

Nature & Human Health Implications for Seattle's Urban Forest



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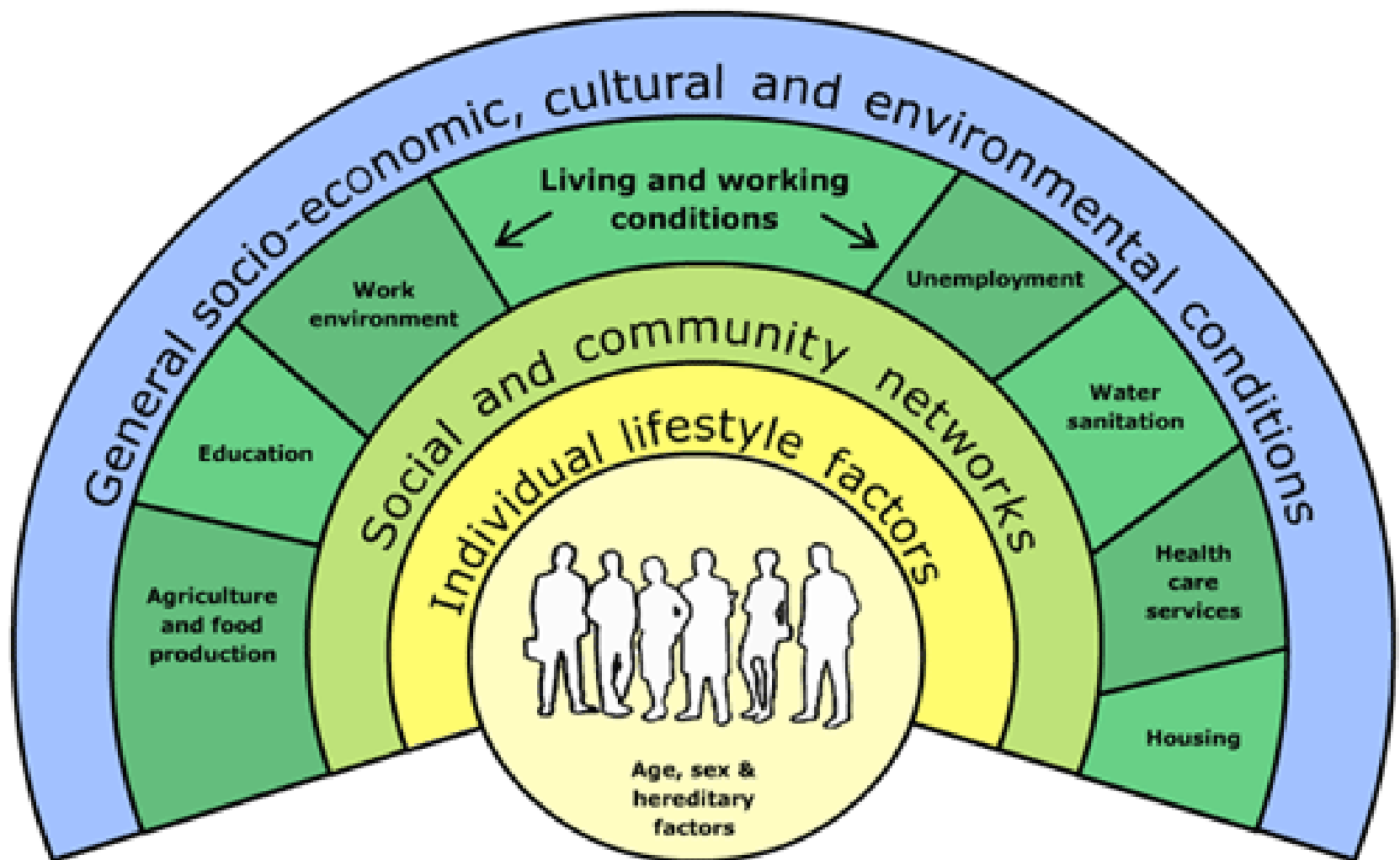
City of Seattle, UFC/IDT Workshop
3 October 2018





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



Outline

- 1. City Trees & Health: the evidence**
- 2. Nearby Nature & Health: the evidence**



3. Program Translations



4. UF Planning/Design

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**

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)

cognitive and affective
improvements after
walking in a
nature setting

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





City Trees & Human Health

newborn & infant health

increased physical activity for kids

overall adult health

social cohesion

respiratory & cardiovascular health

reduced depression

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

-  Kathleen Wolf, Ph.D., University of Washington
-  Sharon Lam, MSc, University of Toronto
-  Jennifer McKeen, MPH, Simon Fraser University
-  Gregory Richardson, MUP, Health Canada
-  Matilda Van Den Bosch, M.D, University of British Columbia
-  Adrina Bardekjian, Ph.D., Tree Canada

