But Will There Be Forests?
Local Policy & Conservation

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University of Washington, College of the Environment

Forest Bathing International Conference

12 July 2019

What do we know?
Evidence of Trees & Human Health

What should we do?
Local Government Policy

Where is this going?
Some Random Thoughts!

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

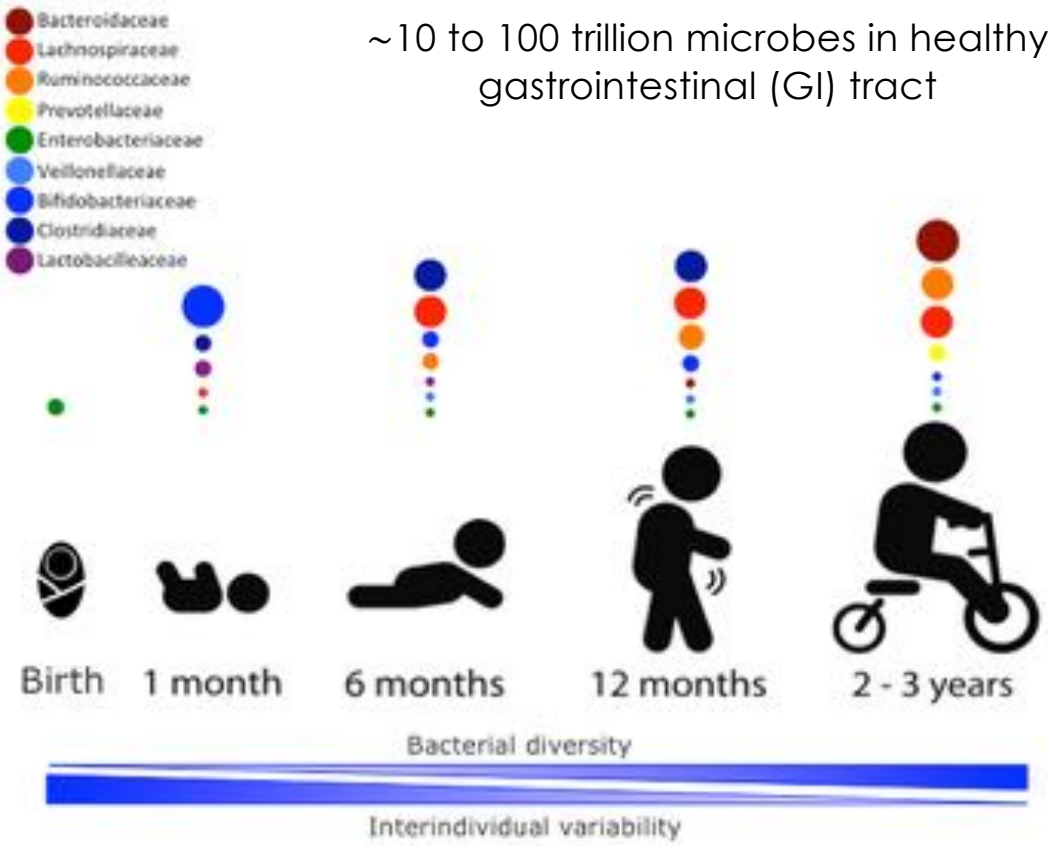
Healthy Microbiome

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”

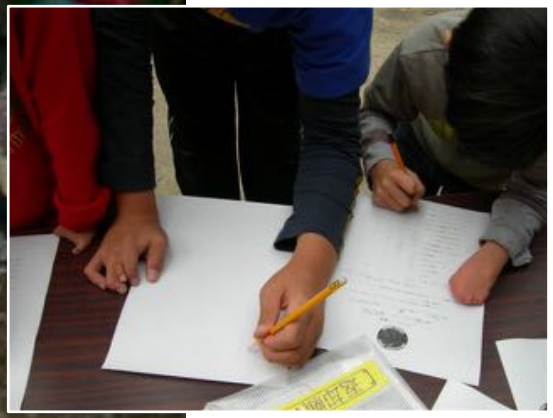


~10 to 100 trillion microbes in healthy gastrointestinal (GI) tract

intestinal microbiome development

Arrieta et al. 2014. Frontiers in Immunology

www.treeclimbing.jp/



physically disabled & tree climbing!

