Trees & Human Health

talk about trees with us!

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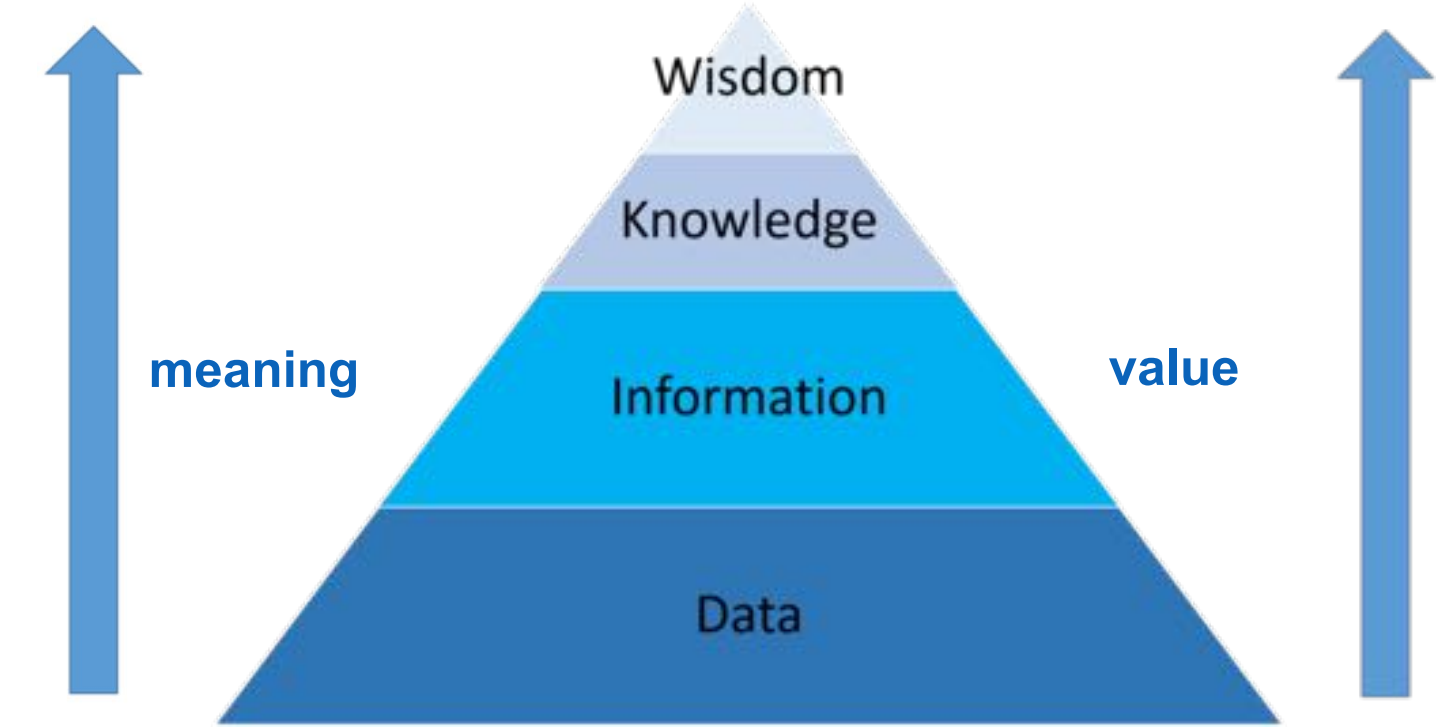
Puyallup Watershed Initiative

2 August 2019

What do we know?
Evidence of Trees & Human Health

What are the evidence ‘stories’?

What is the economic value?