Methods



Keyword search (n=1644)



Abstract review (n=436)



Quality assessment (n=198)



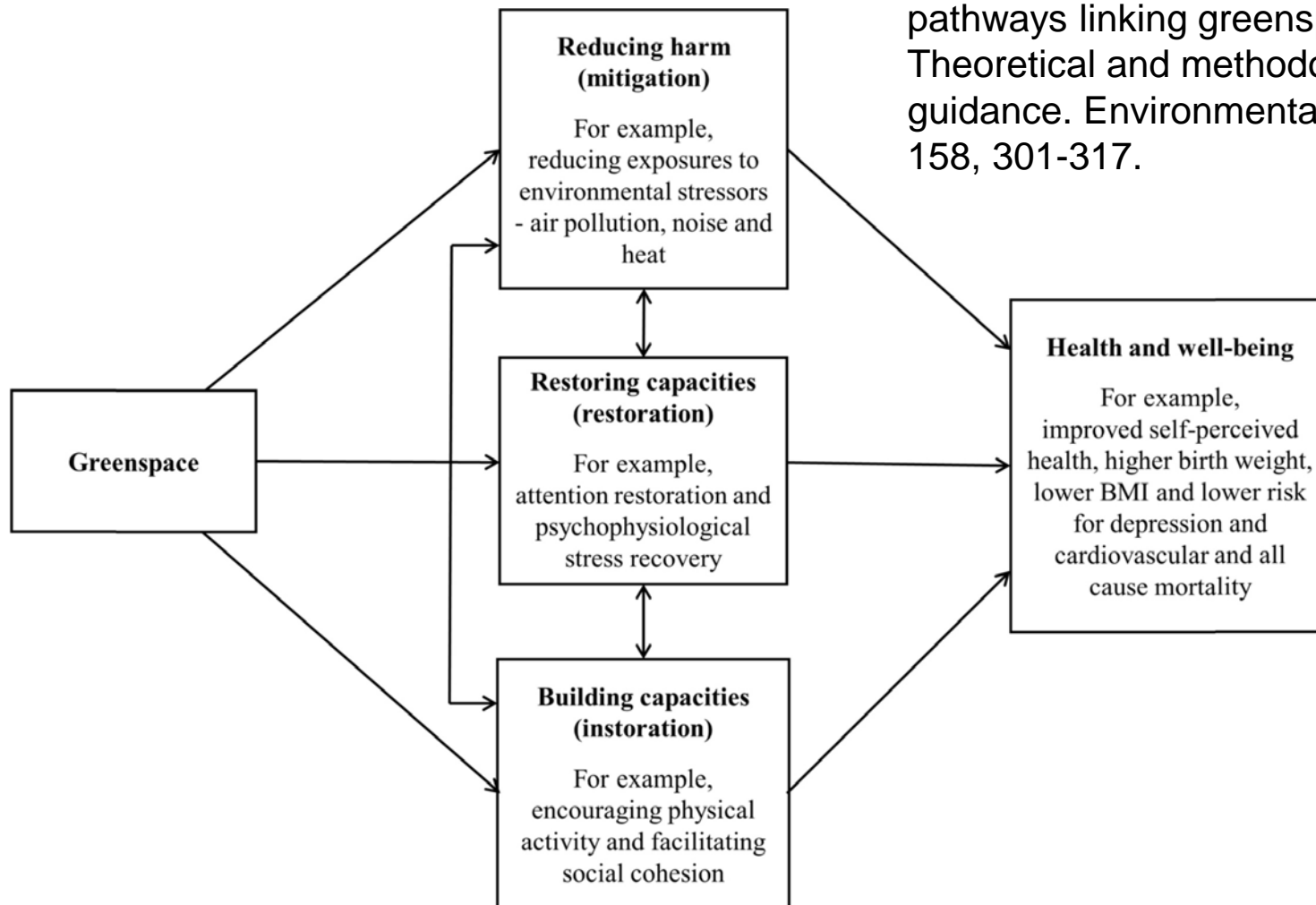
Final article set (n=182)