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

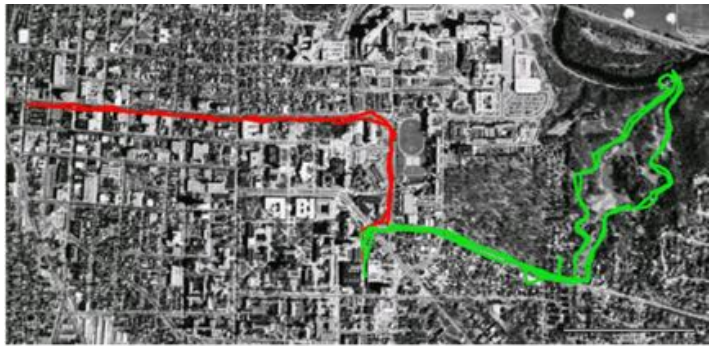
Improving Depression

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%

ss recovery

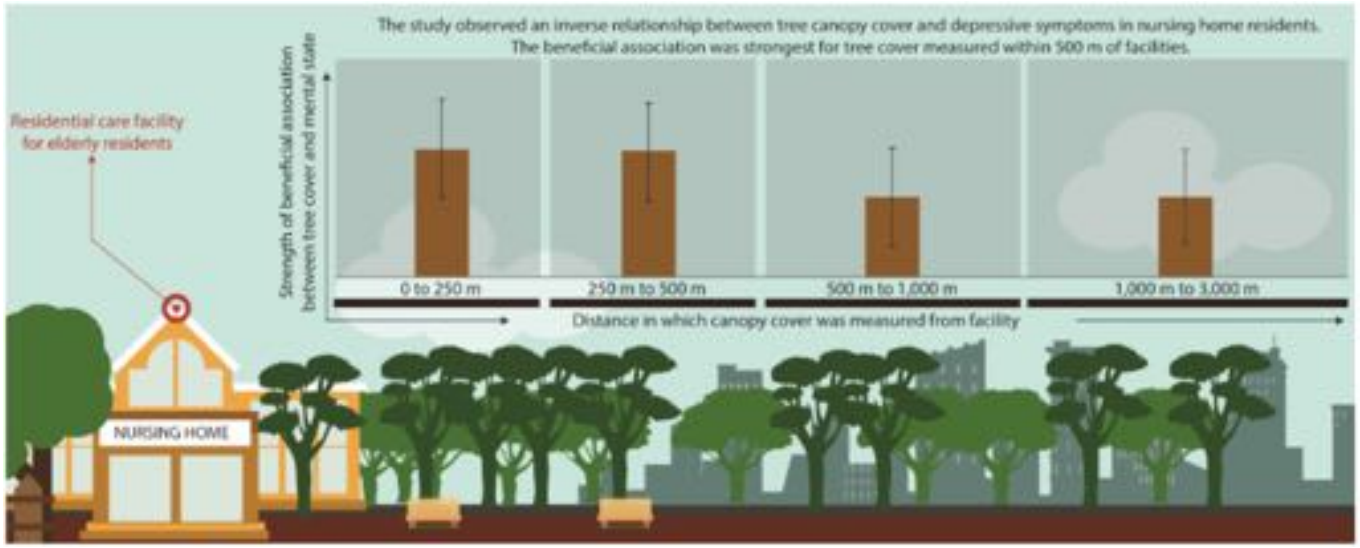
of a video (%)

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

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]



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

The Urban Forest, Trees, & Green Space

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

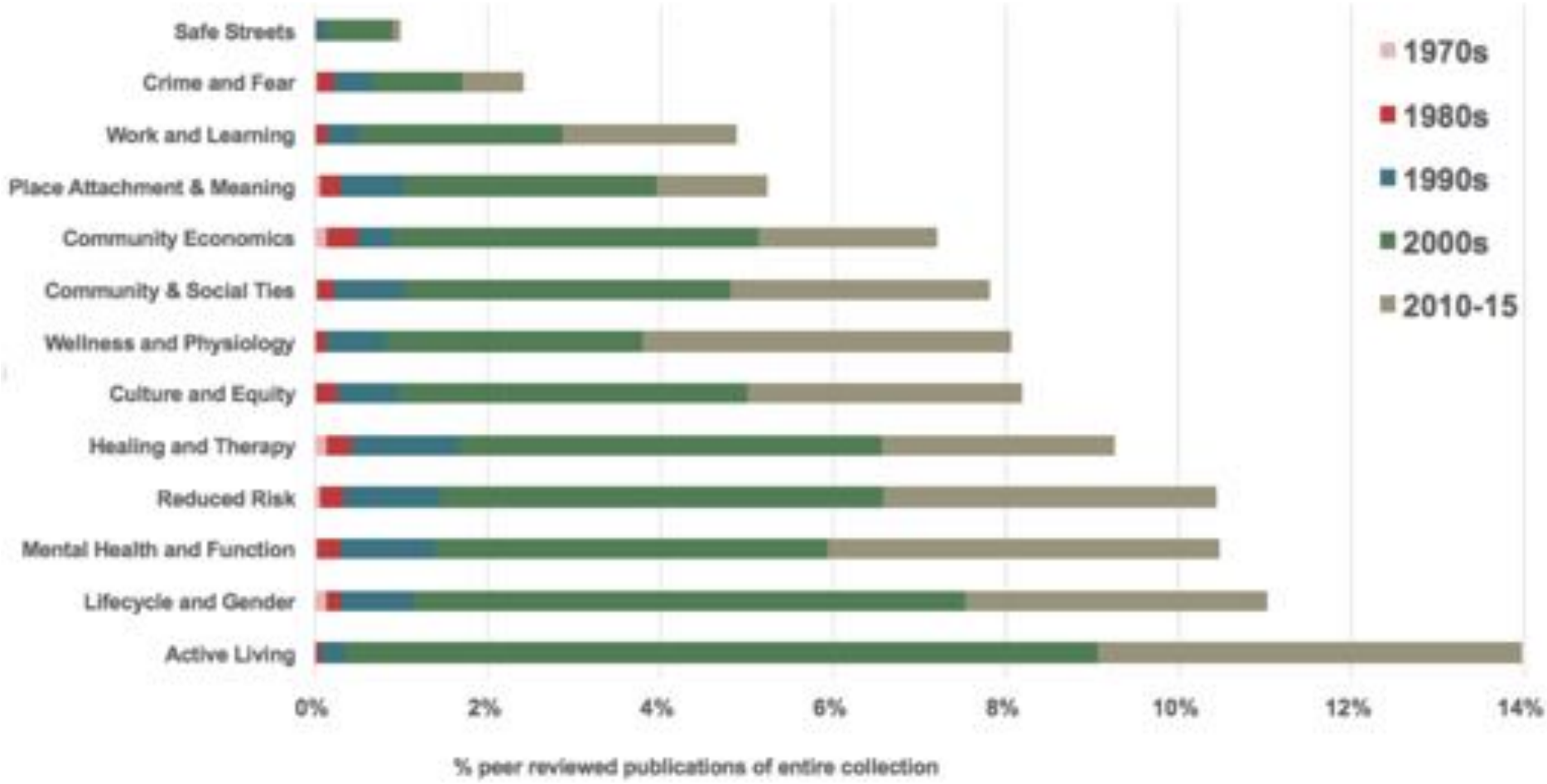
Trees in cities are not grown and managed for products that can be bought and sold on markets, but they do provide many intangible services and functions! This article serves two purposes. First, it introduces valuation methods that are used to convert intangible benefits to dollar sums.[1,2] Then, it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

