

City Trees & Public Health

diverse benefits, diverse beneficiaries



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WHO Health Definition



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



Social Determinants

Urban Nature and Health





City Trees and Human Health: A Systematic Review

Purpose: carefully collect and synthesize the peer-reviewed evidence concerning city trees and human health

Sponsors:



Health
Canada

Santé
Canada





Project Team

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 -  Gregory Richardson, MUP, Health Canada
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Methods



Keyword search (n=1644)

Abstract review (n=436)

Quality assessment (n=198)

Final article set (n=182)

Synthesize and
present findings

Final Article Collection

- 🌿 182 articles
- 🌿 diverse methods, populations, measures, and study locations
- 🌿 conducted by multiple disciplines

study examples and synthesis

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



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

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.

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

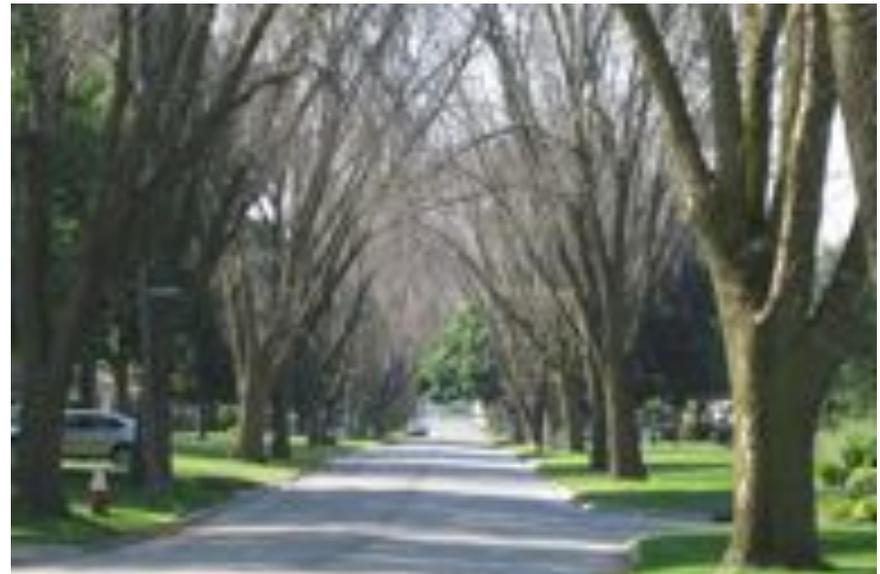


photo credits: Dan Herms, Ohio State U

Improving Depression

20 adults with major depression
walk in a park setting and a built setting

🌿 50-minute walks one week apart

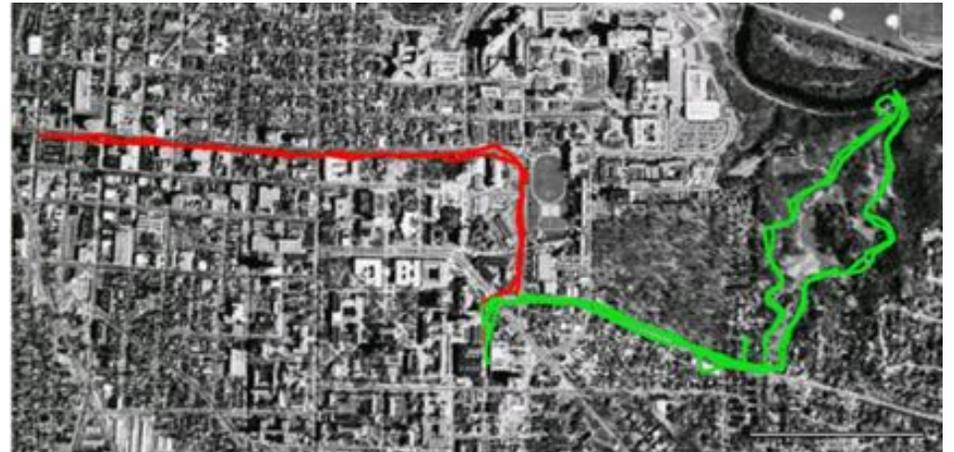
🌿 before-after testing:

🌿 Mood: Positive and Negative Affect (PANAS)

🌿 Cognition: Backward Digit Span (BDS)

