nearby nature in cities – history & tech
in the background
trees & forests provide many benefits!
The Evolution of Cities ::
From Sanitary to Sustainable

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Outline

sanitary to sustainable city
green infrastructure solutions
examples – co-design for co-benefits
trees/nature in cities & human health
(mental health & wellness)
sanitary city

efficient and hygienic
supply & removal
of materials and services
natural systems disconnect
Industrial Age – city squalor

Filthy Cities!

credit: BlendSpace
credit: blogs.isb bj.edu.cn
sustainable city

etiological function, green infrastructure, & ‘revealed’ processes

Pincetl, S. 2010. From the sanitary city to the sustainable city. Local Environment
Green Infrastructure

systems solutions
ecology that works
co-design for co-benefits
measure the canopy of a city
Eco (UFORE)
Streets (STRATUM)
Hydro
Vue

tools provided by USDA
Forest Service

STRUCTURE
FUNCTION
VALUE
MANAGEMENT

photo credits: Seattle i-Tree Training by Al Zelaya
Reducing Stormwater Runoff

Image courtesy of the Center for Urban Forest Research
stormwater retention
Grey Infrastructure

- Drain, direct, dispatch

Green Infrastructure

- Slow, spread, soak

Source: Low Impact Development: A Design Manual for Urban Areas, 2010
How can we transform the roof?

evapotranspiration

biodiversity

How can we transform the walls?

How can we transform the ground?

retention

infiltration

filtration

treatment

storage

infiltration

Low Impact Development: A Design Manual for Urban Areas, 2010
green infrastructure tools & strategies

= mini parks?

credit: Seattle Public Utilities
stormwater management
Thornton Creek Water Quality Channel (Seattle, SvR Design)
1 hectare, treats runoff from 275 hectares (1 hectare = 2.47 acres)
Tanner Springs Park
Portland OR
linked to active living network
neighborhood
social cohesion

environmental
education &
social learning
Clear Creek Basin, 2 acre stormwater detention lake, 17 acres of greenspace & parks amenities
nature in cities for human health

quality of life
livable places
disease prevention
health promotion
WHO Health Definition

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

- General socio-economic, cultural and environmental conditions
  - Work environment
  - Unemployment
  - Water sanitation
  - Health care services
  - Housing
- Social and community networks
  - Agriculture and food production
  - Education
- Individual lifestyle factors
  - Living and working conditions
  - Age, sex & hereditary factors
Green Cities: Good Health
www.greenhealth.washington.edu

Sponsors:
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University of Washington
NGO partners

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Research Reviews & 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 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 $153 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.
green infrastructure & reduced crime

Philadelphia

reduction in narcotics arrests (18–27 %) for green not gray

vs. 65% increase across city

Kondo et al. 2015.
Journal of Public Health
management for co-benefits - retail
Design Ideas

- enhance aesthetics & appeal
- create great places
- encourage health behaviors & outcomes
place making:
vertical + horizontal surfaces
design concept

bring people in!
design concept
orient seating
to nature!
design concept

enable biodiversity & soft fascination
spatial linkages: the city becomes a park

TKF Foundation :: Nature Sacred initiative
City Trees & Nearby Nature for Human Health

Tree Fund – research review underway
trees are the cornerstone of quality
nature places
actionable evidence = programs
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
Hygiene Hypothesis

 présence of soil bacteria in body, *Mycobacterium vaccae* = increased serotonin

 boost immune function

 may alleviate depression (dirt or Prozac?)

Lowry et al. 2007. Neuroscience
Fiddleheads Forest School
Washington Park Arboretum (Seattle)
cognitive social & physical learning
CDC moderate activity recommendations

parks, active living, active transit
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
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

Canopy Cover & Stress

images of canopy cover varied 0-60%

Shinrin yoku (forest bathing)

- extensive research
- restorative experiences
- workers retirees
- networked system, 52 bases in Japan
The medicine of being in the forest
We are the leading global voice for forest bathing and forest therapy

Santa Rosa, California
Summary

sanitary to sustainable cities
green infrastructure solutions
nature in cities & human health
co-design for co-benefits
improved human habitat
trees are essential!
Human Dimensions of Urban Forestry and Urban Greening

- 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.

- Green Cities: Good Health
  Research on peoples’ perceptions and behaviors regarding nature in cities.

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

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