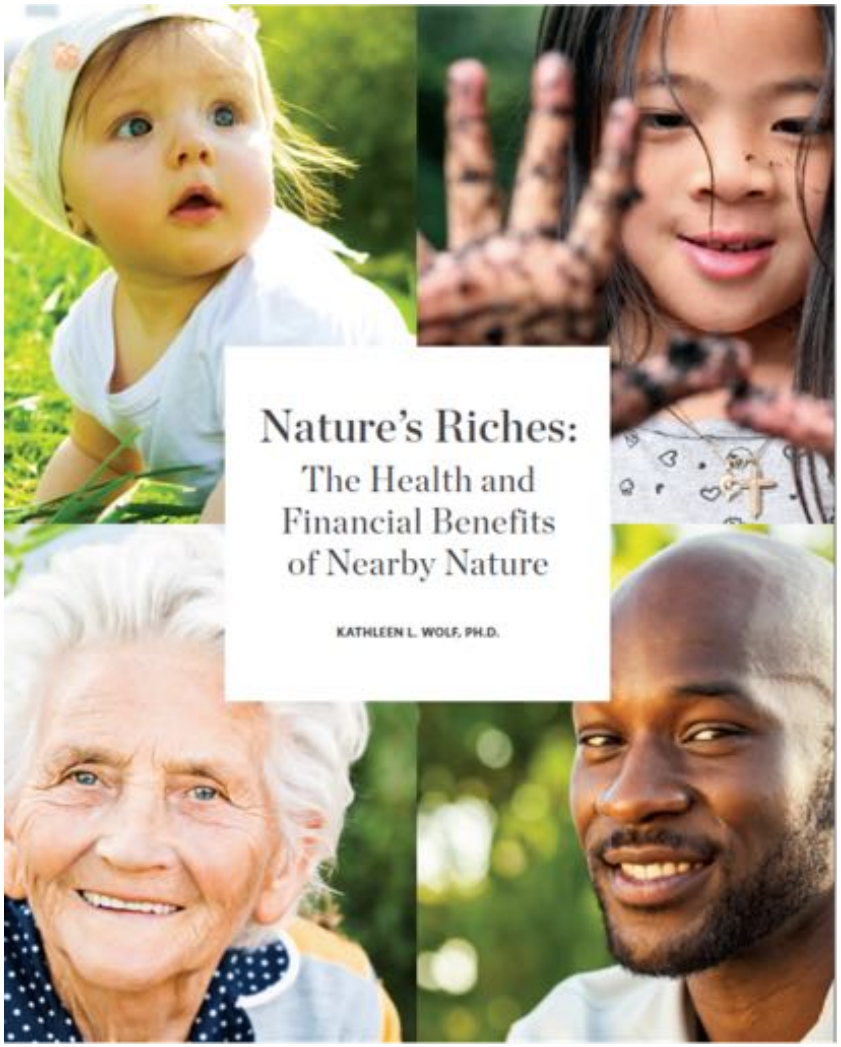
street trees boost market value of houses, providing tax revenue for communities