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

cognitive and affective
improvements after
walking in a
nature setting



City Trees & Human Health



newborn & infant health

increased physical activity for kids

overall adult health

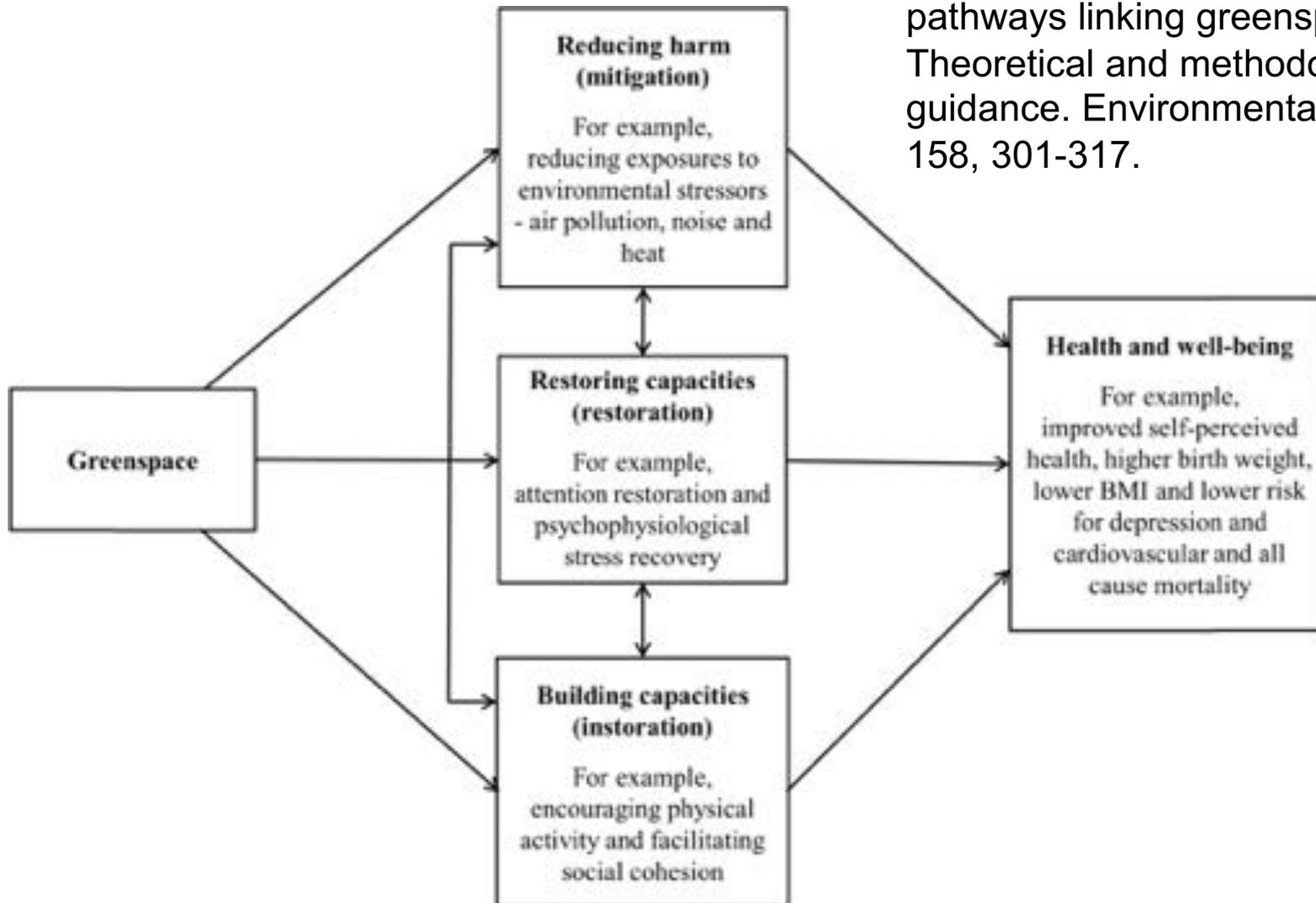
social cohesion

respiratory & cardiovascular health

reduced depression

Greenspace & Health Pathways

Markevych, I., et al. 2017. Exploring pathways linking greenspace to health: Theoretical and methodological guidance. *Environmental Research* 158, 301-317.