Synthesize and
present findings

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

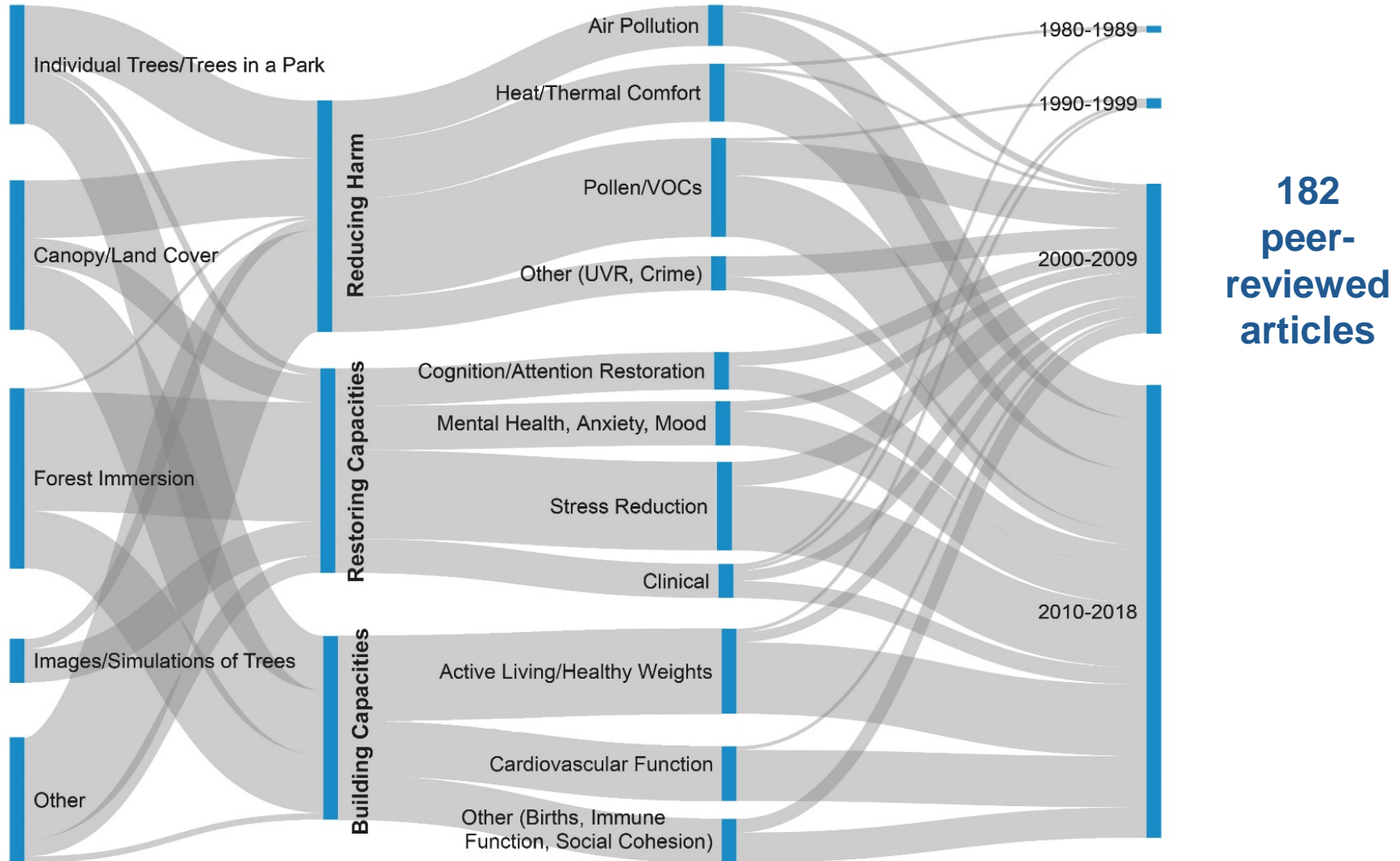


figure credit: Sharon Lam



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



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Metro Nature & Human Health

NEARBY NATURE INCLUDES A VARIETY OF SPACES AND PLACES

URBAN FOREST CANOPY



BIOPHILIC DESIGN



PARKS AND GARDENS



GREEN STORMWATER INFRASTRUCTURE



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

Green Cities: Good Health



INTRODUCTION RESOURCES FUTURE RESEARCH REFERENCES

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

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





Science Review

nearby nature & health evidence

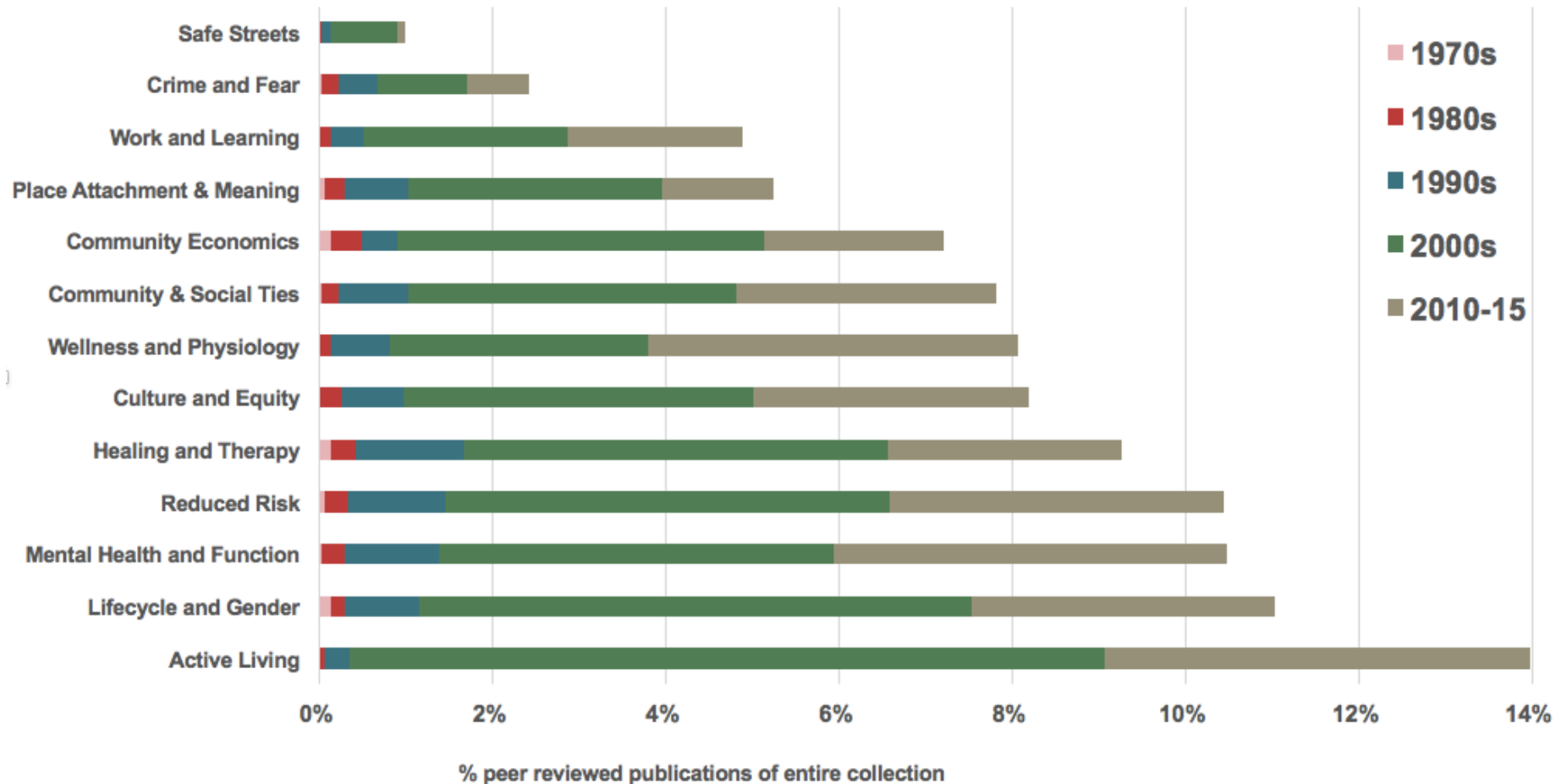
> 40 years

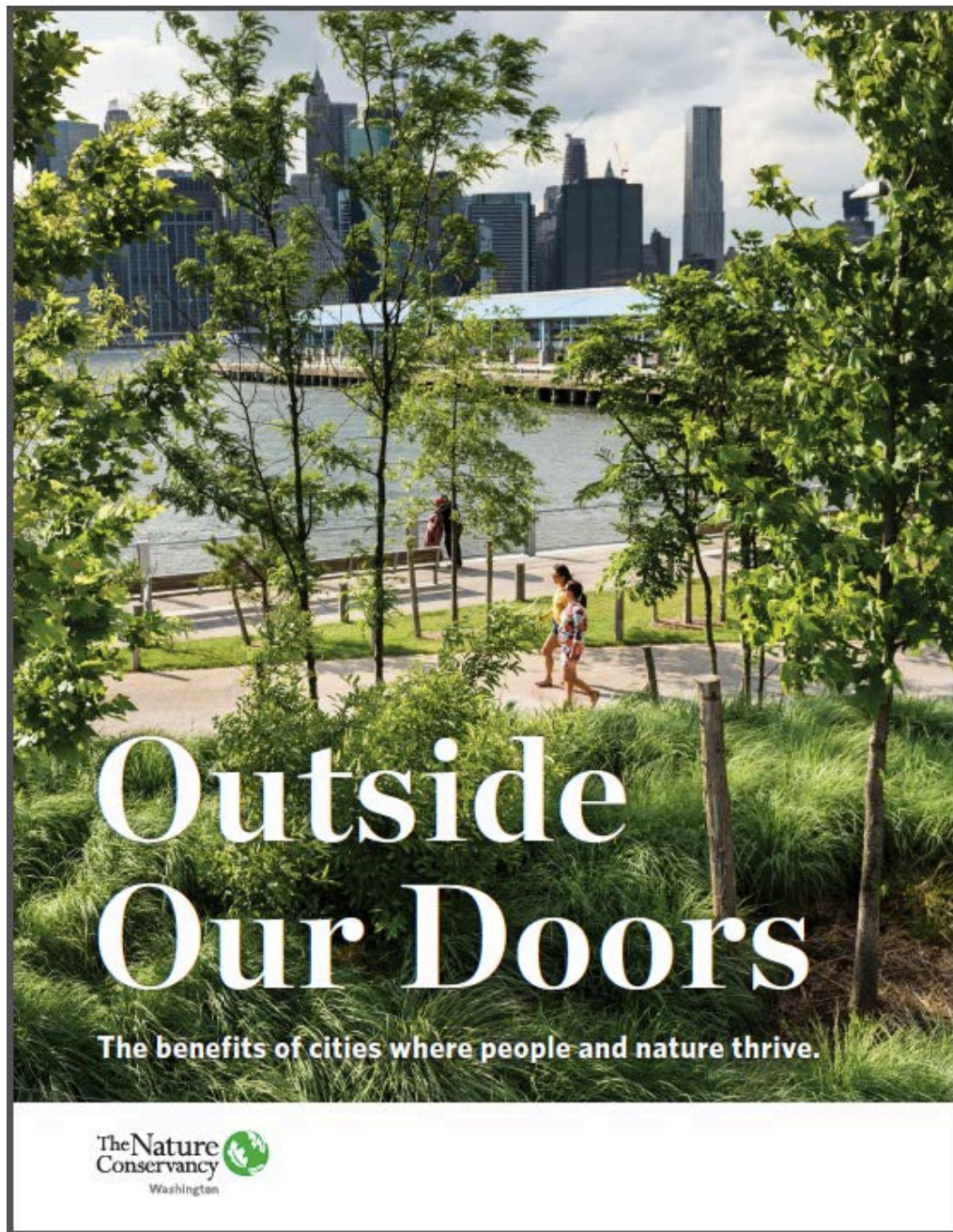
