Crossing the Bridge: Natural Areas & Human Health

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Urban Natural Areas Seminar
12 January 2017
systems thinking

- Air Quality
- Stormwater
- Waste Water
- Solid Waste
- Cultural Heritage
- Biota
- Energy
- Connectivity
- Public Art
- Carbon
- Bmp's
- Community Identity
- Social Capital
- Active Mobility
- Exercise & Fitness
- Noise
- Heat Island
- Allergens
- Credit: American Planning Association
WHO Health Definition

A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (1946)
Diversity in Metro Nature

Nearby nature includes a variety of spaces and places.

Urban Forest Canopy

Biophilic Design

Parks and Gardens

Green Stormwater Infrastructure
including natural areas public access?
evidence of health benefits?
Green Cities: Good Health
www.greenhealth.washington.edu

Sponsors:
USDA Forest Service, U&CF Program
University of Washington
NGO partners

Thanks!
to U of WA students:
Katrina Flora
Mary Ann Rozance
Sarah Krueger

Research Reviews & Summaries
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.
Green Cities: Good Health
database of >4,000 peer reviewed publications
how to interpret the evidence?
Discovery: Human Health Benefits Across the Life Cycle
Urban Forests and Newborns
the natural environment affects 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; Hystad et al., Env Health Perspectives 2014
Hygiene Hypothesis

- presence of soil bacteria in body, *Mycobacterium vaccae* = increased serotonin
- may alleviate depression
- dirt or Prozac?

Lowry et al. 2007. Neuroscience
Eat Dirt!
Walking Programs

children
elders
families

walking meetings
Shinrin yoku (forest bathing)

- extensive research
- restorative experiences
- workers retirees
- networked system, 52 bases in Japan
Green Streets for Walkability

evidence of lower frustration and higher meditation when moving into the greener streets

Aspinall et al. 2013. The Urban Brain: Analysing Outdoor Physical Activity with Mobile EEG. British Journal of Sports Medicine
Improving Depression

20 adults with major depression walk in a park setting and a built setting

- 50-minute walks one week apart

before-after testing:

- Mood: Positive and Negative Affect (PANAS)
- Cognition: Backward Digit Span (BDS)

Berman et al. 2012. *Journal of Affective Disorders*

cognitive and affective improvements after walking in a nature setting
Alzheimer’s Disease & Dementia
Provide wander gardens & horticulture therapy

10.5% reduction in amount of medications used in dementia facility

30% fewer falls, accompanied by a reduction in fall severity

Detweiler et al. 2009. *American Journal of Alzheimer’s Disease and Other Dementias*
• Iraq/Afghan wars: Brain injury and PTSD in 30% of force
• Military/Vet suicides: 20% of all U.S. suicides
• Drugs and surgery relatively *ineffective*

**project support:** The TKF Foundation, Nature Sacred program

**slides credit:** Frederick Foote, M.D.
Project Manager for the Green Road Project
The Green Road Project
A model program of the Institute for Integrative Health
Naval Support Activity Bethesda
Home of Walter Reed National Military Medical Center
The Green Road: Healing with *Wild* Nature

- Natural woodland
- Maximum encounter, minimum disruption
- Highlight core elements
  - Water – Stone – Trees - Animals
woody debris :: fallen tree trunks symbolize the fallen soldiers’ legacy in conflicts
Stream restoration heals the landscape and invites access to the water
measures of veterans (and associates):
cognition
mental health
physiology and healing
social
Veterans Outdoor Therapy

Les Winkeler/The Southern Illinoisan

World-Herald News Service

Hope for the Warriors

Outward Bound
Military Service & Health Impacts

• Military service to civilian transition
• Prevalence of Stress Response
• Service carry-overs
  • Purpose/mission oriented
  • High commitment & exertion
  • Advanced skill sets
  • Social cohesion/comraderie
Civic Stewardship for Healing

urban forest restoration
community tree plantings

American Forests

Tree People, Los Angeles

parks
public gardens
street trees
eighborhood
community gardens

The Heights Community Garden, Dayton OH

local food
food security
child education
nutrition
food donations
why is this important?


* Research and publications were funded in part by the U.S.D.A. Forest Service, National Urban and Community Forestry program, as recommended by the National Urban and Community Forestry Advisory Council (NUCFAC).
annual value of $11.7 billion U.S. (2015 dollars)

- cradle to grave human life cycle
- varied expressions of urban greening (metro nature)
- evidence based human health and wellness benefits
- just beginning the analysis!
Nearby nature experiences are important across the entire life cycle, from cradle to grave.

**INFANTS**

**BIRTH WEIGHT**

*Potential Economic Value: Savings on Annual Health Care Costs.*

Birth weight influences long-term childhood health and development, and has been linked to some adult diseases. Low birth weight is associated with both short- and long-term health care costs, such as longer hospital stays and increased illness. Pregnant women that have more tree canopies and green space near their homes generally have babies with healthier birth weights.

