Green Cities & Good Health

Austin State of the Urban Forest Summit

Dr. Kathleen Wolf
College of the Environment
University of Washington
January 2011
Tools for assessing and managing Community Forests

Assessing Urban Ecosystems
Find out how to assess all the trees in your community
visit here to begin

Assessing Street Tree Populations
Learn how to assess just the street trees in your community.
visit here to begin

Applications and Utilities
Access tools available for your tree management.
visit here to begin

The i-Tree Tools help quantify the structure, function, and value of tree populations. They provide a scientific process for data collection, analysis and quantification of the benefits.

Click here to find out more...
i-Tree Suite of Software

i-Tree Eco

i-Tree Streets

i-Tree Vue

i-Tree Storm

i-Tree Species

i-Tree Hydro
## Ecosystem Services

<table>
<thead>
<tr>
<th>ECOSYSTEM SERVICES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Provisioning Services</strong></td>
</tr>
<tr>
<td>Food (crops, livestock, wild foods, etc...)</td>
</tr>
<tr>
<td>Fiber (timber, cotton/hemp/silk, wood fuel)</td>
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<tr>
<td>Genetic resources</td>
</tr>
<tr>
<td>Biochemicals, natural medicines, pharmaceuticals</td>
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<tr>
<td>Fresh water</td>
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<tr>
<td><strong>Regulating Services</strong></td>
</tr>
<tr>
<td>Air quality regulation</td>
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<tr>
<td>Climate regulation (global, regional, and local)</td>
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<tr>
<td>Water regulation</td>
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<tr>
<td>Erosion regulation</td>
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<tr>
<td>Water purification and waste treatment</td>
</tr>
<tr>
<td>Disease regulation</td>
</tr>
<tr>
<td>Pest regulation</td>
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<tr>
<td>Pollination</td>
</tr>
<tr>
<td>Natural hazard regulation</td>
</tr>
<tr>
<td><strong>Cultural Services</strong></td>
</tr>
<tr>
<td>Aesthetic values</td>
</tr>
<tr>
<td>Spiritual and religious values</td>
</tr>
<tr>
<td>Recreational and economic</td>
</tr>
</tbody>
</table>

**Supporting Services**

- Nutrient cycling
- Soil formation
- Primary production

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**Millennium Ecosystem Assessment**

2005
Improving Air Quality

- Shade on Paved Surfaces and Parked Cars Reduces Evaporative Hydrocarbon Emissions and Ozone Formation
- Oxygen and Volatile Organic Compounds Released Through the Leaves
- Gaseous Pollutants Absorbed Through Leaf Stomata and Lenticels
- Small Particles Adhere to Surfaces
- Trees Save Energy for Cooling and Heating, Thereby Reducing Pollutant Emissions from Power Plants

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

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

human health, functioning, & well-being
Finding that study . . . . . .
Research Reviews

first phase: June 2010
summaries complete: Dec 2010
additional products

http://www.greenhealth.washington.edu
Research Reviews

sponsors:
University of Washington
USDA Forest Service, U&CF Program
NGO partners
a treasure trove!
1,706 articles

% distribution
City Trees & Nature
Active Living

<table>
<thead>
<tr>
<th>Positive Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical Environment</strong></td>
</tr>
<tr>
<td>higher population density (city core rather than suburbs)</td>
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<tr>
<td>higher housing density</td>
</tr>
<tr>
<td>mix of land uses (such as residential and retail)</td>
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<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>
</tr>
</tbody>
</table>

*Table 1: Determinants of City Walkability*
Obesity Trends* Among U.S. Adults

1985

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

Source: Behavioral Risk Factor Surveillance System, CDC.
Obesity Trends* Among U.S. Adults
2008

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

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

310-580,000 deaths per year
$100 billion medical costs (1995)
9.4% of all U.S. medical costs
Fat for Life?
Six Million Kids Are Seriously Overweight. What Families Can Do.
By Geoffrey Cowley & Sharon Begley
A brisk walk in the park keeps Harry II in shape because dog owners, like many others, get up early to give the 2-year-old Doberman its regular exercise. They typically jog 10 miles in Ballard Park.

*Canine Constitutional*
parks, open spaces & trails
make room for pedestrians
walkable places = health & happiness
Nature, Human Health & Walkable Neighborhoods

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

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

1,706 articles

% 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%
- Improved consumer environments in business districts - 9-12% product spending
directed attention fatigue
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
bottom line = $\text{benefits of trees & nature}$
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
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%
retail & place marketing

“Companies stage an experience when they engage customers in a memorable way.”

The Experience Economy

Work Is Theatre & Every Business a Stage

B. JOSEPH PINE II
JAMES H. GILMORE
Bell Town District, Seattle, WA
Austin, TX
typical retail street in urban Japan
Namba Parks, Osaka

view from nearby hotel
interior retail space
ground level
small plazas, retail entry
passive nature experiences
Namba Parks: retail success & nature experience benefits
Planning Guidelines for Trees and Retail Business

Pacific Northwest Chapter
International Society of Arboriculture
TREES ARE GOOD FOR BUSINESS
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 behavior below includes research studies, booklet to help create and sustain beautiful...

Studies

Trees and Business - Growing Together A National Research Program

Trees provide environmental benefits in cities, but also contribute to the health of residents, and their state has found that shoppers respond positively to urban green spaces. The most positive consumer response is associated with urban forests where overhanging tree canopy helps create a sense of serenity across several research studies. Details of research found in sections below.

www.naturewithin.info
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: Dec 2010
additional products

http://www.greenhealth.washington.edu
a treasure trove!
Nature & Psych Development
children’s play & imagination
Japanese Version Click Here

TREE CLIMBING® JAPAN
Dedicated to Teaching Tree Friendly, Safe Tree Climbing for Rehabilitation, Recreation and Research

Welcome | About Us | What’s New | Tree Stories | Tree School | TreeHab | TreeGear | Levels | Contact

http://www.treeclimbing.jp/
physically disabled & tree climbing!
recreational tree climbing (& youth therapy)
hospitals: healing gardens
Elders & Horticulture Therapy
方法
実験1:
課題①: 2種の土を混ぜる
課題②: 土を鉢に入れる
課題③: 花を鉢に植える

| 課題①④ | 15 | 10 | 20 | 10 | 20 | 10 | 20 |
| 課題② | 15 | 15 | 20 | 15 | 20 | 15 | 20 |
| 課題③ | 15 | 20 | 20 | 20 | 20 | 20 | 20 |

ベースライン タスク レスト タスク レスト タスク レスト

図．各課題の手順（数字は秒）
フォルダ装着位置は、額の正中位で且つ眉から1cm上とした
園芸作業中のOxy-Hb濃度変化
Community Resilience

collaborative resource management
Elinor Ostrom
Namba Parks, Osaka
engineered urban greening
Green Roof - Chicago City Hall

high-rise nature, preferred views
Nature & Livable Cities!
High Line Railway - W Manhattan
NUCFAC 2009 Annual Report
Trees & Nature Benefits

• messages • health • quality of life •
• community advantage • public values •
Human Dimensions of Urban Forestry and Urban Greening

What's New?

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...

Green Cities: Good Health
human health & well-being research.

Projects Director
Kathleen L. Wolf, Ph.D.

www.naturewithin.info