Wisdom
Knowledge
Information
Data
meaning
value

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

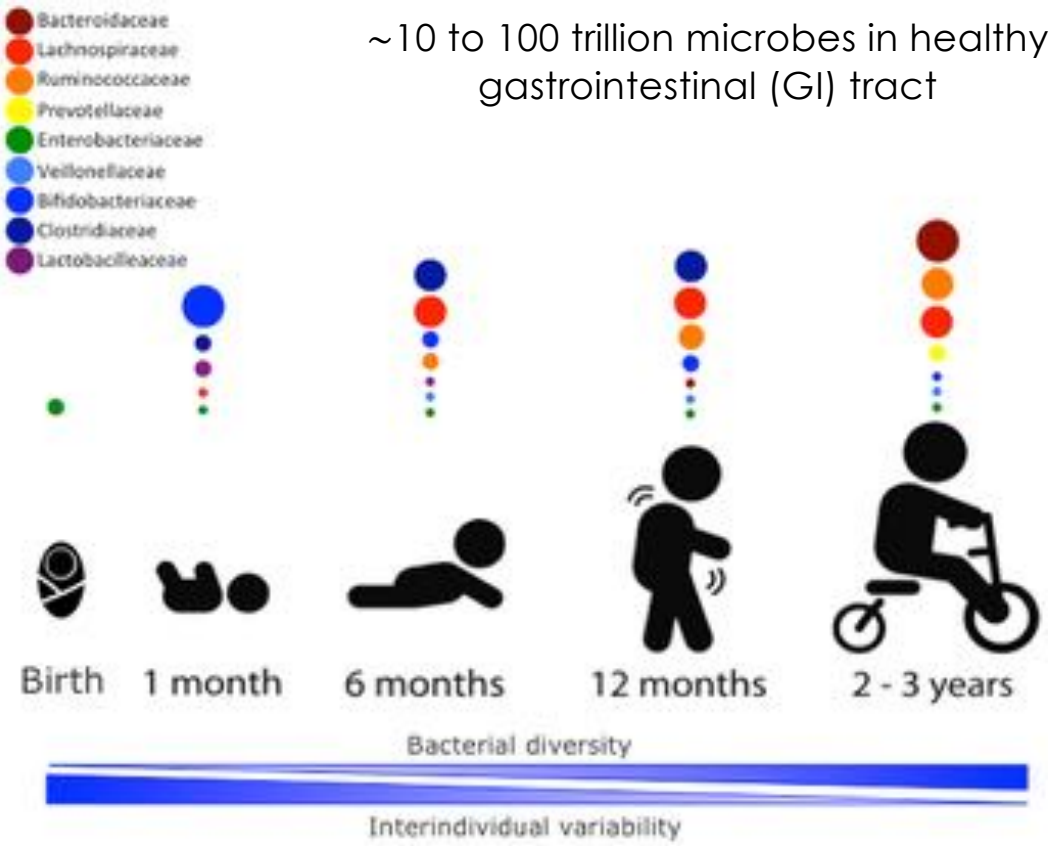
Healthy Microbiome

Bloomfield et al.
2016 Perspectives
in Public Health

- control obesity & asthma
- boost immune function
- improve mental health

put aside the Hygiene Hypothesis

need contact with ‘Old Friends”