**IMMUNE FUNCTION**

*Economic Indicators:* Stronger immune system leads to reduced illness and chronic disease across a lifetime.

We are most vulnerable to the early months of our lives, when the body and mind are growing and developing at an astounding rate. The "hygiene hypothesis" suggests that early contact with outdoor microbes stimulates the development of healthy immune responses.

**FAMILY DYNAMICS**

*Economic Indicators:* Improved family dynamics, perhaps reducing mental health treatment and counseling services.

An infant's parents and siblings adjust their lives after a baby arrives, and the changes can bring on stress and anxiety. Nature visits and walks help reduce these conditions and improve interactions between people within the household.

**CHILDREN & TEENS**

**OVERALL HEALTH AND WELL-BEING**

*Potential Economic Value: Increased Physical Activity, Reduced Asthma, and Reduced Risk of Adult Skin Conditions.*

Reduced stress in a child's surroundings can reduce immediate and ongoing health impacts. Nature is a positive influence, playing in nature helps children develop learning, social, and interpersonal skills that improve health and later life achievement.

**ADHD**

*Potential Economic Value: Savings on Medication Savings Per Year.*

Millions of children ages 5-17 are treated for Attention Deficit Hyperactivity Disorder (ADHD) in the U.S. Nature exposure is a potential alternative treatment, studies show that activity within nature or green spaces, such as play or just 20 minutes of walking, can reduce symptoms.

**FUTURE FINANCIAL SUCCESS**

*Potential Economic Value: $1.32 Increase in High School Graduates' Lifelong Annual Income.*

School performance affects both near-term self-sufficiency and long-term success. Having green spaces near classrooms and common spaces in schools can improve students' capacity to direct attention and feel less stressed. Green high school landscapes are linked to higher graduation rates.

**ADULTS**

**DEPRESSION AND STRESS**

*Potential Economic Value: Reduced Fractures, Mental Distress, and Depression.*

Being highly scheduled lives take their toll. Nature experiences reduce stress. Nearly 1 in 8 adults experience major depression each year in the U.S., and mental, behavioral, and neurocognitive disorders are a leading cause of disability. Nature experiences support resilience and rehabilitation for improved mental health, mood, and life function. Improved mental health and function reduce disease treatment costs, and improve work productivity.

**CARDIOVASCULAR DISEASE**

*Potential Economic Value: Annual Savings on Medication Based on a 1%-Reduction in Medication Expenditures.*

Cardiovascular disease is the leading cause of premature death in the U.S. People who have slight reduced risk of CVD (or their neighborhoods have greater nature coverage, particularly tree canopy), however it is worth noting the majority of studies have focused on men.

**CRIME & SAFETY**

*Potential Economic Value: Annual Savings on Medical Services, Not Counting the Value of Home Caregiver Services.*

About one in five older adults experienced mental and cognitive disorders, with age being the greatest risk factor. In 2010, about 11% of people aged 65 or older were affected with Alzheimer's disease. Those with dementia have three times as many hospital stays per year as other elders. Encounters with nature improve symptoms related to cognitive disorders, such as agitation, depression, and reduced mobility.

**OLDER ADULTS**

**MOBILITY & QUALITY OF LIFE**

*Potential Economic Value: Savings on health-care costs from falls per year.*

One in three older adults falls each year, giving rise to fatal and nonfatal injuries. Residents' falls within their care facilities are particularly expensive medical situations. Being in nature maintains personal mobility, leading to reduced falls and reduced need for medications. For those who are socially isolated are more likely to be unhealthy, as gardening and nature walking activities that promote social interactions support positive lifestyles and quality of life.

**HYPERTENSION**

*Potential Economic Value: Savings on treatment costs annually.*

Hypertension, or high blood pressure, is one of the most expensive conditions impacting older adults. Views of nature, particularly forest, and "forest bathing" (walks in natural forest settings) decrease diastolic rates.

**COGNITIVE DISORDERS**

*Potential Economic Value: Annual Savings on Medical Services, Not Counting the Value of Home Caregiver Services.*

Conclusions:

Nature experiences can reduce the financial burden and improve the quality of life for individuals across the life cycle. The economic benefits extend to reducing health care costs, increasing productivity, and promoting overall well-being. By investing in nature-based solutions, communities can foster healthy, resilient systems that support the health and economic prosperity of all residents.
the suggestion?

coop- design for co-benefits
consider user & visitor benefits
welcome but guide
Access Prohibited
making sense & legibility

cues to care

right amount of complexity
The Green Road, Bethesda
Summary

• evidence-based human health & wellness benefits
• across the human life cycle, from cradle to grave
• economic values
• co-design for co-benefits of natural areas
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...

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

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