in the background
trees & forests provide so many benefits!
the canopy of a city
Eco (UFORE)  
Streets (STRATUM)  
Hydro  
Vue  

tools provided by USDA  
Forest Service  

STRUCTURE
FUNCTION
VALUE
MANAGEMENT

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

Shade on Paved Surfaces and Parked Cars Reduces Evaporative Hydrocarbon Emissions and Ozone Formation

Oxygen and Volatile Organic Compounds Released Through the Leaves

Gaseous Pollutants Absorbed Through Leaf Stomates and Lenticels

Small Particles Adhere to Surfaces

Trees Save Energy for Cooling and Heating, Thereby Reducing Pollutant Emissions from Power Plants

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

Image courtesy of the Center for Urban Forest Research
To Your Good Health!
trees & nature for wellness

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University of Washington (Seattle, USA)
College of the Environment

Barcham Trees – Big Barn Conference
June 17, 2015
evidence about human wellness & ‘nearby nature’
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
Community Trees, Urban Forests, Metro Nature for Health

scientific evidence
health & well being benefits
life course concept
‘cradle to grave’
THE LIFESPAN OF A WOMAN FROM THE CRADLE TO THE 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
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

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
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
our evolution?!
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
What is the Evidence?

Trees, Urban Greening, Metro Nature Human Health, Welfare & Function
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.
To Your Good Health!

disease prevention!
health promotion!

fine-tuning the tree message
enlisting more partners
Trees as Place-Makers
back
on
track . .
combatting obesity
U.S. moderate activity recommendations

parks, active living, active transit
A brisk walk in the park helps Warrier II stay in shape between dog shows. His owner, Columbus resident Carlos Silverio, got up early to give her 3-year-old Shiba Inu his regular exercise. They typically walk 10 miles in Sherwood 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

Takano, Nakamura, Watanabe. 2002.
Journal of Epidemiology & Community Health
Green Streets for Walkability

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

Aspinall et al. 2015. 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

Hygiene Hypothesis

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

Lowry et al. 2007. Neuroscience
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

health care $$ savings
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

Tim Lynch Associates
urban forest benefits
Summary
nearly 40 years of health evidence
diverse health benefits
‘cradle to grave’

trees/nature for disease prevention
& health promotion
economic value potential
expand partnership, collaboration
& clients
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