the canopy of a city
urban forest benefits
in the background

trees & metro

nature for

human health & well-being
Trees for Human Health & Well-Being
Human Dimensions of Urban Forestry

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Western Tree Management Symposium
The Human Side of the Urban Forest
2015 Summer Workshop
July 23, 2015
Human Dimensions of Urban Forestry and Urban Greening

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

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
Kathleen L. Wolf, Ph.D.
WHO health definition

a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (1946)

science & evidence re: environment role of ‘metro nature’?
not a panacea, but important!
Determinants of Health
Environment = Toxin, Risk

Love Canal, Niagara Falls, OH

EPA QUANTA RESOURCES SUPERFUND SITE

WARNING: Hazardous substances present in soil and sediment. No Trespassing.

For further information call the U.S. Environmental Protection Agency (800) 346-5009
Beyond Toxicity
Human Health and the Natural Environment

Howard Frumkin, MD, DrPH, FACP, FACOEM

Abstract: Research and teaching in environmental health have centered on the hazardous effects of various environmental exposures, such as toxic chemicals, radiation, and biological and physical agents. However, some kinds of environmental exposures may have positive health effects. According to E.O. Wilson’s “biophilia” hypothesis, humans are innately attracted to other living organisms. Later authors have expanded this concept to suggest that humans have an innate bond with nature more generally. This implies that certain kinds of contact with the natural world may benefit health. Evidence supporting this hypothesis is presented from four aspects of the natural world: animals, plants, landscapes, and wilderness. Finally, the implications of this hypothesis for a broader agenda for environmental health, encompassing not only toxic outcomes but also salutary ones, are discussed. This agenda implies research on a range of potentially healthful environmental exposures, collaboration among professionals in a range of disciplines from public health to landscape architecture to city planning, and interventions based on research outcomes.


American Journal of Preventive Medicine, 2001
Overview

- evidence of human health? Green Cities: Good Health web site
- ~ 40 years of research, > 3K peer-reviewed publications
- cradle to grave benefits
- mental health & function
- the public paradox
talk #1

Community Trees, Urban Forests, Metro Nature for Health

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; Hystad et al., Env Health Perspectives 2014
Nature & Psych Development
children’s play & imagination

Richard Louv -
Last Child in the Woods
Fiddleneck Forest School
Washington Park Arboretum (Seattle)
cognitive
social &
physical
learning
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!
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

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
combatting obesity
U.S. moderate activity recommendations

parks, active living, active transit
A brisk walk in the park keeps Nero II in shape because dog owners, like owners, Columbus residents Caroli Anderson, get up early to give her 7-year-old Doberman his regular exercise. They usually do 10 miles in Bertime 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

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
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
Elders: mobility & social connections
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*

www.rph.org/eden.html
Questions or Comments?
talk #2

Nearby Nature & Mental Health

urban lifestyles
increased poor mental health
evidence of nature benefits
mental health & function
% of U.S. Population Using Mental Health Medications
2001 vs 2010

America’s State of Mind, Medco Health Solutions, Inc
Prevalence of Adult Antidepressant Use

2010

America’s State of Mind, Medco Health Solutions, Inc
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
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

Improving Depression

20 adults with major depression walk in a park setting and an urban setting

- 50-minute walks one week apart
- before-after testing:
  - Mood: Positive and Negative Affect (PANAS)
  - Cognition: Backward Digit Span (BDS)

Cognitive and affective improvements after walking in a nature setting

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

Source: Berman MG et al. Interacting with nature improves cognition and affect for individuals with depression. *J Affective Disorders* 2012;140:300-05.
Change in % Population on ADHD Treatments
2001 - 2010

America’s State of Mind, Medco Health Solutions, Inc
ADHD and nature contact

- 17 children aged 7-12 with diagnosed ADHD
- 20-minute guided walks
  - Park
  - Neighborhood
  - Downtown
- Pre-walk puzzles
- Post-walk cognitive test

