
Parks Prescription
San Francisco
Albuquerque
trees & green = health & happiness
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
3. Lifecycle & Gender

% distribution
Nature & Psych Development
children’s play & imagination
Nature Deficits
Richard Louv
http://www.treeclimbing.jp/
physically disabled & tree climbing!
recreational tree climbing – youth therapy
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

Tennessen & Cimprich. 1995. Journal of Environmental Psychology
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
Trees & Nature Benefits

- urban livability
- quality of life
- improved human habitat
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’
- Nature sustains economic value
  - Homeowners
  - Neighborhoods
  - Local government