Trees for Better Human Habitat: the evidence of health benefits

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evidence about the importance of ‘nearby nature’
City Trees, Urban Forests for Health . . . . . Habitat

scientific evidence
health & well being benefits
life course concept
‘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

Richard Louv - 
Last Child in the Woods
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

Matsuoka. 2010. Landscape & 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*
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

Branas et al. 2011. *American Journal of Epidemiology*
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
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
http://www.treeclimbing.jp/
physically disabled & tree climbing!
recreational tree climbing – youth therapy
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

parks, recreation, active transit
Effects of nature window view on recovery from surgery (Roger Ulrich, 1984)

- Shorter stays
- Less pain
- Fewer minor complications
- Better emotional well-being
hospital healing gardens: patients; family and friends; professional staff

health care $$ savings
Legacy Good Samaritan Medical Center
Stenzel Healing Garden 1997
Rehabilitation Institute of Oregon
Oregon Burn Center Garden
Hospital Staff – Respite and Support
Nature: A stress coping resource for employees 24-7

thanks to Teresia Hazen for slides
What is the Evidence?

Urban Greening & Nearby Nature
Human Health, Welfare & Function
Finding that study . . . . . .
Research Review and Summaries

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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.\(^1\)\(^,\)\(^2\) 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.\(^3\)^\(^4\)
- Shoppers claim that they will spend 9% to 12% more for goods and services in central business districts having high quality tree canopy.\(^3\)^\(^4\)
- 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.\(^3\)^\(^4\)
Metro Nature & Health Evidence Framework
Summary

nearly 40 years of health evidence
diverse health benefits
associated with diverse nearby nature

consider a habitat outlook
expand partnership & collaboration

current work . . . . .
urban forest benefits
Improving Air Quality

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

Image courtesy of the Center for Urban Forest Research
more than trees . . . nature & health evidence
Urban Tree Canopy Assessment

i-Tree analysis

City of Seattle
Top Down Mapping
plus understory vegetation
for human habitat

green space and school yard landscapes
forest = silviculture
forest = ecosystem
Remote Sensing-LIDAR

Remote Sensing-LIDAR

LiDAR response to built versus vegetative surfaces.

credit: Qian-Yi Zhou, Stanford University
Veg Assessment Explorations

oblique aerial view

LIDAR point cloud
Veg Assessment Explorations

ground view

LIDAR point cloud
Summary & Conclusions
Summary

• urban forests & urban greening provide human habitat for health
• throughout human life course!
• evidence? Green Cities: Good Health
• additional vegetation assessment
• economic implications – preliminary