Literature Review – City Trees & Human Health

USDA Forest Service, U of WA, Health Canada, Natural Resources Canada, Tree Fund

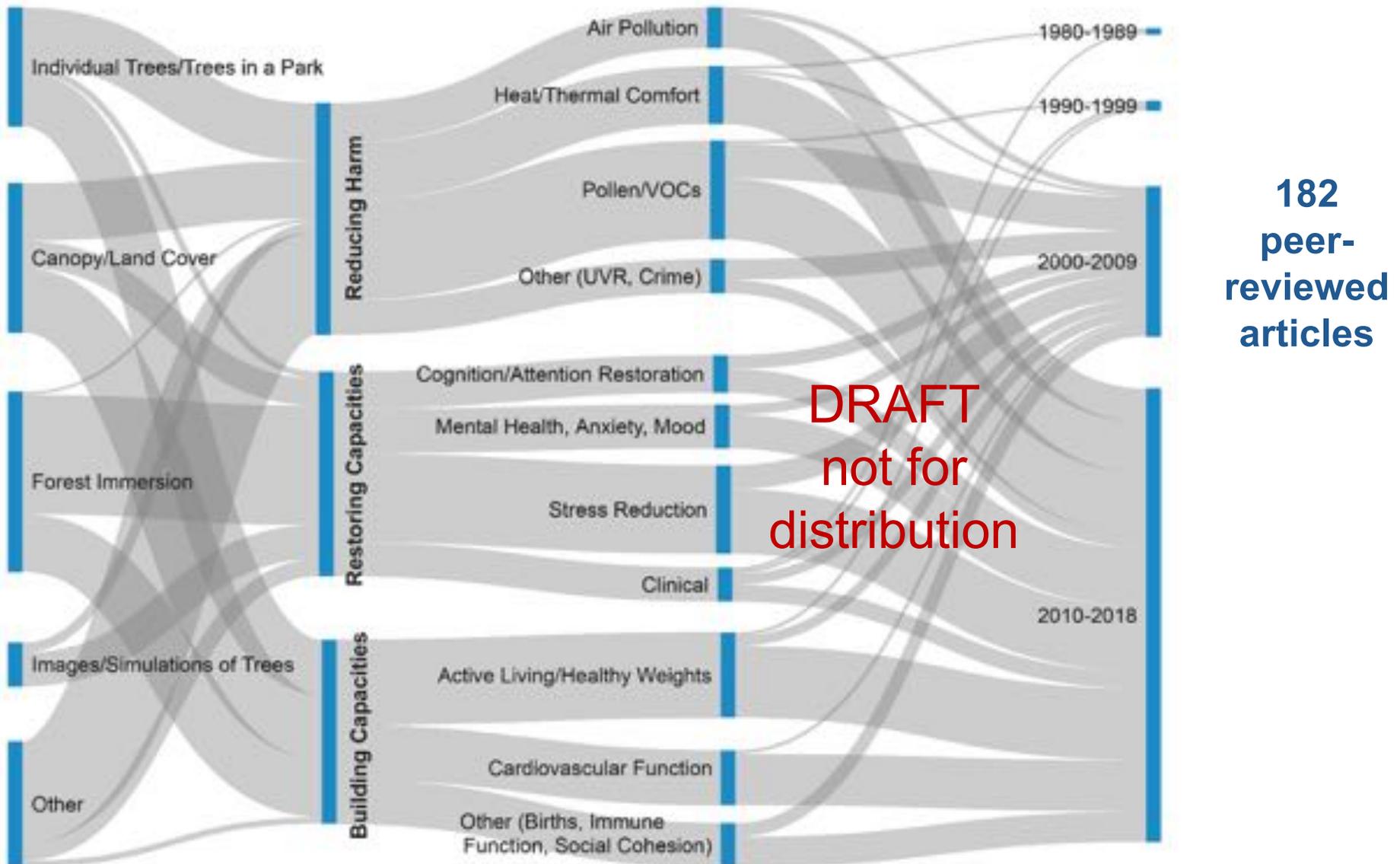


figure credit: Sharon Lam

Limitations of Evidence

- heterogeneity of study methods, few experiments
- heterogeneity of tree or forest interventions
- lack of replication
- did not include qualitative studies
- thus, not able to conclusively state outcomes





Implications of the Review

- city trees are essential for health-supportive environments
- **effects of trees vary** by receptor, not always beneficial (allergy symptoms due to tree pollen)
- **benefits mediated** by many factors, including the health status of trees and forests
- integrated and **proactive design and management**
- maximize health benefits and minimize potential adverse impact
- **collaboration** between health and environmental professionals, planning guidelines
- **health equity**, tree distribution

