Be Green – Be Well: city trees, nature, and parks evidence of public health

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Think Trees NM
Urban Tree Care Conference
January 2014
in the background

nearby nature for human health & well-being
City Trees & Urban Greening = Health Benefits

intuition to evidence
‘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
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
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
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

What is the Evidence?

Urban Greening & Nearby Nature
Human Health, Welfare & Function
**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...

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<th>RESEARCH THEMES</th>
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on-line resource

summaries complete: soon!

[www.greenhealth.washington.edu](http://www.greenhealth.washington.edu)
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
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.\(^1\),\(^2\) 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.\(^34\)
Datasheet for each theme

- research highlights
- one page briefing
- print & share

Local Economics

Influences of Trees and Vegetation on Property Values & Retail
Knowing the monetary value of things is important in our society. What is not counted does not count in public decision making. City trees are not grown and managed for products that can be bought and sold on markets, but they do provide many valuable services and benefits. Parks, gardens and green spaces also provide intangible, but measurable values. Economists and other social scientists have devised reliable nonmarket valuation methods to represent natural assets in the decision-making calculus of communities.

Research Highlights:

- While development costs can be greater for parcels where trees are conserved (5.5% in one study), builders can recoup extra costs of preserving trees through higher prices and faster sales for houses on wooded lots. (Bidle and Kinnan, 2003, New England Journal of Resource Economics, Sale and Anderson, 1992, Journal of Development Economics)
- The presence of larger trees in yards and on street trees can add from 3% to 15% to home values throughout residential neighborhoods. (Wall, 2007, Atlantic News)
- Averaging the market effect of street trees on all home values across Portland, OR (population 599,000) yielded a total value of $1.35 billion, generally increasing annual property tax revenues $1.5 million. (Bonner and Berry, 2010, Landscapers and Urban Foresters)
- Homes that are adjacent to naturalistic parks and open spaces are valued at 5-20% higher than comparable properties, with the positive price effect declining to about 1% after a mile away. (Converse, 2004, New England Journal of Resource Economics)

More information at: www.greenhealth.washington.edu

Additional social science about green effects on the economy of communities can be found at the Green Cities: Good Health web site (including research sources & citations).

This research outreach is supported by the USDA Forest Service, Urban and Community Forestry Program, as recommended by the National Urban and Community Forestry Advisory Council, and the University of Washington. Project Director is Kathleen Wolf, Ph.D. (kwolfe@u.washington.edu)
Urban Green :: Human Health & Well Being

> 2,600 articles
Eco-Health Relational Browser
Environmental Protection Agency

www.epa.gov/research/healthscience/browser/
Click a topic bubble or choose a topic from the dropdown list above. Hover over linkages (+) to view relationship between elements.

**Urban Ecosystems**

- **Air Filtration**
- **Water Regulation**
- **Engagement with Nature**

**Details**

**Description**
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 reflecting heat, absorbing impurities.
Click a topic bubble or choose a topic from the dropdown list above. Hover over linkages (+) to view relationship between elements.

**Urban Ecosystems**

- Air Filtration
- Water Regulation
- Water Filtration
- Promotion of Physical Activity
- Heat Mitigation
- Engagement with Nature

--- Health Outcome ---

- ADHD
- Aggression
- Anxiety
- Arthritis
- Asthma
- Birth Outcomes

Details

An urban ecosystem is a natural system that can exist within an urban environment. While not the natural home of many urban animal or plant species, an urban ecosystem can have health benefits for their own inhabitants. These benefits can include mental health benefits to those urban residents who use 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 replacing heat-absorbing impervious surfaces and increased shading from shade trees.

Citations of Key Studies

Guidotti. 2010: Hancock. 2002
Eco–Health Relationship Browser Bibliography

To show or hide an entry's abstract, click on the citation. Click blue citations to link to website source.

A


Urban Greening & Health Evidence Framework
Abraham Maslow
Hierarchy of Needs

- Physiological
  - Breathing, food, water, sex, sleep, homeostasis, excretion

- Safety
  - Security of: body, employment, resources, morality, the family, health, property

- Love/belonging
  - Friendship, family, sexual intimacy

- Esteem
  - Self-esteem, confidence, achievement, respect of others, respect by others

- Self-actualization
  - Morality, creativity, spontaneity, problem solving, lack of prejudice, acceptance of facts
Urban Nearby Nature
Aging & Health
a walk in the park!
Nature, Human Health & Walkable Neighborhoods

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

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

safe spaces 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

Physical Exercise Intervention in Depressive Disorders.
Scandinavian Journal of Medicine & Science in Sports
**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
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

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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
写真引用 福田正人，三國雅彦．近赤外線スペクトロスコピィNIRSによる統合失調症と感情障害の診断．図14．NIRSチャンネルと標準脳との対応．精神医学49(3). P241. 2007．
園芸作業中のOxy-Hb濃度変化

Graph showing the concentration changes of Oxy-Hb during garden work.

- **x-axis:** 0.1 sec
- **y-axis:** mM/mm

Lines in the graph represent:
- **1mix**
- **2fill**
- **3plant**
- **4cont**
hospital healing gardens: patients; family and friends; professional staff

health care $$ savings
healing gardens
soothing
distracting
calm focus
xeriscape for healing & therapy
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

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
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
Better Knowledge . . . .

• correlation to causal mechanisms
• dosage? how much, how often
• green space attributes
• multi-tasking green space; better integration with gray/green infrastructure
• benefit to cost assessments
• lifecycle & cultural specifics
Nature :: From Aesthetics to Necessity in Cities


Human Dimensions of Urban Forestry and Urban Greening

featuring research on peoples' perceptions and behaviors regarding nature in cities

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 . . .

Projects Director
Kathleen L. Wolf, Ph.D.

www.naturewithin.info