measure the canopy of a city
STRUCTURE

FUNCTION

VALUE

MANAGEMENT

Eco (UFORE)
Streets (STRATUM)
Hydro
Vue
tools provided by USDA
Forest Service

photo credits: Seattle i-Tree Training by Al Zelaya
Improving Air Quality

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

Image courtesy of the Center for Urban Forest Research
Stormwater Management

Pierce County WA, Chambers Creek Properties
Pierce County WA, Chambers Creek Properties - 4 year growth
stormwater management

Parks & People Foundation, Baltimore
Tanner Springs Park
Portland OR
linked to active living network
neighborhood social cohesion

environmental education & social learning
Stormwater Report, online April 2014 (search health)

cobenefit opportunities
Urban Forest Pharmacy: Nature for Healthy Communities

Kathleen Wolf, Ph.D.
Research Social Scientist

University of Washington (Seattle)
School of Environmental and Forest Sciences
USDA Forest Service, Pacific NW Research Station

Urban Forestry & Green Infrastructure
MS Annual Urban Forestry Conference
August 20 & 21, 2015
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
in the background

trees & metro

nature for

human health & well-being
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.
Mental Health treatment & therapy
Restorative Nature Benefits Only Beyond the City?
urban forest &

nearby nature benefits
% 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*
Mental Health & Function
just doing better!
‘nearby nature’ experiences
passive encounters for benefit
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
bottom line = $$ benefits of trees & nature

the better office cubicle!
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
Hospital Staff – Respite and Support
Nature: A stress coping resource for employees 24-7

thanks to Teresia Hazen for slides
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
Nature and Creativity

http://www.jimkukral.com/
role of
time
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
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
urban nature & health benefits across the life cycle
Change in % Population on ADHD Treatments
2001 - 2010

America’s State of Mind, Medco Health Solutions, Inc
% of Americans Ages 20-44 on ADHD Meds

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*
Nature & Psych Development
children’s play & imagination

Richard Louv - Last Child in the Woods
Fiddleneck Forest School
Washington Park Arboretum (Seattle)
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!
Summary

- evidence of human health? Green Cities: Good Health
- ~ 40 years of research, > 3K peer-reviewed publications
- nearby nature for better mental health & function
- ADHD, attention restoration theory, creativity, mindfulness