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



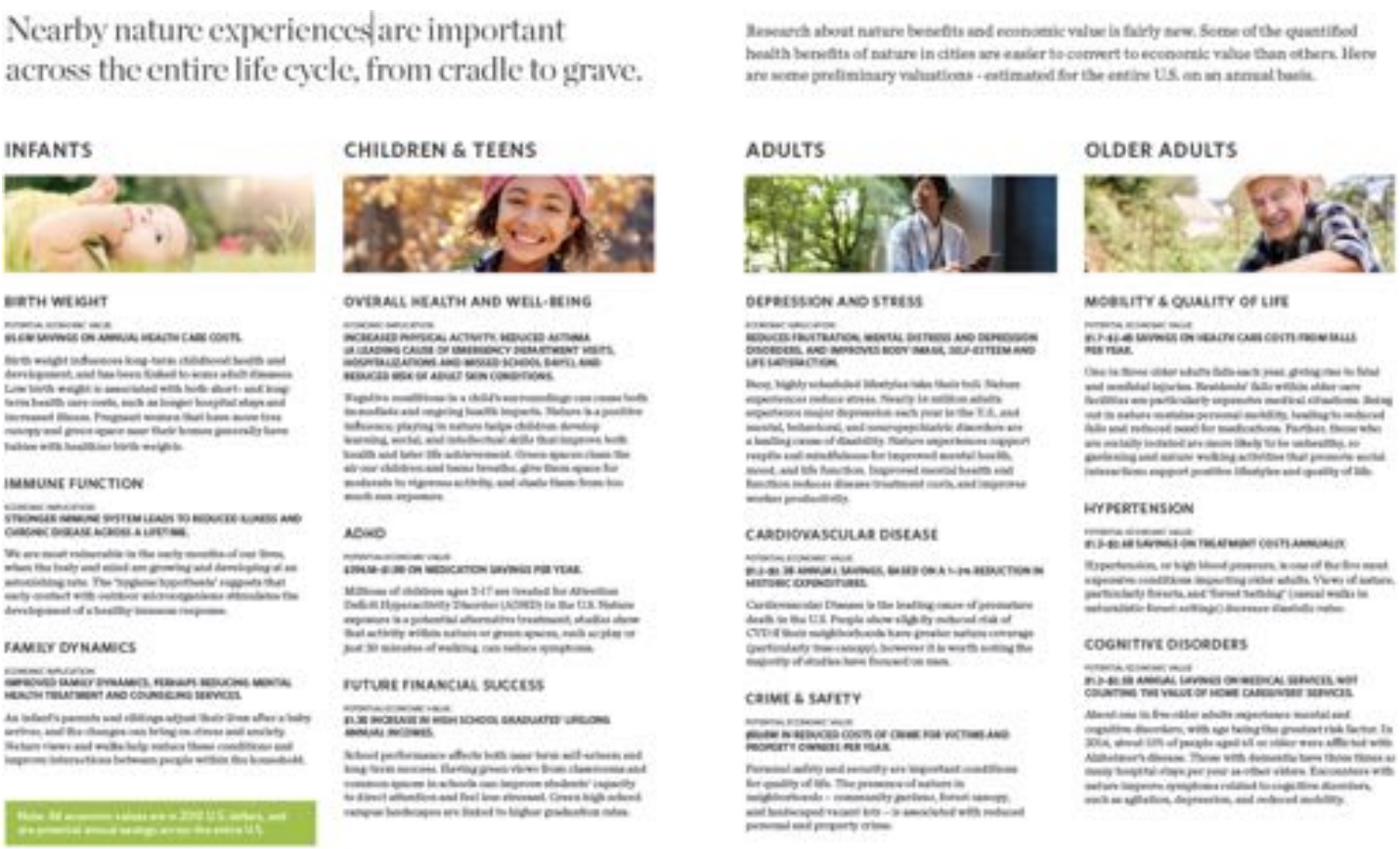


design milepost

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

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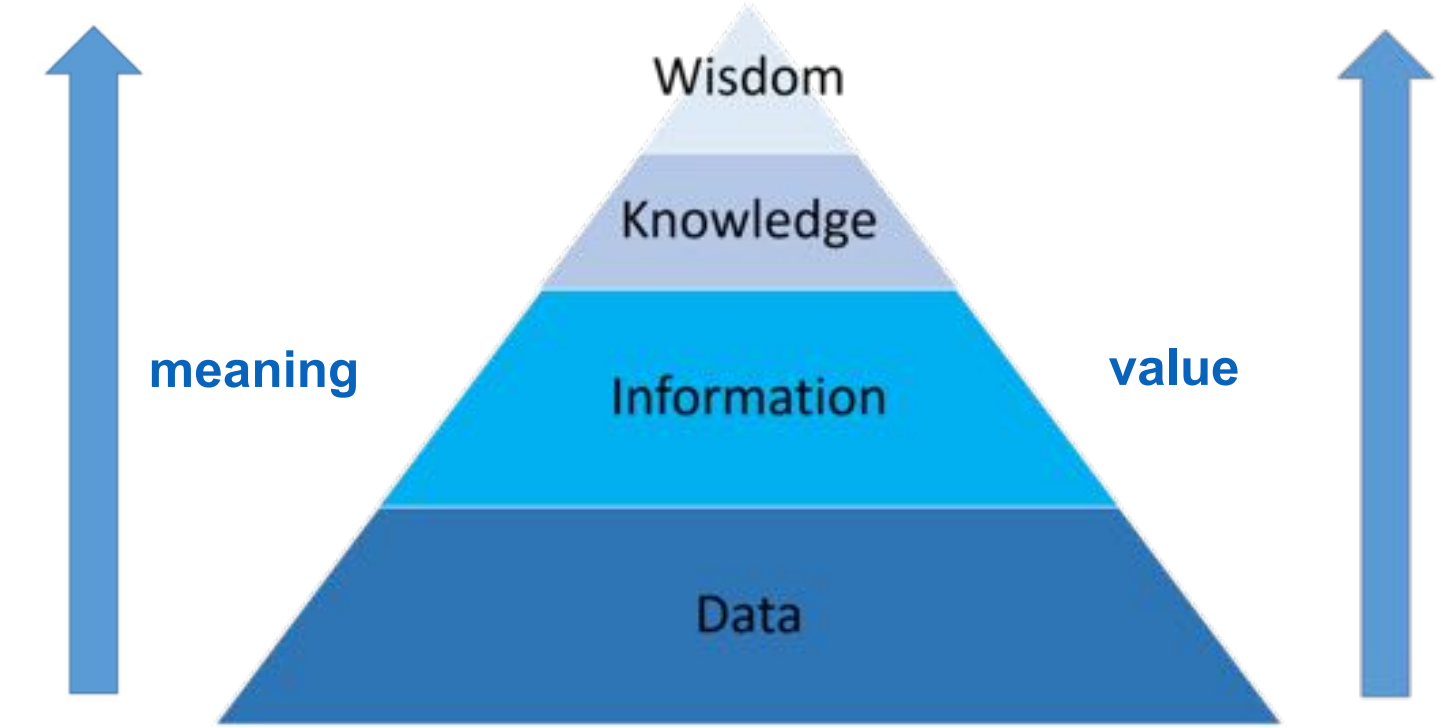

Wisdom
Knowledge
Information
Data
meaning
value

Urban Forestry & Urban Greening 32 (2018) 32–55

Contents lists available at ScienceDirect

Urban Forestry & Urban Greening

journal homepage: www.elsevier.com/locate/ufug

Declining urban and community tree cover in the United States

David J. Nowak*, Eric J. Greenfield

USDA Forest Service, Northern Research Station, 5 Moon Library, SUNY-ESF, Syracuse, NY 13210, United States

- U.S. urban/community tree cover loss is about 175,000 acres per year,
- corresponds to approximately 36 million trees per year,
- estimated loss of tree benefits is $96 million per year.

Industrial Age – city squalor

credit: BlendSpace

credit:
blogs.isb.bj.edu.cn

Filthy Cities!