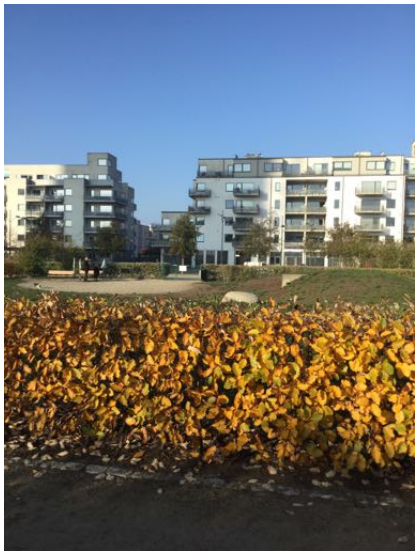


~10 to 100 trillion microbes in healthy gastrointestinal (GI) tract

intestinal microbiome development

Arrieta et al. 2014. Frontiers in Immunology

Design for Nature Contact

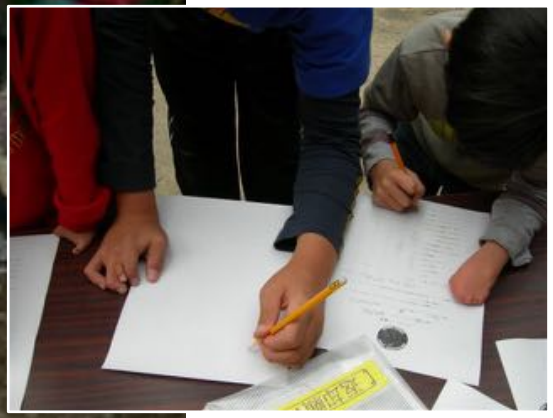


Trees & Physical Activity

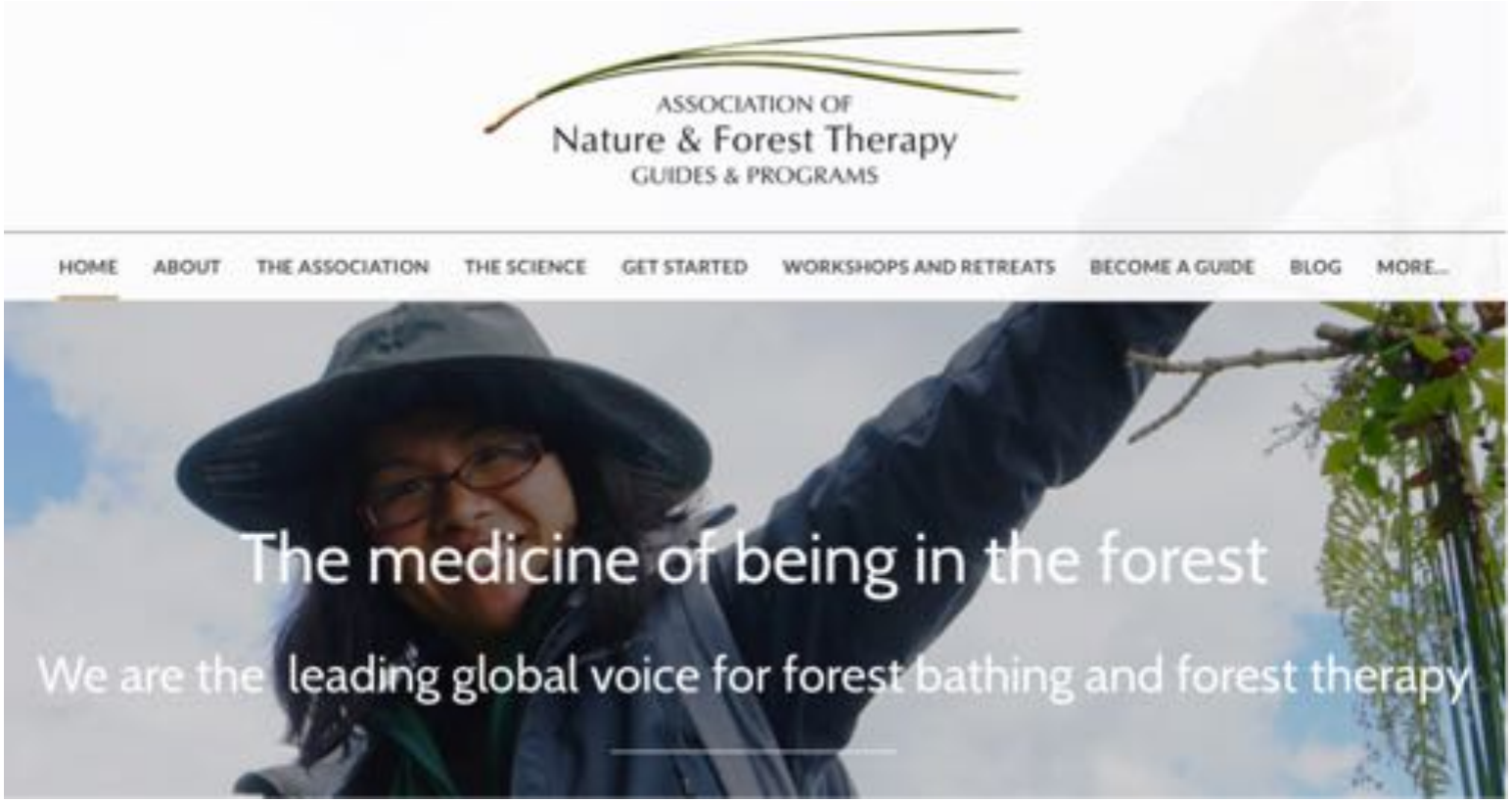
- school children in cities grades 6 to 8
- relationship of tree cover to outside-of-school physical activity
- **5% increase in treed area cover = 5% increase in free-time physical activity**

Janssen et al. 2015. International Journal of Behavioral Nutrition and Physical Activity

www.treeclimbing.jp/



physically disabled & tree climbing!



Santa Rosa, California

Ascending the Giants, Portland OR

public health officials
moderate activity
recommendations
parks, active living, active transit

Donovan et al. 2013. Journal of Preventive Medicine

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

photo credits: Dan Herms, Ohio State U

Sacramento Study :: LIDAR x CHIS data

7,900 adults, 250 m buffer, covariates

more tree cover

= better overall health

= better social cohesion

Ulmer et al. 2016. *Health & Place*. Multiple health benefits of urban tree canopy: The mounting evidence for a green prescription.

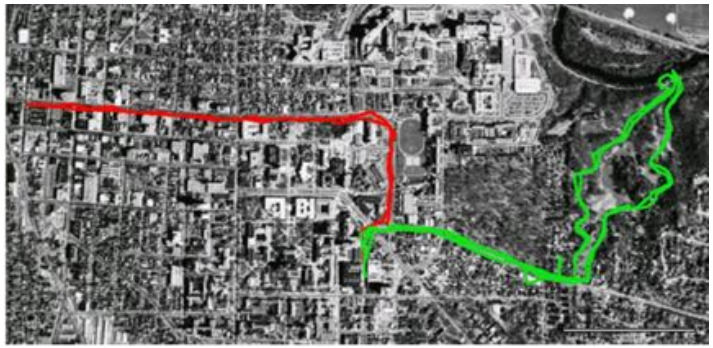
Improving Depression

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 & affective improvements after walking in a nature setting



ed 0-60%

s recovery

of a video (%)

Jiang, et al. 2016. Environment and Behavior 48, 607-629.

