Crossing the Bridge: 
Natural Areas & Human Health

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SYSTEMS THINKING

- AIR QUALITY
- STORMWATER
- ENERGY
- COMMUNITY IDENTITY
- SOCIAL CAPITAL
- ACTIVE MOBILITY
- NOISE
- EXERCISE & FITNESS
- BIOTA
- BMP’S
- CARBON
- CONNECTIVITY
- PUBLIC ART
- CULTURAL HERITAGE
- WASTE WATER
- SOLID WASTE
- 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)
Determinants of Health
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?
Access Prohibited
evidence of health benefits?
Green Cities: Good Health
www.greenhealth.washington.edu

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NGO partners

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

Research Reviews & Summaries
Green Cities: Good Health

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
Walter Reed National Military Medical Center, Bethesda, MD

- 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

Leah 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
neighborhood
community gardens

The Heights Community Garden, Dayton OH

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


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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:**

85.8% 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 canopy and green space near their homes generally have babies with healthier birth weights.

**IMMUNE FUNCTION**

Elevated inflammatory markers and reduced immune system activity are associated with reduced health and well-being. Children who spend time outdoors have lower levels of inflammation and a stronger immune system. Spending time in nature can reduce stress and help regulate the immune system.

**FAMILY DYNAMICS**

Improving family dynamics, particularly reducing mental health treatment and counseling services, can positively impact the overall health and well-being of children and families.

**ADHD**

**POTENTIAL ECONOMIC VALUE:**

9.8% SAVINGS ON MEDICATIONS FOR ADHD PER YEAR

Children with ADHD often benefit from regular outdoor activities, which can help reduce symptoms and improve overall behavior.

**CARDIOVASCULAR DISEASE**

**POTENTIAL ECONOMIC VALUE:**

7% SAVINGS ON TREATMENT COSTS ANNUALLY

Regular outdoor activities, such as walking and playing, can help reduce the risk of cardiovascular disease.

**CRIME & SAFETY**

**POTENTIAL ECONOMIC VALUE:**

$6B SAVINGS IN REDUCED COSTS OF CRIME FOR VICTIMS AND PROPERTY OWNERS PER YEAR

Outdoor spaces can provide safe places for children to play and reduce the risk of crime.

**ADULTS**

**DEPRESSION AND STRESS**

**POTENTIAL ECONOMIC VALUE:**

1.4% SAVINGS ON MEDICATIONS AND TREATMENT COSTS PER YEAR

Spending time in nature can help reduce symptoms of depression and stress.

**MOBILITY & QUALITY OF LIFE**

**POTENTIAL ECONOMIC VALUE:**

$15-20.4B SAVINGS ON HEALTH CARE COSTS FROM FALLS PER YEAR

Regular outdoor activities can help improve mobility and reduce the risk of falls and injuries.

**OLDER ADULTS**

**HYERTENSION**

**POTENTIAL ECONOMIC VALUE:**

1.8% SAVINGS ON MEDICATIONS PER YEAR

Regular outdoor activities can help reduce blood pressure and lower the risk of hypertension.

**COGNITIVE DISORDERS**

**POTENTIAL ECONOMIC VALUE:**

$7.5-10.1B SAVINGS ON MEDICAL SERVICES, NOT COUNTING THE VALUE OF HOME CAREGIVER SERVICES

Regular outdoor activities can help improve cognitive function and reduce the risk of cognitive disorders.

Contributing analysts:
Dr. Stephen Grado & Marcus Measells, MSU; Dr. Alicia Robbins, Weyerhaueser
the suggestion?

co-design for co-benefits
consider user & visitor benefits
welcome but guide
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

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.

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

Urban Forestry and Human Benefits
More resources, studies and links...

Projects Director
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