> 5,000 publications

what are the 'stories'?

Green Cities: Good Health

database of >4,500 peer reviewed publications





Outside Our Doors

The benefits of cities where people and nature thrive.

The Nature
Conservancy 
Washington

design:  milepost

co-author: 

co-author & printing:
The Nature
Conservancy 



United States Department of Agriculture



Forest Service

FS-1096

February 2018

Introduction

Writers, philosophers, and naturalists have praised the benefits of nature for human health, happiness, and well-being for centuries, but only relatively recently have researchers begun studying and quantifying the complex relationship between human health and nature.

In 1984, Roger Ulrich, professor and director of the Center for Health Systems and Design at Texas A&M University, published the results of a pioneering study that looked at the recovery rates of gall bladder surgery patients in relation to the views from their rooms in a Texas hospital. Some of the patients looked out over a garden and grove of trees, while others had a view of a brick

wall. Ulrich found that patients with a natural view spent fewer days in the hospital and used fewer pain medications (Ulrich 1984).

Ulrich's study helped open the door to a new field of inquiry focused on illuminating the ways that nature influences our physical, mental, and social lives. More than three decades later, a broad and diverse body of scientific literature describes the human health value of nature, confirming that trees, parks, gardens, and other natural settings are as essential to livable and sustainable cities as the other critical systems that keep their residents moving and working.

