A Tribute to Stephen Kellert:
The Business Case for Biophilic Design and Human Health
Perceptions and Values of Metro Nature Nature

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perception

a way of regarding, understanding, or interpreting something;

a mental impression

the way you think about or understand someone or something
<table>
<thead>
<tr>
<th>Value</th>
<th>Definition</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilitarian</td>
<td>Practical and material exploitation of nature</td>
<td>Physical sustenance/security</td>
</tr>
<tr>
<td>Naturalistic</td>
<td>Satisfaction from direct experience/contact with nature</td>
<td>Curiosity, outdoor skills, mental/physical development</td>
</tr>
<tr>
<td>Ecologistic-Scientific</td>
<td>Systematic study of structure, function, and relationship in nature</td>
<td>Knowledge, understanding, observational skills</td>
</tr>
<tr>
<td>Aesthetic</td>
<td>Physical appeal and beauty of nature</td>
<td>Inspiration, harmony, peace, security</td>
</tr>
<tr>
<td>Symbolic</td>
<td>Use of nature for metaphorical expression, language, expressive thought</td>
<td>Communication, mental development</td>
</tr>
<tr>
<td>Humanistic</td>
<td>Strong affection, emotional attachment, “love” for nature</td>
<td>Group bonding, sharing, cooperation, companionship</td>
</tr>
<tr>
<td>Moralistic</td>
<td>Strong affinity, spiritual reverence, ethical concern for nature</td>
<td>Order and meaning in life, kinship and affilential ties</td>
</tr>
<tr>
<td>Dominionistic</td>
<td>Mastery, physical control, dominance of nature</td>
<td>Mechanical skills, physical prowess, ability to subdue</td>
</tr>
<tr>
<td>Negativistic</td>
<td>Fear, aversion, alienation from nature</td>
<td>Security, protection, safety</td>
</tr>
</tbody>
</table>

Kellert, *The Value of Life*, 1996
Albert Bierstadt, Valley of the Yosemite, 1864
Thomas Moran, 1872, The Grand Canyon of the Yellowstone
circa 1920, Museum of the White Mountains

Gifford Pinchot, 1909
Pirie MacDonald
conservation vs preservation

conservation seeks the proper use of nature & regulate human use

while preservation seeks protection of nature from use & eliminate human impact altogether
Department of Interior: National Parks
Department of Agriculture:
Forest Service & Bureau of Land Management
Realizing Metro Nature

Nearby Nature includes a variety of spaces and places:

- Urban Forest Canopy
- Biophilic Design
- Parks and Gardens
- Green Stormwater Infrastructure
Thornton Creek Water Quality Channel (Seattle, SvR Design)
1 hectare, treats runoff from 275 hectares (1 hectare = 2.47 acres)
economic & health co-benefits
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.
<table>
<thead>
<tr>
<th>Benefit</th>
<th>Metro Nature</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn Birth Weight</td>
<td>increased tree canopy cover near mothers' homes</td>
<td>fewer small for gestational age babies</td>
</tr>
<tr>
<td>Attention Deficit Hyperactivity Disorder</td>
<td>greener play areas vs built outdoor or indoor settings</td>
<td>reduced symptoms potentially reducing medication</td>
</tr>
<tr>
<td>School Performance</td>
<td>green views from classrooms and cafeteria</td>
<td>reduced dropout rate - average annual income</td>
</tr>
<tr>
<td>Crime Reduction</td>
<td>trees and lawn in outdoor common areas</td>
<td>reduced violent and non-violent incidence and costs</td>
</tr>
<tr>
<td>Cardiovascular Disease</td>
<td>presence of residential tree canopy</td>
<td>reduced incidence or severity of cardiovascular disease</td>
</tr>
<tr>
<td>Alzheimer’s Disease</td>
<td>wander garden in care facility</td>
<td>reduced medications for patients</td>
</tr>
</tbody>
</table>


KATHLEEN L. WOLF, PH.D.

design:

milepost

printing:

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

### INFANTS

**Birth Weight**
- Potential economic value: **$5.6B SAVINGS ON ANNUAL HEALTH CARE COSTS**
  - Birth weight influences long-term childhood health and development, and has been linked to some adult diseases. Low birth weight is associated with both short- and long-term health care costs, such as longer hospital stays and increased illness. Pregnant women that have more tree canopy and green space near their homes generally have babies with healthier birth weights.

**Immune Function**
- Suggests a stronger immune system leads to reduced illness and chronic disease across a lifetime.

**Family Dynamics**
- Suggests improved family dynamics in an outdoor environment.

### CHILDREN & TEENS

**Overall Health and Well-Being**
- Potential economic value: **$200-800 SAVINGS ON MEDICATION SAVINGS PER YEAR**
  - Increased physical activity, reduced asthma, or leading cause of emergency department visits, hospitalizations and missed school days.

**ADHD**
- Potential economic value: **$1.8B INCREASE IN HIGH SCHOOL GRADUATES’ LIFETIME ANNUAL INCOME**
  - School performance affects both nearterm well-being and long-term success. Environmental influences from classroom and outdoor spaces in schools can improve students’ capacity to direct attention and feel less stress.

### ADULTS

**Depression and Stress**
- Potential economic value: **$1.75-4.6B SAVINGS ON HEALTH CARE COSTS FROM MENTAL ILLNESS PER YEAR**
  - Improved mental health and function reduce disease treatment costs and improve productivity.

**Cardiovascular Disease**
- Potential economic value: **$1.3-3.2B ANNUAL SAVINGS ON MEDICATIONS BROAD BASED REDUCTION IN MENTAL ILLNESS**
  - Cardiovascular disease is the leading cause of premature death in the U.S. People show slightly reduced risk of CVD if their neighborhoods have greater nature coverage (particularly tree canopy), however it is worth noting the majority of studies have focused on trees.

### OLDER ADULTS

**Mobility & Quality of Life**
- Potential economic value: **$1.5-2.5B SAVINGS ON MEDICAL SERVICES, NOT COUNTING THE VALUE OF HOME CAREGIVER SERVICES**
  - About one in five older adults experience mental and cognitive disorders, with age being the greatest risk factor. In 2015, about 11% of people aged 65 or older were affected with Alzheimer’s disease. Those with dementia have three times as many hospital stays per year as other elders. Environments with nature improve symptoms related to cognitive disorders, such as agitation, depression, and reduced mobility.

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**Contributing Analysts:**
Dr. Stephen Grado & Marcus Measells, Miss. SU; Dr. Alicia Robbins, Weyerhaueser
U.S. health benefits valuation
annual value of $11.7 billion (2015 U.S.D.)

- cradle to grave human life cycle
- varied expressions of urban greening (metro nature)
- evidence based human health and wellness benefits
- preliminary analysis!
Reframing Urban Nature

project sponsored by the TKF Foundation
Annapolis, MD

Perception Gaps :: U.S. Public

Urban Nature

Cities
• Hustle & bustle
• Entertainment
• Opportunity + productivity
• Danger, threat, disease
• Concrete
• Urban nature = parks and paths

Nature
• Pure
• Everything
• Not manmade
• An escape
• Sustaining
• The roots of humanity
• Exercise and recreation
• Beautiful

??

Health
• Function / freedom from disease
• Determined by willpower and personal choices
• Mental health matters
• Nature is healthful
• Single dose
emergent perceptions

nearby nature = health, wellness
resilience
gratitude
stewardship
Human Dimensions of Urban Forestry and Urban Greening

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.