Linking People to the Landscape: urban greening for better health & well-being

Kathleen Wolf, Ph.D.
Research Social Scientist
University of Washington
College of the Environment

High Desert
Green Industry Conference
February 2014
Lubbesmeyer Studio & Gallery
Bend, OR
design matters!
in the background

nearby nature for human health & well-being
Eco (UFORE)
Streets (STRATUM)
Hydro
Vue

STRUCTURE
FUNCTION
VALUE
MANAGEMENT

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

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

Image courtesy of the Center for Urban Forest Research
Stormwater Management

Pierce County WA, Chambers Creek Properties
stormwater management

Parks & People Foundation, Baltimore
high land values
reduced public funds
community needs
new parks??

SO . . . . . .
multi-tasking nature
creating co-benefits
Tanner Springs Park
Portland OR
linked to active living network
neighborhood
social cohesion

environmental
education &
social learning
Urban Heat Island Effect

studies by NASA & EPA

urban trees = mitigation
Hilton Head, SC
Hilton Head, South Carolina
Urban Greening, Trees & Nearby Nature

benefits and life course cradle to grave
Urban Forests and Newborns
the natural environment may affect pregnancy outcomes . . .

10% increase in tree-canopy cover within 50m of a house
= lower number of low weight births (1.42 per 1000 births)

Donovan et al., Health & Place, 2011
Nature & Psych Development
children’s play & imagination
School & Learning
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
nature recovery & schools

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

Parks & People Foundation, Baltimore
planning skills & efficacy
What is the Evidence?

Urban Greening & Nearby Nature
Human Health, Welfare & Function
Finding that study . . . . . .
Research Reviews

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...

on-line resource summaries complete: soon!

next? economic valuation

www.greenhealth.washington.edu
Sponsors:
University of Washington
USDA Forest Service, U&CF Program
NGO partners

thanks to U of WA students:
Katrina Flora
Mary Ann Rozance
Sarah Krueger
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.\textsuperscript{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.\textsuperscript{9}
- A study found 7\% higher rental rates for commercial offices having high quality landscapes.\textsuperscript{14}
- Shoppers claim that they will spend 9\% to 12\% more for goods and services in central business districts having high quality tree canopy.\textsuperscript{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.\textsuperscript{34}
Datasheet for each theme

- research highlights
- one page briefing
- print & share
Urban Green :: Human Health & Well Being

> 2,600 articles

% distribution
Eco-Health Relational Browser
Environmental Protection Agency

www.epa.gov/research/healthscience/browser/
An urban ecosystem is a dynamic system that contains both built and natural elements on a regional scale. In an urban ecosystem, human, plant, and animal communities are situated within an urban environment. Urban ecosystems can mimic the function of natural ecosystems and thus provide their own important ecosystem services that contribute to human well-being in those urban areas. Various green environments such as shade trees, urban green spaces and urban forests can exist within a single urban region. The services provided by urban ecosystems include filtering water runoff, providing areas for physical activity and recreation such as hunting and bird watching, and mitigating the Urban Heat Island effect by capturing heat, absorbing incoming...
Click a topic bubble or choose a topic from the dropdown list above. Hover over linkages (+) to view relationship between elements.

- Urban Ecosystems
- Forests
- Urban Ecosystems
- Wetlands
- ADHD
- Aggression
- Anxiety
- Arthritis
- Asthma

Details
Description
--- Health Outcome ---

Birth Outcomes

Promotion of Physical Activity

Heat Mitigation

Engagement with Nature

Water Filtration

Water Regulation

Air Filtration

Citations of Key Studies
Guidetti. 2010: Hancock. 2002


Urban Greening & Health Evidence Framework
Adults

nature benefits and life course
cradle to grave
human health & well-being

workplace productivity
our evolution?!
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

ART Design Elements

- being away
- ‘soft’ fascination
- extent
- compatibility
human health & well-being

nearby nature & physical activity
City Trees and Public Health

- risks and toxics in the environment – one side of the story
- another perspective . . . . .
  Howard Frumkin
  Centers for Disease Control
  nature as health asset
- community and nature planning for health
EAB Tree Loss & Public Health