City Trees & Human Health

newborn & infant health

increased physical activity for kids

student therapy

overall adult health

social cohesion

respiratory & cardiovascular health

reduced depression

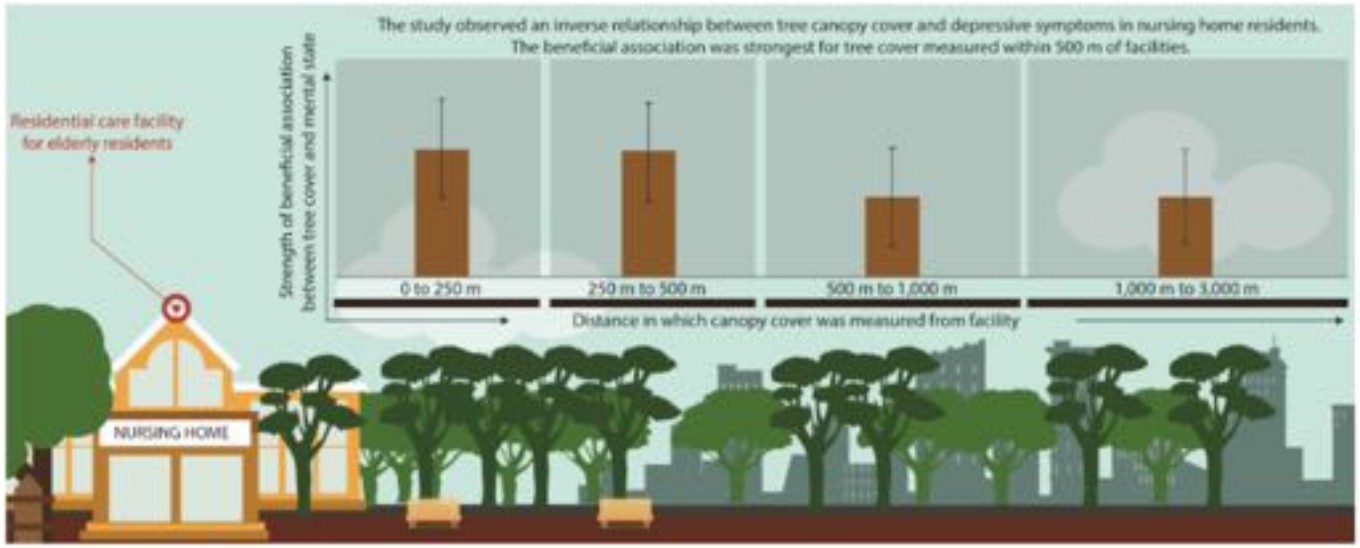
elder care improvements

Story: Nature for Human Health Benefits Across the Life Cycle

Urban Forestry & Urban Greening
Volume 41, May 2019, Pages 23-32

Tree cover shows an inverse relationship with depressive symptoms in elderly residents living in U.S. nursing homes

Matthew H.E.M. Browning [a, b], Kangjae Lee [b], Kathleen L. Wolf [c]



JAMA Network | Open

Original Investigation | Public Health

Association of Urban Green Space With Mental Health and General Health Among Adults in Australia

Thomas Astell-Burt, PhD; Xiaoqi Feng, PhD

Key Points

Question What type of green space is associated with better mental health?

Findings In this cohort study of 46 786 adults older than 45 years, exposure to 30% or more tree canopy compared with 0% to 9% tree canopy was associated with 31% lower odds of incident psychological distress, whereas exposure to 30% or more grass was associated with 71% higher odds of prevalent psychological distress after adjusting for age, sex, income, economic status, couple status, and educational level. Similar results were found for self-rated fair to poor general health but not physician-diagnosed depression or anxiety.

Meaning Investments specifically in tree canopy may provide more support for mental health.

The Urban Forest, Trees, & Green Space

Green Cities: Good Health

www.greenhealth.washington.edu

Sponsors:

USDA Forest Service,
(U&CF Program + Pacific NW Research)
University of Washington
NGO partners

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

Research Reviews & Summaries

Urban Forestry/Urban Greening Research

Green Cities: Good Health

Community Building
Local Economics
Place Attachment & Meaning
Crime & Fear
Safe Streets
Active Living
Reduced Risk
Wellness & Physiology
Healing & Therapy
Mental Health & Function
Work & Learning
Culture & Equity
Lifecycle & Gender