08/04/2005

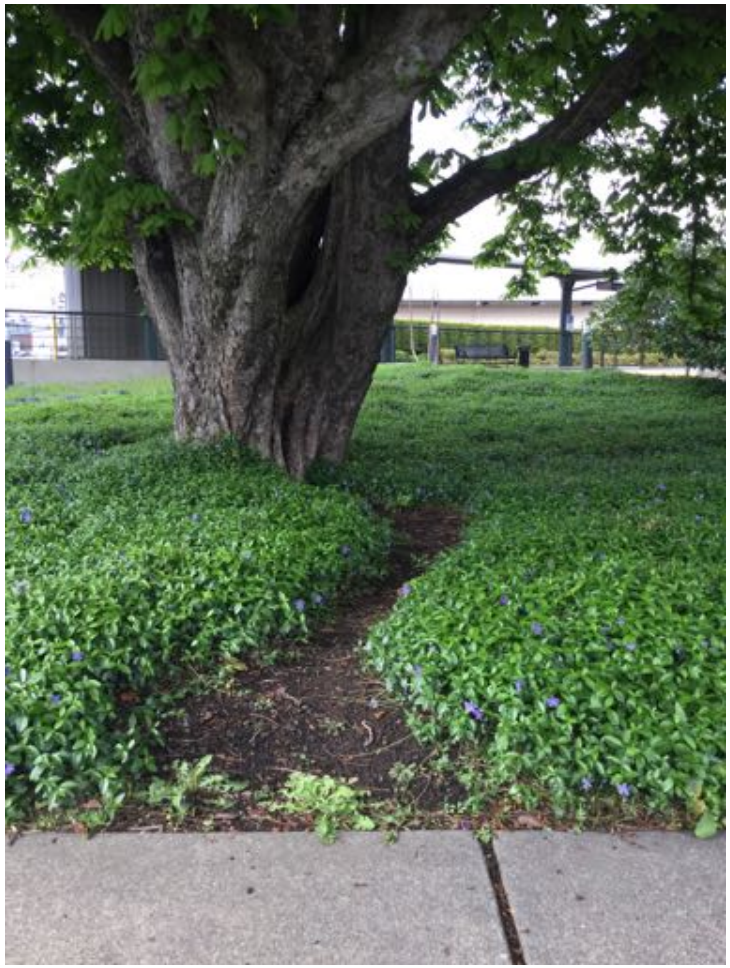
Baltimore: Public Works Museum

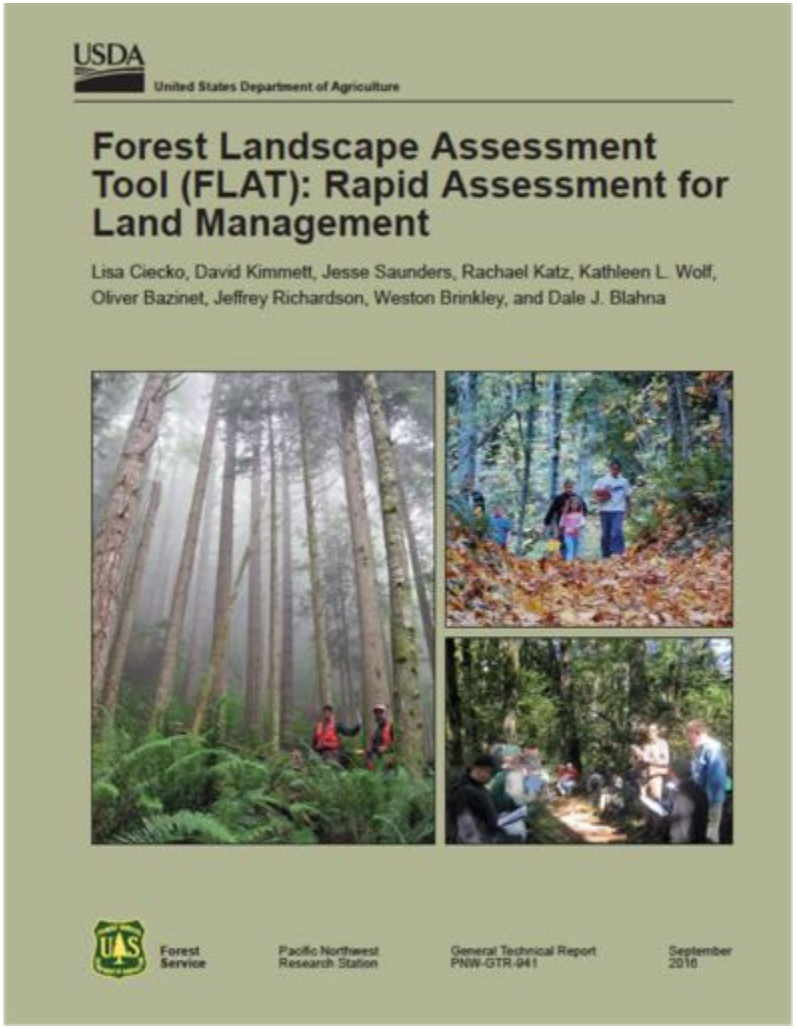
Forests Within Urban Areas
essence of forest attributes for planning?

- tree & parcel size
- scope of space & sense experience
- degree of ‘naturalness’
- resident access distance
- connectivity of trees/sites

Opportunies for Micro-Experiences?!

- parks
- arboreta & public gardens
- conservation lands & easements
- floodplains & riparian corridors
- campuses (university, healthcare)
- corporate centers
- streetscapes





Rapid Assessment & Mapping

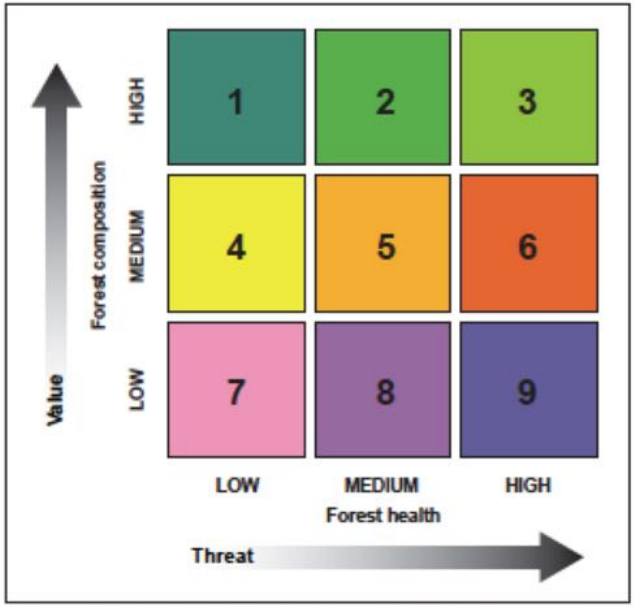


Figure 4—Management unit classification matrix (Tree-iage) example, King County, Washington.