1990 to 2007, 1,296 counties in 15 states infected areas vs. no bugs
15,000 more deaths from cardiovascular disease
6,000 more deaths from lower respiratory disease
controlled for demographic, human mortality, and forest health data at the county level

Toledo, Ohio in 2006, pre EAB

2009, EAB in neighborhood

photos: Dan Herms, Ohio State University
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
+ $1,429 per person per year for obese vs not
CDC 2010
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
2010
(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)

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

Obesity Trends* Among U.S. Adults
BRFSS, 1990, 2000, 2010
(*BMI ≥30, or about 30 lbs. overweight for 5’ 4” person)

1990

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

2000

dothing of U.S. obesity rate since 1980s

2010

dothing of U.S. obesity rate since 1980s

Source: Behavioral Risk Factor Surveillance System, CDC.
overweight kids . . . obese adults

Obesity Is Found to Gain Its Hold in Earliest Years
By GINA KOLATA

Experts say the results of a major new study may reshape approaches to combating the nation's obesity epidemic, suggesting that efforts must start much earlier and focus more on the children at greatest risk.
### City Trees & Nature

### Active Living

<table>
<thead>
<tr>
<th>Physical Environment</th>
<th>Positive Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>higher population density (city core rather than suburbs)</td>
</tr>
<tr>
<td></td>
<td>higher housing density</td>
</tr>
<tr>
<td></td>
<td>mix of land uses (such as residential and retail)</td>
</tr>
<tr>
<td></td>
<td>street design with more connectivity (rather than cul-de-sacs)</td>
</tr>
<tr>
<td></td>
<td>availability of public transit</td>
</tr>
<tr>
<td></td>
<td>walking and biking infrastructure (such as sidewalks and bike lanes)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Psycho-Social Environment</th>
<th>Positive Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>safety from crime</td>
</tr>
<tr>
<td></td>
<td>safety from traffic</td>
</tr>
<tr>
<td></td>
<td>absence of social disorder</td>
</tr>
<tr>
<td></td>
<td>aesthetics (including trees and landscape)</td>
</tr>
<tr>
<td></td>
<td>educational campaigns (such as Walk-to-School)</td>
</tr>
<tr>
<td></td>
<td>incentive programs (such as work place reimbursement for transit use)</td>
</tr>
</tbody>
</table>

*Table 1: Determinants of City Walkability*
parks, open spaces & trails
make room for pedestrians
Physical Activity & Depression Reduction

- Review of 13 high quality studies
  - exercise recommended for mild to moderate depression
  - people who are willing & motivated
  - associated meditation and mindfulness are important

Shinrin-yoku  Forest Bathing

- extended forest walks
  - reduced ‘fight or flight’ nervous system activity
  - lower cortisol – a stress indicator
  - increased immune function
  - lower pulse rate & blood pressure
Urban Nearby Nature
Aging & Health
Nature, Human Health & Walkable Neighborhoods

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

- Outcomes: Elderly People & Walking
  - less illness
  - lower mortality rate over 5 years

Takano, Nakamura, Watanabe. 2002.
Journal of Epidemiology & Community Health
Effects of nature window view on recovery from surgery (Roger Ulrich, 1984)

- Shorter stays
- Less pain
- Fewer minor complications
- Better emotional well-being
PAIN CONTROL DURING BRONCHOSCOPY

80 patients undergoing bronchoscopy

40 viewed a pristine meadow scene, heard bubbling brook sounds

40 controls
80 patients undergoing bronchoscopy

40 viewed a pristine meadow scene, heard bubbling brook sounds

29.3% with “very good” or “excellent” pain control

40 controls

20.5% with “very good” or “excellent” pain control

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

health care $$ savings
healing gardens
soothing
distracting
calm focus
Future Research & Outreach Opportunities?
Restorative Nature
Beyond the City?
evidence about the importance of ‘nearby nature’
Urban Green :: Public Health & Well Being

> 2,600 articles

% distribution
Nature :: From Aesthetics to Necessity in Cities


Human Habitat
for more livable communities

- evidence says! experience of nature in cities is profoundly important for public health and human well-being

- ‘critical mass’ of high quality research, U.S. +

- reach out to new partners – medicine, public health, school board, elder services