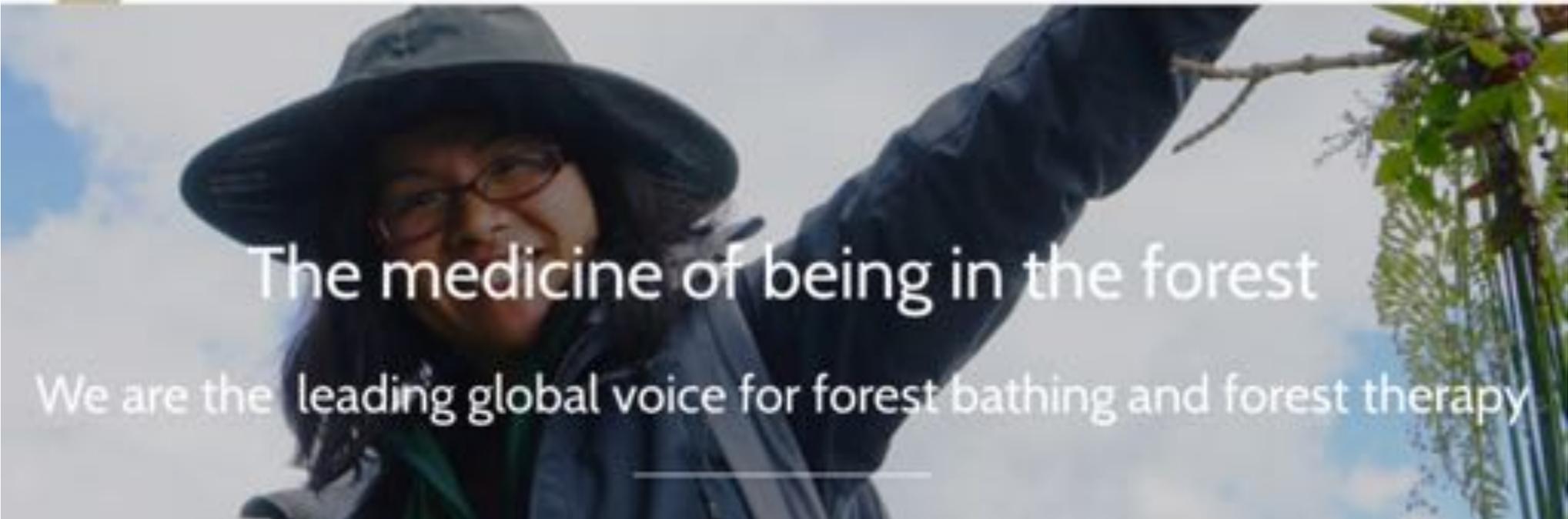
Shinrin yoku (forest bathing)

- extensive research
- restorative experiences
- workers
retirees
- networked system,
52 bases
in Japan