Findings from the current literature indicate the wide range of effects.

CONTENTS

- 1 Introduction
- 2 Defining Nature and Health Research
- 4 Pollution and Physical Health
- 6 Active Living
- 8 Features that Promote Physical Activity
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USDA Forest Service 2018



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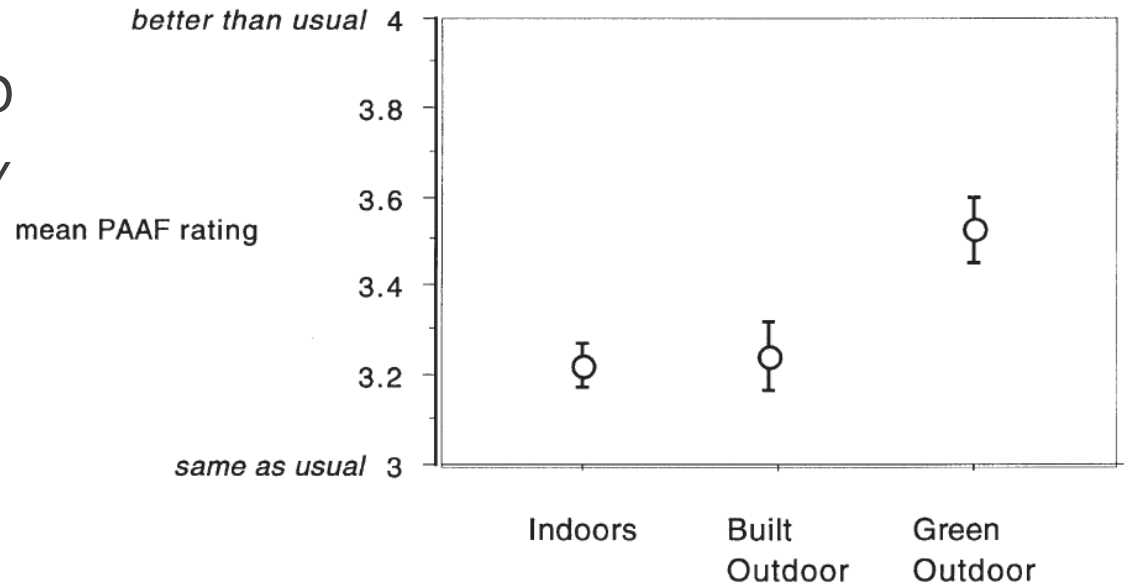
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Story: Human Health Benefits Across the Life Cycle



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*

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

Hygiene Hypothesis

- 🌱 presence of soil bacteria in body,
Mycobacterium vaccae = increased serotonin
- 🌱 boost immune function
- 🌱 may alleviate depression (dirt or Prozac?)

Lowry et al. 2007. Neuroscience



Eat Dirt!



Fiddleheads Forest School

Washington Park Arboretum (Seattle)



cognitive
social &
physical
learning

CDC moderate activity recommendations



parks, active living, active transit





Parks Prescription

R_X for Health

Date: _____

Dr: _____

Name: _____

I recommend:

☐ Walking ☐ Other: _____

_____ minutes a day

_____ days per week

* Health Canada suggests moderate activity of 30 minutes per day | 5 days a week

Benefits of daily activity

- Improve overall physical and mental health
- Maintain a healthy weight
- Reduce the risk of diabetes and other chronic conditions
- Lower cholesterol levels
- Manage stress and anxiety

Signature: _____

doctors
of bc



Parks Prescription



PARKS Rx
Your Prescription For Better Health



walk^{with a}
DOC
educate. exercise. empower.



credit: healthy central florida



credit: CNN.com

Shinrin yoku (forest bathing)

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





[HOME](#) [ABOUT](#) [THE ASSOCIATION](#) [THE SCIENCE](#) [GET STARTED](#) [WORKSHOPS AND RETREATS](#) [BECOME A GUIDE](#) [BLOG](#) [MORE...](#)

A woman with long dark hair, wearing a wide-brimmed hat and glasses, is smiling and looking towards the camera. She is wearing a dark jacket and has her right arm raised, reaching towards a tree branch. The background is a soft-focus forest scene with green foliage and a blue sky with light clouds.