Faber Taylor & Kuo. 2009. Journal of Attention Disorders
ADHD and nature contact

- 96 children aged 7-12 diagnosed ADD or ADHD
- Parents gave postactivity attentional functioning ratings (PAAF) – 4 measures:
  - Can’t stay focused on unappealing tasks (homework or chores)
  - Can’t complete tasks
  - Can’t listen and follow directions
  - Easily distracted

Faber Taylor. 2001. Environment & Behavior
Mental Health & Function not only diagnosed concerns just doing better!
our evolution?!
life is hectic!

trying to multi-task

‘out of balance’
Attention Restoration Theory
Rachel & Stephen Kaplan, U of MI
directed attention
fatigue . . . .
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
the better office cubicle!

bottom line = $$ benefits of trees & nature
Nature and Creativity

http://www.jimkukral.com/
role of nature in creativity development

http://daycare.sulekha.com
Give Your Ideas Some Legs

creative test – analogy generation

conditions: sit inside, treadmill walk, walk outside, wheelchair outside

walking outside produced most novel & highest quality analogies – walking opens up free flow of ideas

Oppezzo & Schwartz. 2014. Journal of Experimental Psychology
Nature & Creative Professionals

focused interviews in Denmark

nature:
makes us more curious
supports flexible thinking
recharges directed-attention

aids 2 phases of the creative process:
Preparation phase and Incubation phase

sensory dimensions: space & serene

Plambech & Konijnendijk van den Bosch. 2015.
Urban Forestry & Urban Greening
Mindfulness

Mind Full, or Mindful?
constant busyness

attempted multi-tasking

‘out of balance’

Anna and Elena Balbusso, NY Times
Nature and Mindfulness

focus
soft fascination
undirected attention

Attention Restoration Theory, Kapan & Kaplan

credit: Michael Hellgren
Mindfulness/Meditation Training

- meta analysis; clinical/non situations
- focus on moment-to-moment experience and mental awareness
- more veridical perception (reality check)
- reduce negative affect
- improve vitality and coping
- medical symptoms & sensory pain

Mindfulness/Meditation Training

- healthy workplace employees
- 8 week mindfulness training
- brain electrical activity – positive affect
- brain activation – reduce stress event response
- more antibodies after influenza vaccine = better immune function

Davidson et al. 2003. Alterations in Brain and Immune Function Produced by Mindfulness Meditation. Psychosomatic Medicine
Trees & Emotion

Kathy’s big climb!
Ascending the Giants

Portland, Oregon

Old-growth Ecology Tour

The third aspect of the Old Growth Eco Tour is a vertical exploration in an ancient grove of towering Douglas-Fir, Grand Fir and Western Red Cedar. Here, the ATG team will assist your 230 foot ascent toward the top of an old growth tree with PhD Ornithologist, Dr. David Anderson, for a captivating view over the nation’s largest and wildest city park, Forest Park. Dr. Anderson will be your personal guide explaining the ecological functionality of this forest and the forest/urban forest interface.

Explore and experience the true Northwest in an actual Oregon old-growth forest grove in a real and unique manner that is guaranteed to be safe and unforgettable.

Speaker Line
Participant Line

Pacific Northwest Chapter
ISA
talk #3

Public Paradox

beauty & aesthetics
benefits evidence
modest public investment
meager public commitment – why?
Finding that study . . . . .
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 review & 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.
The TKF Foundation
Open Spaces Sacred Places

Integrated Design and Research Projects
10 Years
100 Gardens
10,000 Journal Entries

Open Spaces
Sacred Places
FrameWorks designs, conducts and publishes communications research to prepare nonprofit organizations to expand their constituency base, to build public will, and to further public understanding of specific social issues.
Findings: Public View of Nature, Cities, and Health

the presentation included draft findings

final report will be released by Frameworks and the TKF Foundation at a later date
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Urban Forestry and Human Benefits
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