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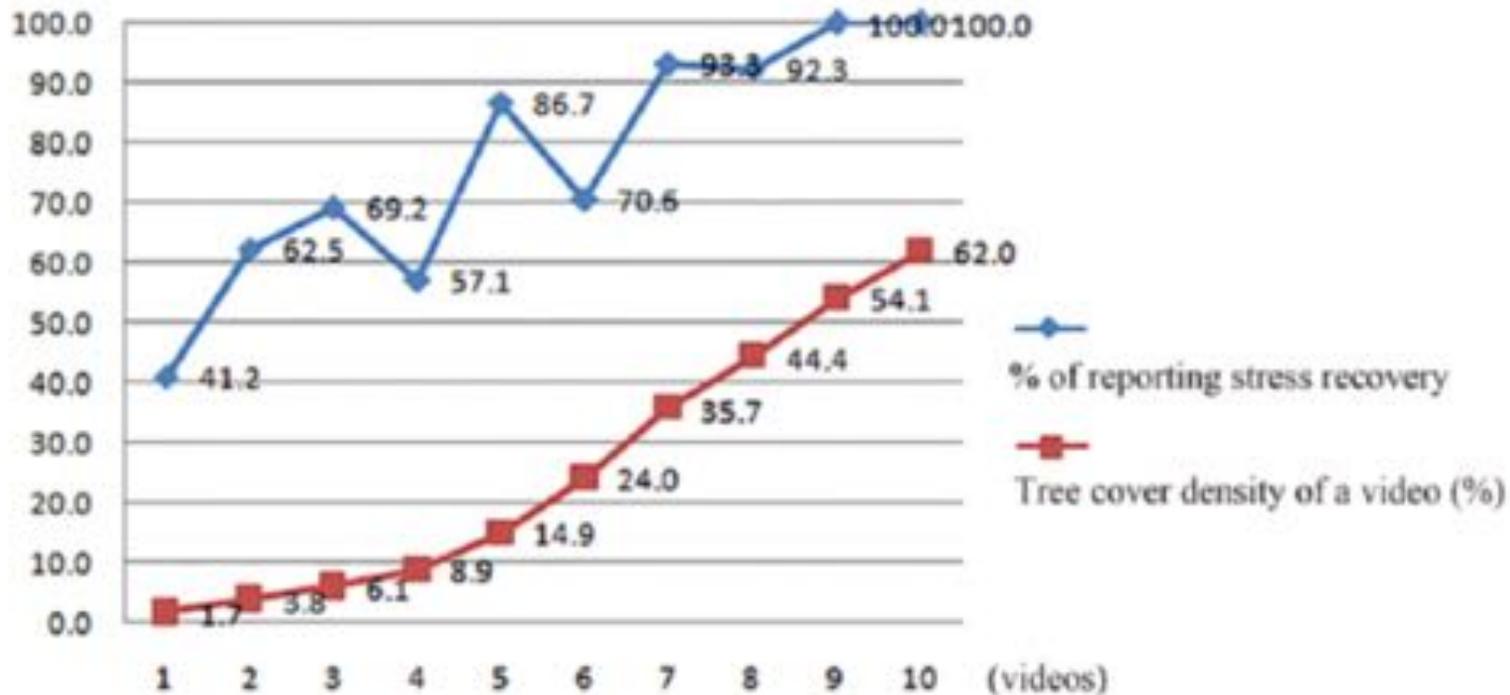
The medicine of being in the forest

We are the leading global voice for forest bathing and forest therapy

Santa Rosa, California

Canopy Cover & Stress

images of canopy cover varied 0-60%



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

Trees, Income & Health

▲ income ▲ health care ▲ health

11 more trees in a city block

decreased cardio-metabolic conditions =

increase in annual personal income

of \$20,000, or

moving to a neighborhood

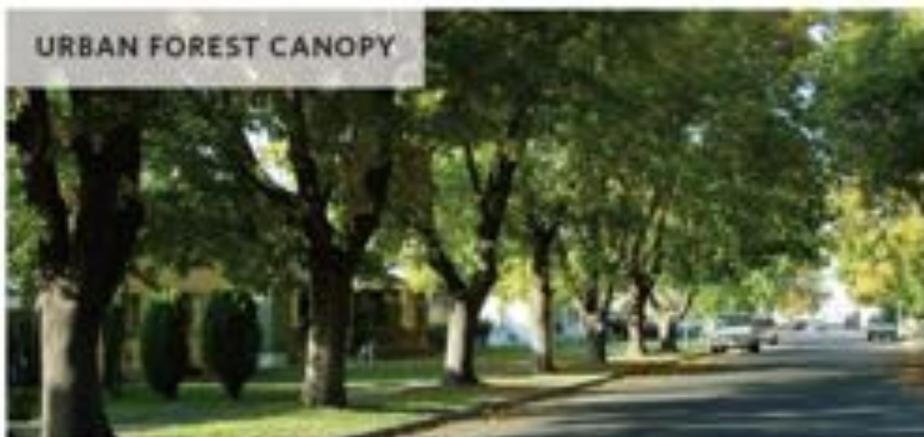
with \$20,000 higher median income

Kardan, et al. 2015. Scientific Reports 5, 11610

Metro Nature & Human Health

NEARBY NATURE INCLUDES A VARIETY OF SPACES AND PLACES

URBAN FOREST CANOPY



BIOPHILIC DESIGN



PARKS AND GARDENS



GREEN STORMWATER INFRASTRUCTURE



IMAGE BY MIG / SVR

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



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.