The medicine of being in the forest

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

Santa Rosa, California

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





BLOEDEL
RESERVE

VISIT

EXPERIENCE

EVENTS

STROLLS FOR WELL-BEING

CREATIVE RESIDENCY

GET INVOLVED

ABOUT

CONTACT



A PLACE TO MEND HEARTS & HEAL MINDS

STROLLS FOR WELL-BEING




Experience the restorative powers of nature and join us for Strolls for Well-Being, a free 10-week program offered at Bloedel Reserve. If not already a member, participants are given a temporary membership to

DAY-USE STROLLS:

Since introducing the Strolls for Well-Being program in 2014, hundreds of people have benefited from the healing effects of nature.



Other Programs?

-  study or research
-  program interpretation
-  other possibilities within Seattle's urban forest?



Outline

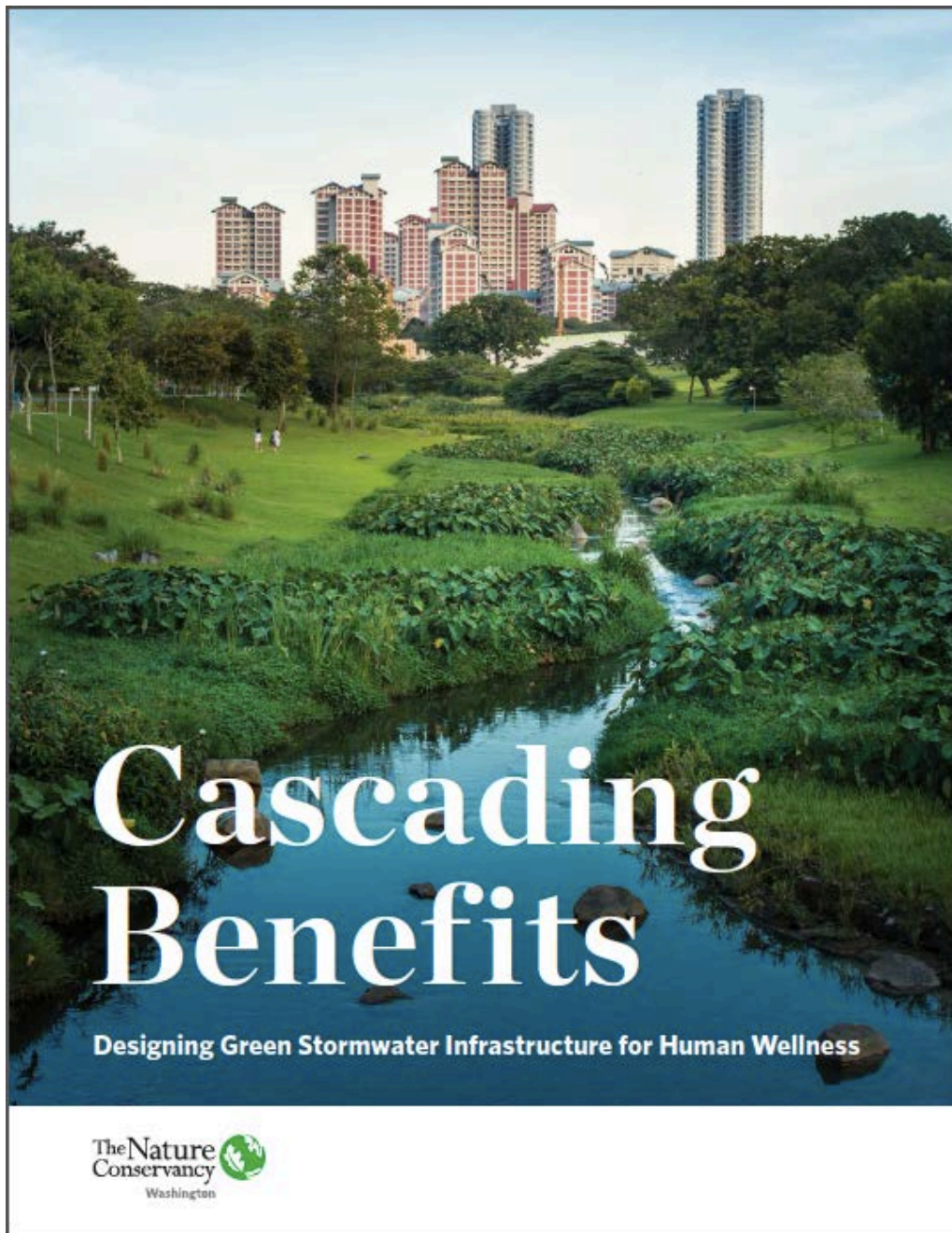
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co-author:



co-author & printing:

The Nature
Conservancy



Walking Programs

children
elders
families



Transport for Greater Manchester

Greater Manchester Walking Weekends

Join our free guided walks
Routes to suit all ages and abilities

16-18 September 2016
21-23 October 2016

For more details visit:
www.tfgm.com/walking | [f/GMwalkingfestival](https://www.facebook.com/GMwalkingfestival)

Vegetation & Mental Health

- vegetation cover and afternoon bird abundances
- lower prevalence of depression, anxiety, and stress:

depression, more than 20% cover,

anxiety, more than 30% cover,

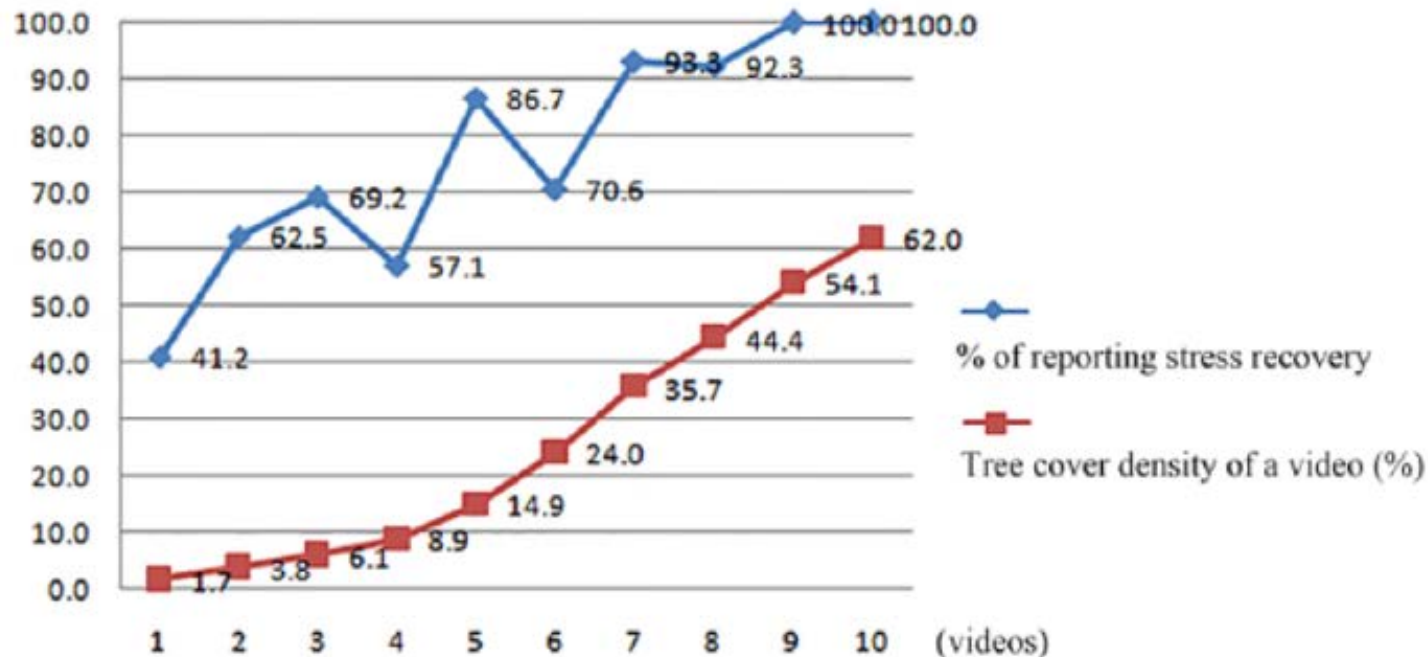
stress, more than 20% cover

“dose” at
which health
issue is
lower

Cox et al. 2017. BioScience 67, 147-155.

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

Beacon Food Forest (Seattle)

mimic woodland ecosystem – edible gardening

- 🌿 arboretum
- 🌿 berry patch
- 🌿 nut grove
- 🌿 community garden
- 🌿 gathering plaza
- 🌿 children's area
- 🌿 living gateway



complexity - productivity

Summary:

Knowledge to Practice



- nearly 40 years of research:
city trees, nearby nature
- critical mass of evidence – now what?
- integrate evidence into planning & mgmt
- integrate urban forest goals with broader urban systems needs

Human Dimensions of Urban Forestry and Urban Greening

featuring research on peoples'
perceptions and behaviors
regarding nature in cities

Green Cities: Good Health

human health & well-being research

Projects Director
Kathleen L. Wolf, Ph.D.



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 . . .

Sponsors