Local Economics

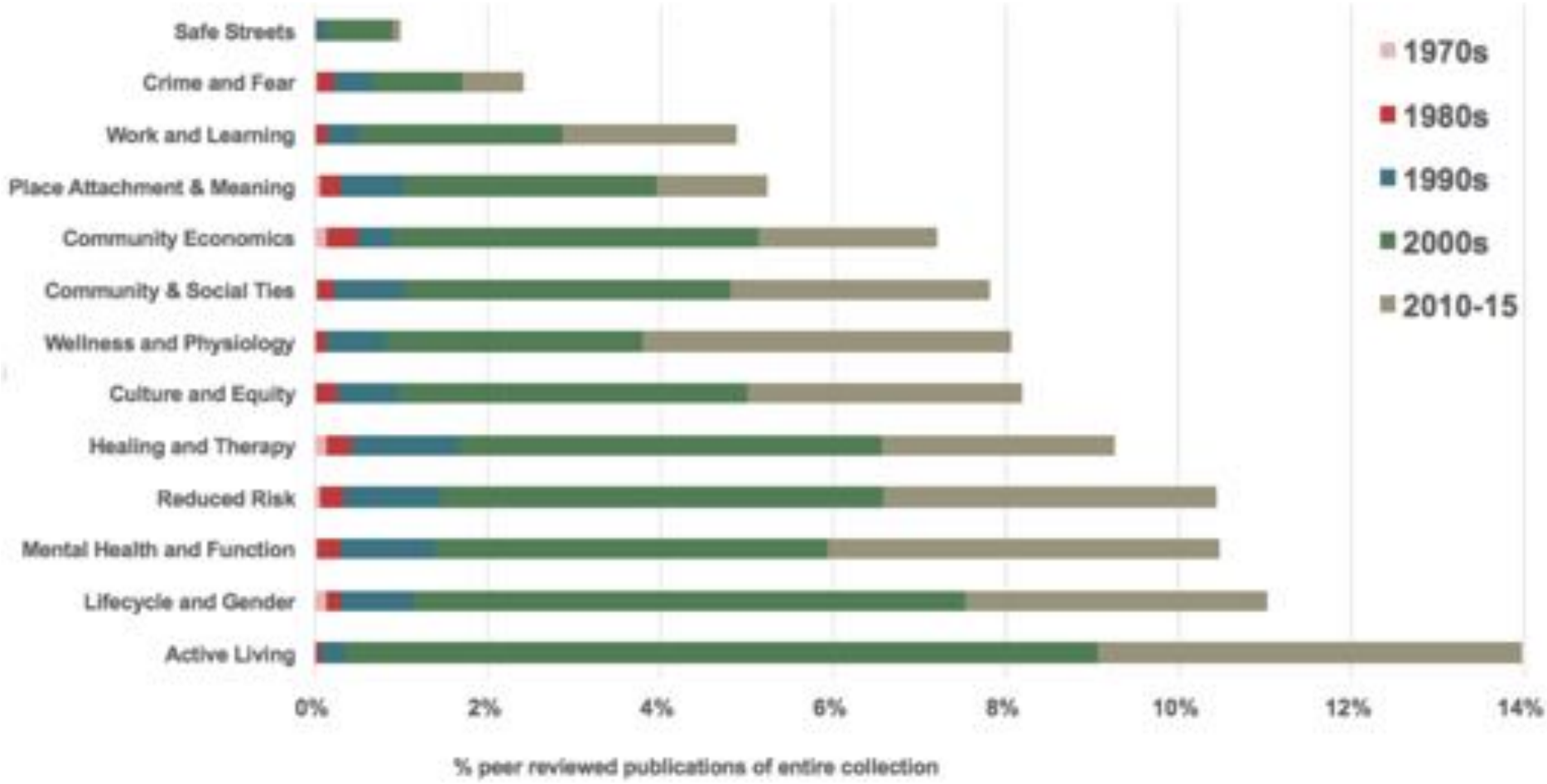
Trees in cities are not grown and managed for products that can be bought and sold on markets, but they do provide many intangible services and functions! This article serves two purposes. First, it introduces valuation methods that are used to convert intangible benefits to dollar sums.[1,2] Then, it shows how nonmarket valuations can support local decision-making.

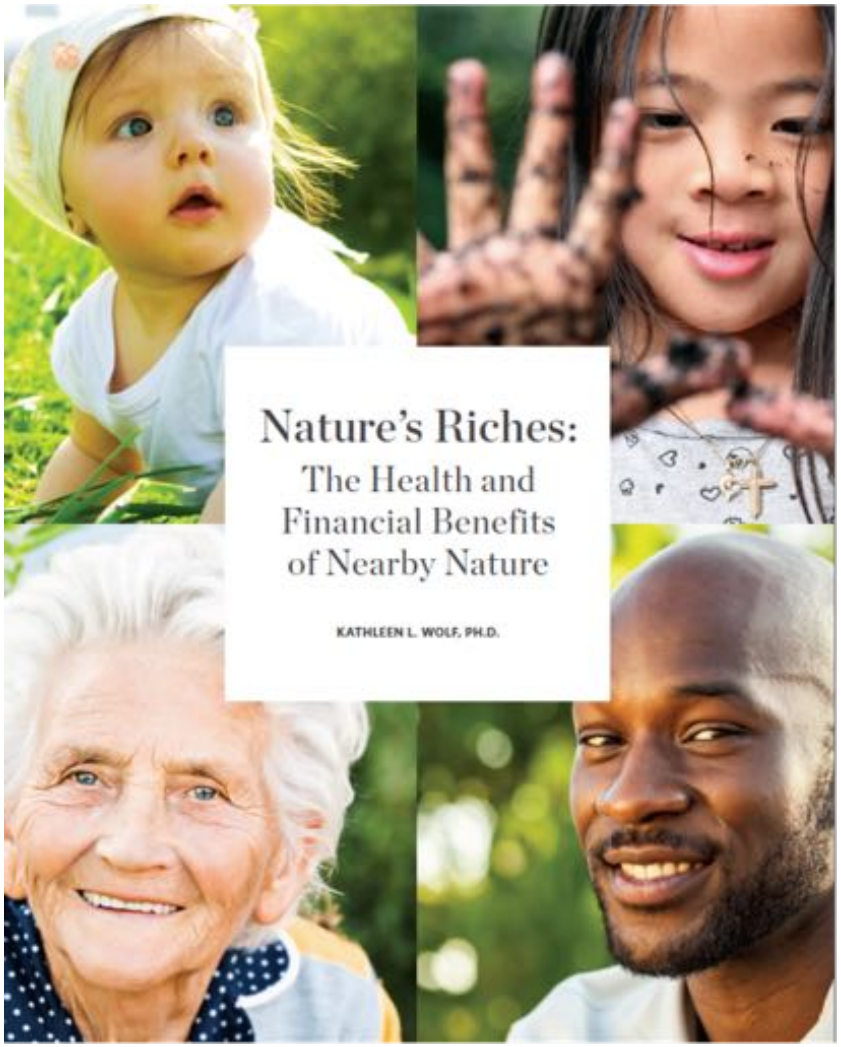
street trees boost market value of houses, providing tax revenue for communities