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

RSS Feed

Print

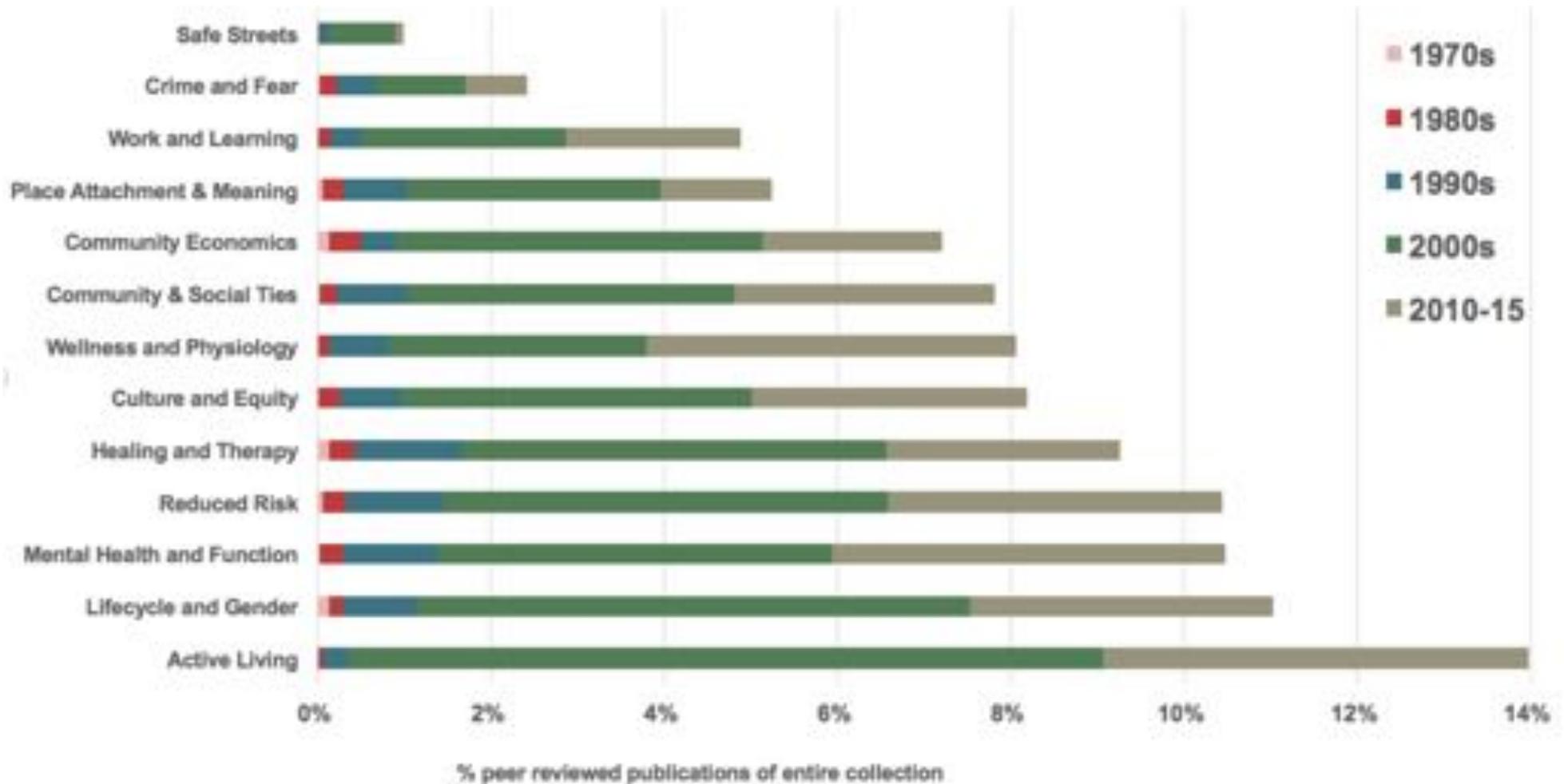


street trees boost market value of houses, providing tax revenue for communities



Green Cities: Good Health

database of >4,500 peer reviewed publications



Science Review



nearby nature & health evidence

> 40 years

> 4,500 publications



Closing

- trees in cities, health protective environments
- tree research + metro nature research
- 3 domains of benefit:
 - reducing harm
 - restoring capacity
 - building capacity
- collaborative UF planning & management

www.naturewithin.info

College of the Environment University of Washington

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.
- Urban Forestry and Human Benefits**
More resources, studies and links . . .

Green Cities: Good Health
human health & well-being research

Projects Director
Kathleen L. Wolf, Ph.D.

Sponsors