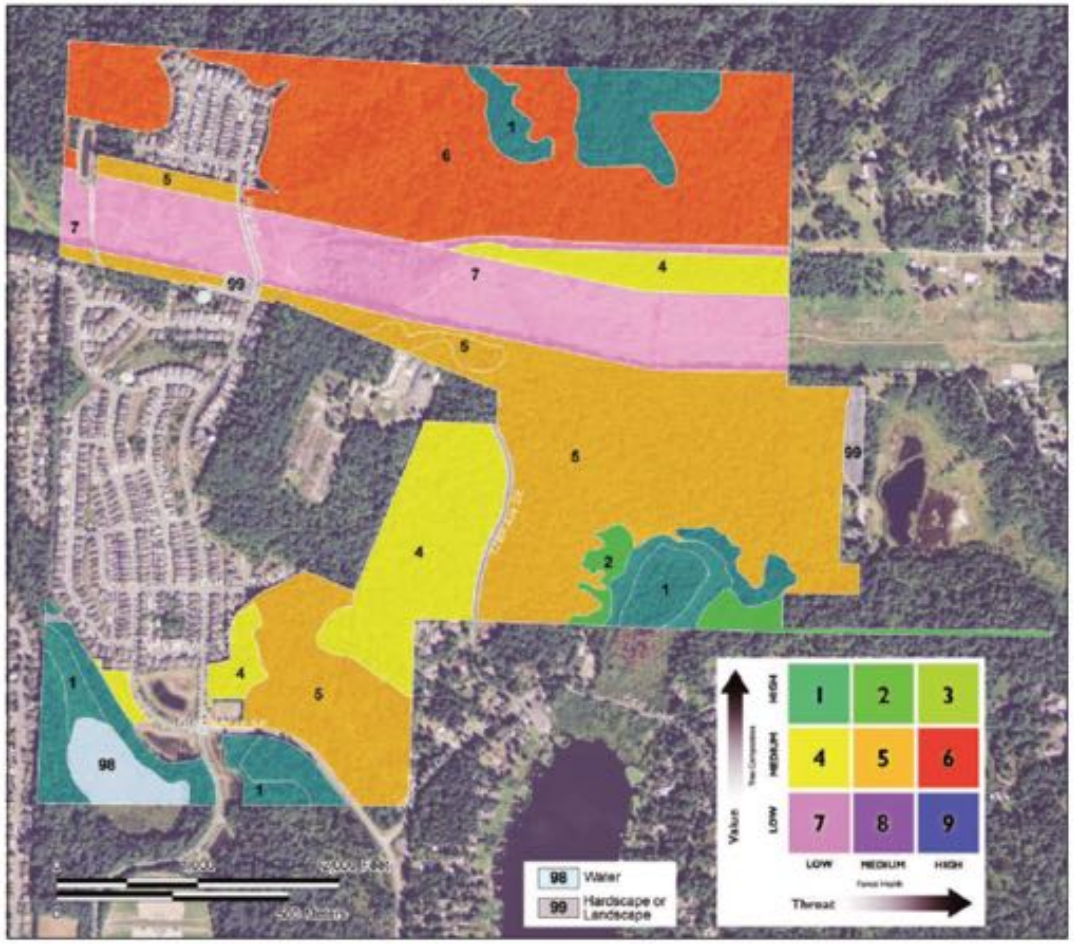


Figure 14—Distribution of management units classified by Tree-iage tree composition and health threat values for McGarvey Park Open Space.

Figure 2: Vegetation is associated with positive response on school campuses. Depicting school sites, these images are an example of the diverse vegetation conditions of metro nature that are associated with potential human health and well-being benefits.

Rapid Visual Assessment

or?

Technology & Mapping

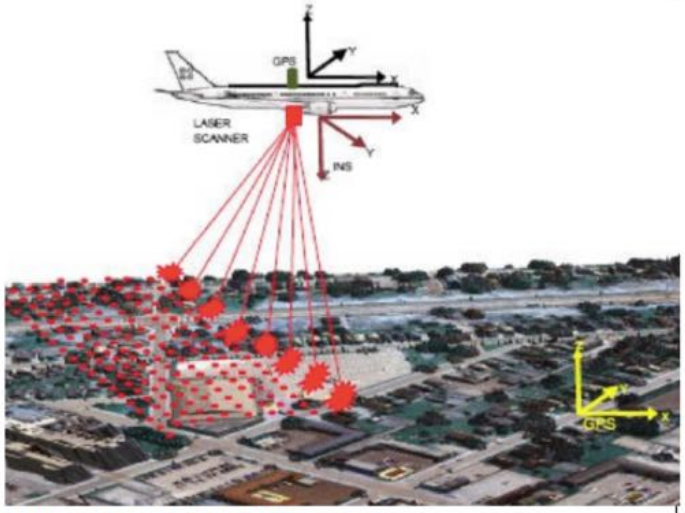


Figure 4: Airborne LiDAR data scan.