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.[9]
- A study found 7% higher rental rates for commercial offices having high quality landscapes.[14]
- Shoppers claim that they will spend 9% to 12% more for goods and services in central business districts having high quality tree canopy.[34]
- 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.[34]

Green Cities: Good Health > 4,500 peer reviewed publications



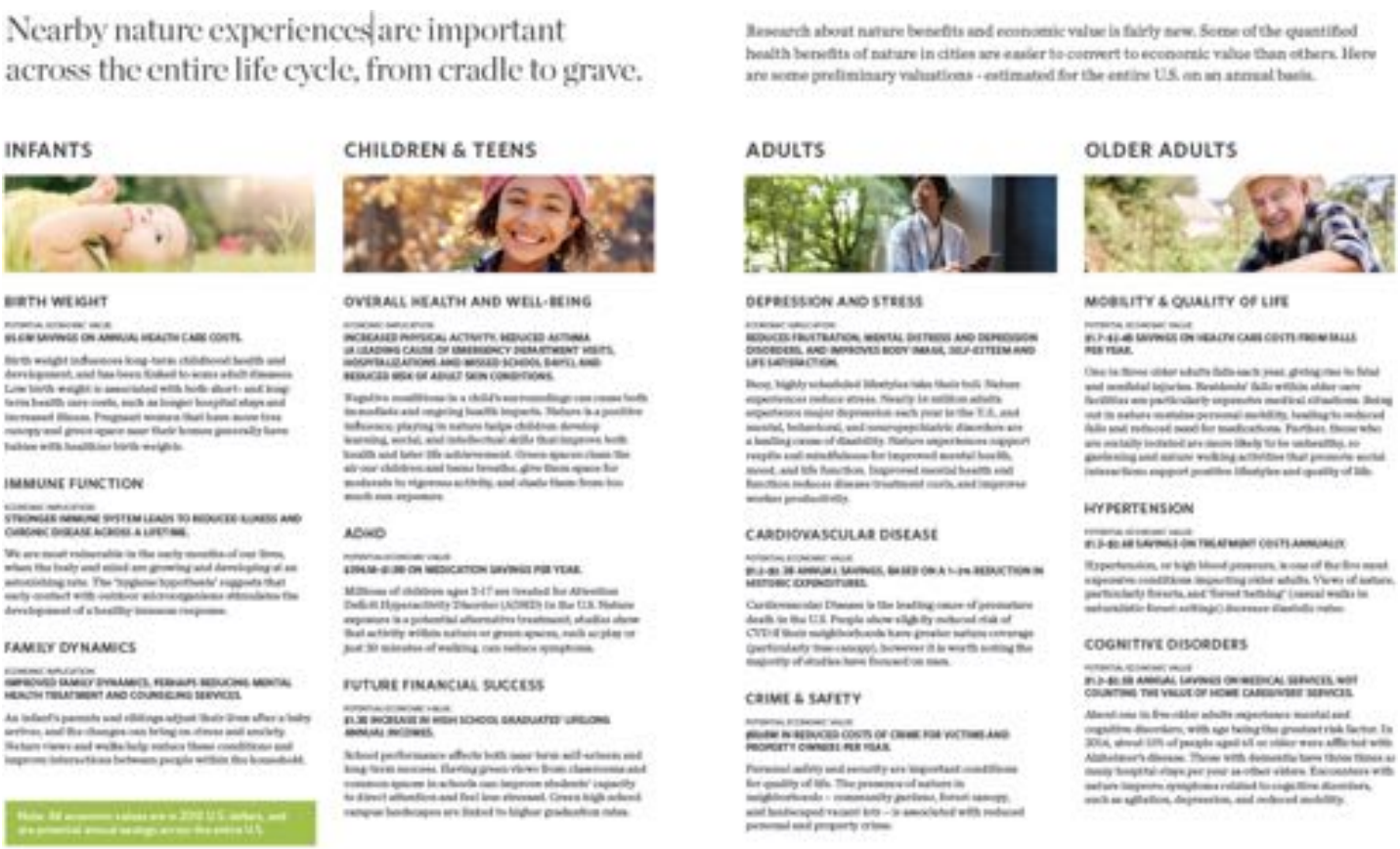


design milepost

author: USDA Forest Service

printing: The Nature Conservancy

also in Spanish!
and Arabic!



