Economics of City Trees & Forests
what does science tell us?

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Manchester, 21 September 2016
English Garden Landscapes

Blenheim Palace Park – Capability Brown
English Garden Landscapes

horticultural introductions
English Garden Landscapes

horticultural emphasis with urbanization
English Garden Landscapes

Butchart Gardens – Victoria B.C., Canada
international destinations
importance of nearby nature & trees
credit: American Planning Association
urban forestry and urban greening
‘metro nature’
economic values to communities
# Yard & Street Trees

<table>
<thead>
<tr>
<th>Value</th>
<th>Increase</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>2%</td>
<td>mature yard trees (greater than 9-inch dbh)</td>
</tr>
<tr>
<td>Value</td>
<td>3%</td>
<td>larger street trees (up to 100’ away)</td>
</tr>
<tr>
<td>Value</td>
<td>3-5%</td>
<td>trees in front yard landscaping</td>
</tr>
<tr>
<td>Value</td>
<td>6-9%</td>
<td>good tree cover in a neighborhood</td>
</tr>
<tr>
<td>Value</td>
<td>10-15%</td>
<td>mature trees in high-income neighborhoods</td>
</tr>
</tbody>
</table>

*multiple studies:*

**Green Cities: Good Health > Local Economics**
Local Government Benefits

*Civic Investment – Public Goods*

*like schools, emergency response, roads*

- street trees average positive effect on house values
- added up across Portland, Oregon
- yields a total value of $1.35 billion
- potentially increasing annual property tax revenues $15.3 million

Donovan & Butry. 2010
*Landscape and Urban Planning*
1. Place Perceptions
   • Place Character
   • Interaction with Merchants
   • Quality of Products

2. Patronage Behavior
   • travel time, travel distance
   • duration & frequency of visits
   • willingness to pay for parking

3. Product Pricing
   • higher willingness to pay for all types of goods
   • higher in districts with trees – 9-12%
“Companies stage an experience when they engage customers in a memorable way.”
urban forestry and urban greening
‘metro nature’

human health & wellness benefits
WHO health definition

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

science & evidence re: environment
role of ‘metro nature’?
not a panacea, but important!
Determinants of Health
canopy of a city = human health benefits
evidence about human wellness & ‘nearby nature’
Green Cities: Good Health
www.greenhealth.washington.edu

Sponsors:
USDA Forest Service, U&CF Program
University of Washington
NGO partners

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

research review & summaries
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 that are functional. This article serves two purposes. First, it introduces valuation methods that are used to convert intangible benefits to dollar values. Then, it shows how remnant utilities can support local decision-making.

Fast Facts

- The presence of larger trees in yards and on street trees can add from 3% to 15% to home values throughout neighborhoods.
- Averaging the market effect of street trees on in-house values across Portland, Oregon yields a total value of $1.25 billion, potentially increasing annual property tax revenues $15.5 million.
- A study found 7% higher rental rates for commercial offices having high-quality landscapes.
- Shoppers claim that they will spend 6% to 12% more for goods and services in central business districts having high-quality tree canopy.
- Shoppers indicate that they will travel greater distances and spend more time in a district having high-quality trees, and spend more time there when they arrive.
urban nature & health benefits across the life cycle
Urban Forests and Newborns
the urban natural environment and 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; similar studies in Lithuania, Vancouver B.C., Munich, Tel Aviv Israel, Spain
Change in % Population on ADHD Treatments
2001 - 2010

America’s State of Mind, Medco Health Solutions, Inc
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*
Classroom Views & Stress

Li & Sullivan. 2016. Landscape & Urban Planning
Classroom Views & Stress

high school student response

attention scores

stress scores
Trees & Crime Reduction

- Trees in the public right of way are associated with lower crime rates
  - Smaller, view-obstructing trees are associated with increased crime
  - Larger trees are associated with reduced crime

Donovan & Prestemon. 2012. *Environment and Behavior*
10% increase in tree canopy
~ 12% decrease in crime

Improving Depression

20 adults with major depression walk in a park setting and an urban 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*
**Shinrin-yoku**  Forest Bathing

- extended forest walks
  - reduced ‘fight or flight’ response
  - lower cortisol – a stress indicator
  - increased immune function
  - lower pulse rate & blood pressure

Tsunetsugu, Park, Miyazaki. 2010. Environmental Health and Preventive Medicine
Effects of nature window view on recovery from surgery (Roger Ulrich, 1984)

- Shorter stays
- Less pain
- Fewer minor complications
- Better emotional well-being
hospital healing gardens
health care $$ savings
patient preference & return

Ulfelder Healing Garden, Massachusetts General Hospital
Scripps Encinitas Hospital
Massachusetts General Hospital

credit: Frank Oudeman
Lifecycle :: disease & illness
economic costs to nation and community

Disability Adjusted Life Year
Conclusions

• Nearby trees & nature in cities & towns is essential!
• Economic benefits – property value & retail behavior
• Nature supports disease prevention & health promotion for people of all ages
• Evidence? Green Cities: Good Health
• Many more studies underway . . . . .
Human Dimensions of Urban Forestry and Urban Governing

- Nature and Consumer Environments
- Trees and Transportation
- Civil Environments
- Policy and Planning
- Urban Forestry and Human Benefits

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