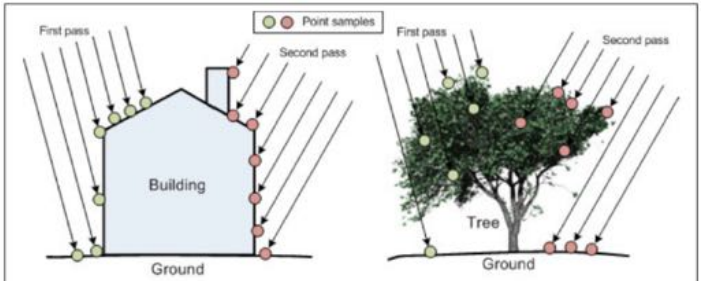


Figure 5: LiDAR response to built versus vegetative surfaces.
credit: Qian-Yi Zhou, Stanford University

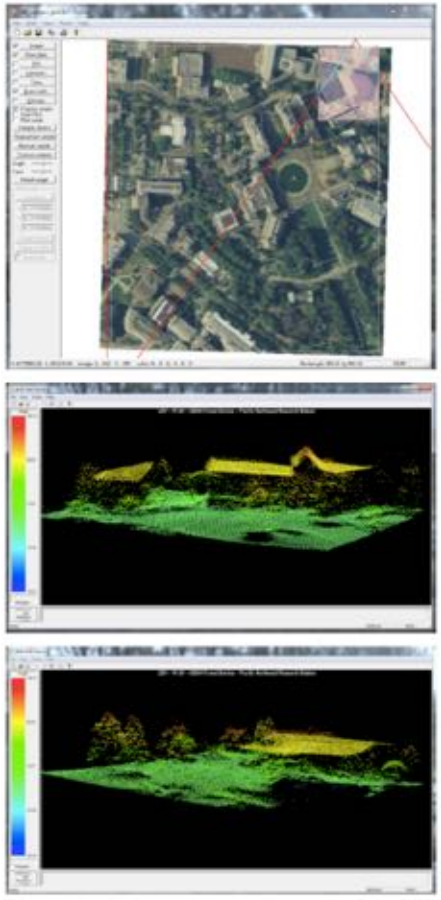


Figure 6: Aerial photograph of UW campus area used for metro nature LiDAR analysis, with point cloud display of subarea using color-enhanced height display.

Technologies for Metro Nature Health Benefits Mapping

Kathleen L. Wolf, Ph.D.
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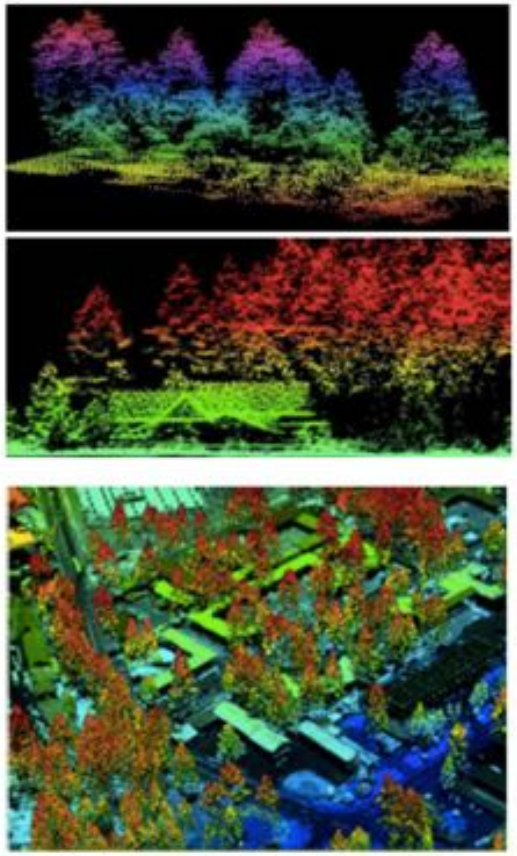
School of Environmental and Forest Sciences/College of the Environment

University of Washington

May 2014

vegetation and land use map for Seattle
image credit: UW Remote Sensing and Geospatial Lab



examples of urban vegetation analysis using LiDAR
- oblique aerial and ground plane from point cloud data -

Your Thoughts?

- what are 2-3 physical features of a site needed for a ‘good’ forest bathing experience?
- do you know of any parks/green space/natural area policy/plans that address human health response?

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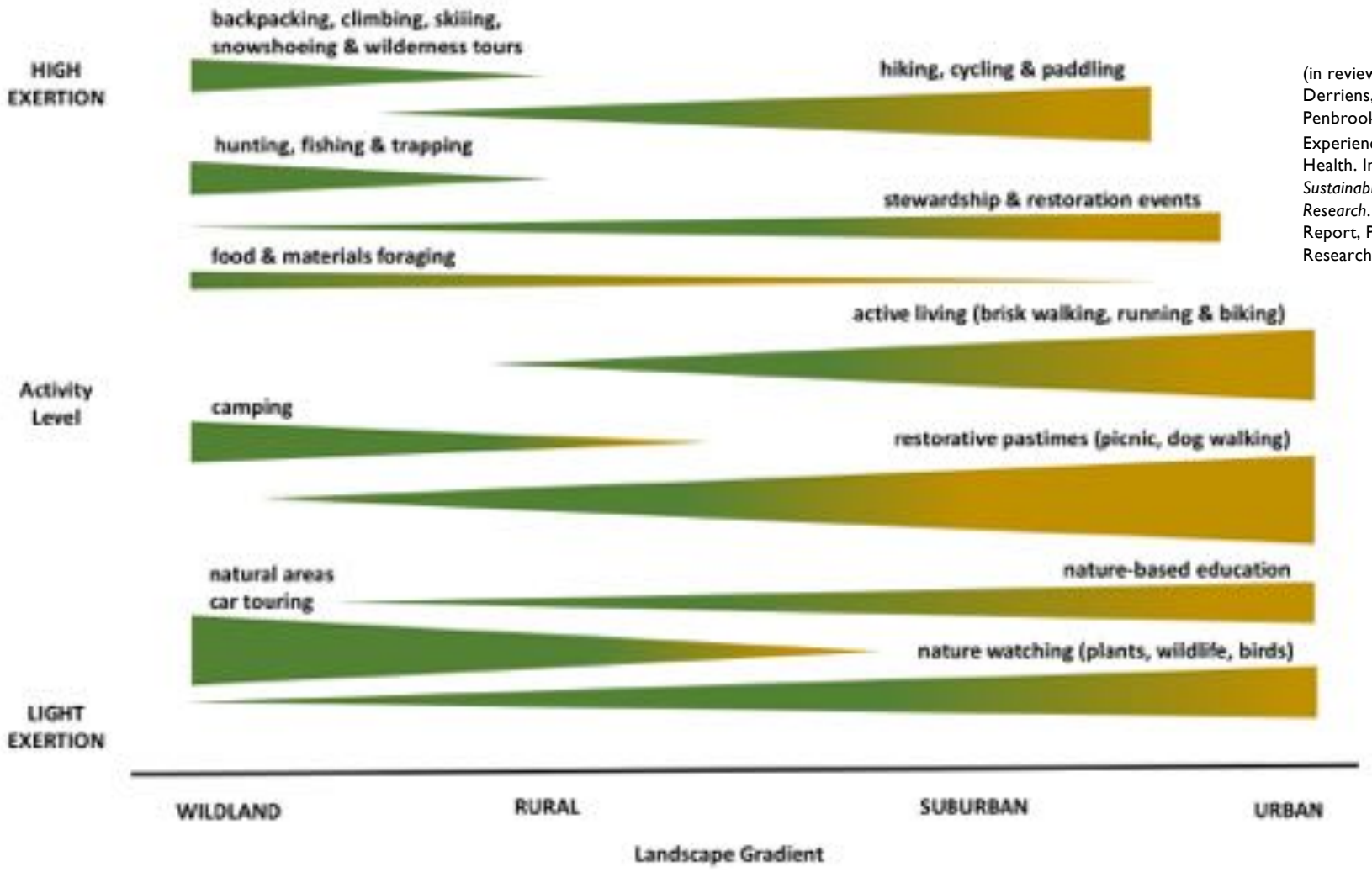
Some Random Thoughts!