Nearby nature experiences are important across the entire life cycle, from cradle to grave.

Research about nature benefits and economic value is fairly new. Some of the quantified health benefits of nature in cities are easier to convert to economic value than others. Here are some preliminary valuations - estimated for the entire U.S. on an annual basis.

INFANTS

BIRTH WEIGHT

IMMUNE FUNCTION

FAMILY DYNAMICS

CHILDREN & TEENS

OVERALL HEALTH AND WELL-BEING

ADHD

FUTURE FINANCIAL SUCCESS

ADULTS

DEPRESSION AND STRESS

CARDIOVASCULAR DISEASE

CRIME & SAFETY

OLDER ADULTS

MOBILITY & QUALITY OF LIFE

HYPERTENSION

COGNITIVE DISORDERS

contributing analysts:
Dr. Stephen Grado & Marcus Measells, MSU; Dr. Alicia Robbins, Weyerhaueser

What do we know?
Evidence of Trees & Human Health

What are the evidence 'stories'?

What is the economic value?

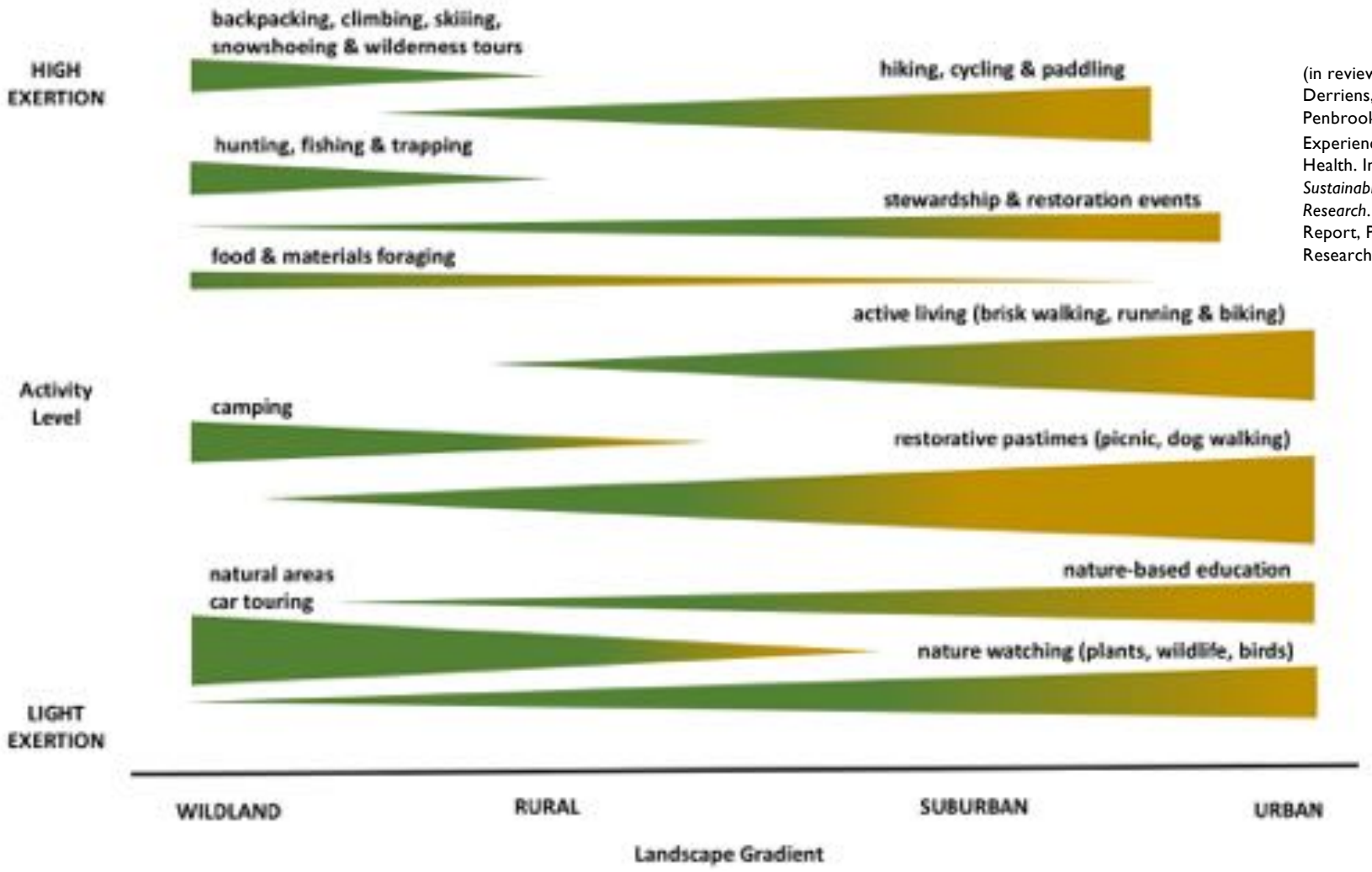
Last thoughts . . .

Access

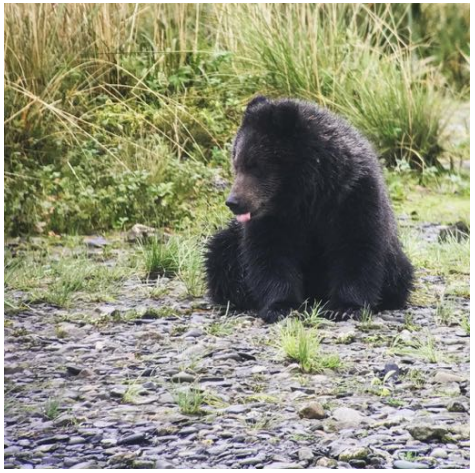
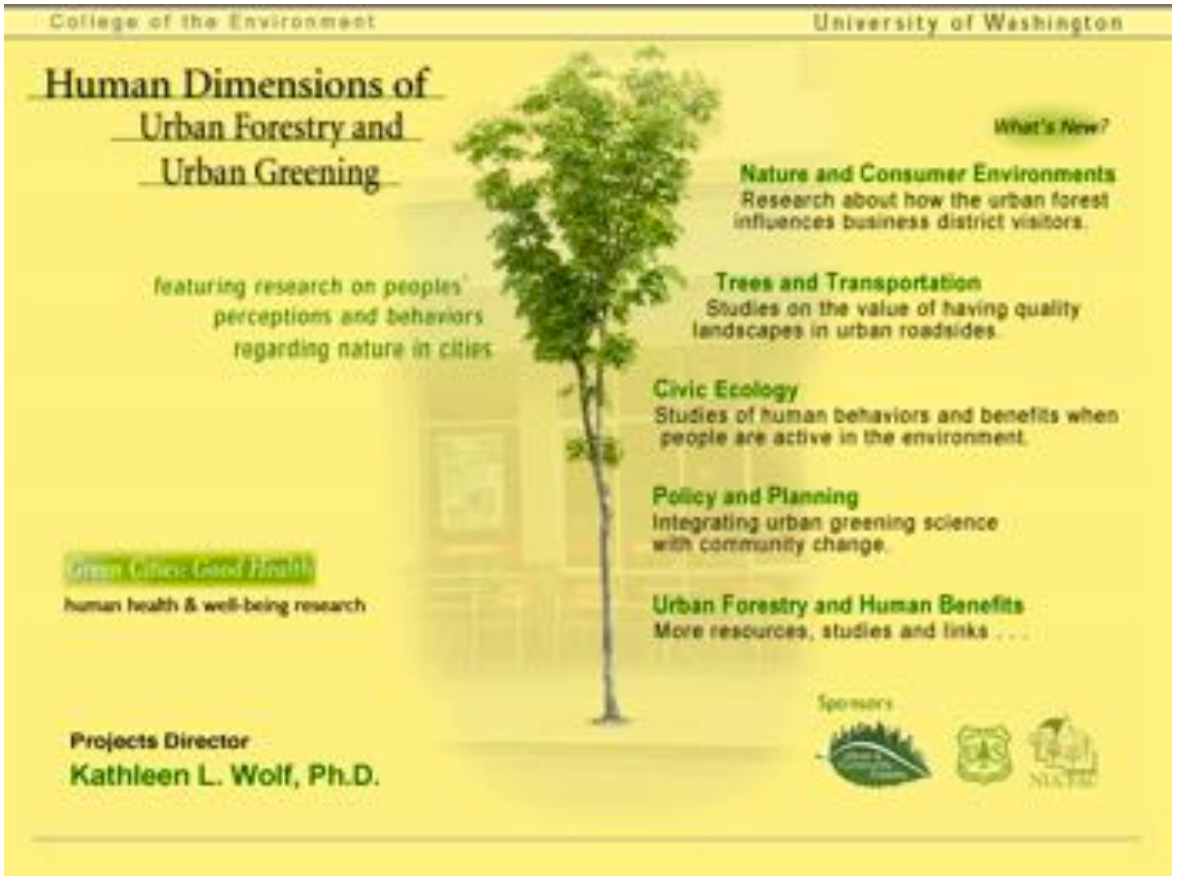
Equity

Everyday

Last thoughts . . .



(in review) Wolf, K.L., M. M. Derriens, L.E Kruger, T.L. Penbrooke. Nature, Outdoor Experiences, and Human Health. In: edited, *Re-imagining Sustainable Recreation Research*. General Technical Report, Pacific Northwest Research Station.



www.naturewithin.info