- **importance of nearby nature**
- **acknowledge the spiritual**
- **Blessed Unrest**



(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.

The Sacred in the Forests of Japan – Shinto & Buddhism

Characteristics of the religion-related places for rituals and their relation with rural people -A case study of Hokudan-cho, Awajishima-

Kayo Nitta * Mayumi Hayashi**

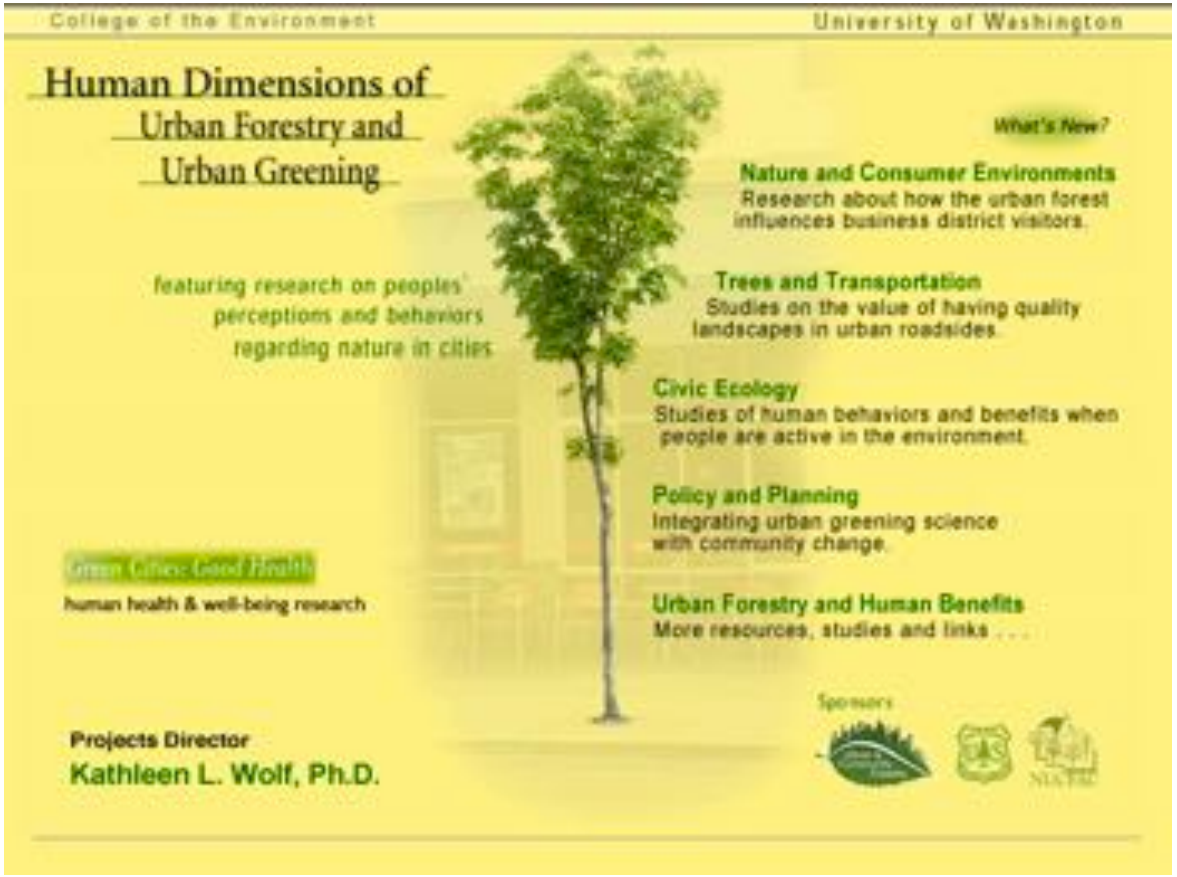
*Toyooka Municipal Government
**Himeji Institute of technology /ALPHA

１：名称：調査

A　孤立小樹林型：地面･巨大岩

Izumo-Taisha - eight million Shintō deities gather in October, kami deliberate over the fortunes of mankind for the coming year

credit: Studio Ghibli

2007 :: environmental & social justice

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