Design for Health: green stormwater infrastructure (and more?)

Kathleen Wolf, Ph.D.
Research Social Scientist

University of Washington (Seattle)
School of Environmental and Forest Sciences

GA Urban Forest Council Conference
Savannah :: November 2015
Sanitary City

urban forestry
climate response
urban agriculture
green stormwater systems

increased ecological function/
green infrastructure

Sustainable City

human wellness & public health
equity
civic stewardship

increased human connection &
engagement

Sacred City
sanitary city

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

credit: BlendSpace
credit: blogs.isb.bj.edu.cn
Baltimore: Public Works Museum
sustainable city

ecological function, green infrastructure, & ‘revealed’ processes

Pincetl, S. 2010. From the sanitary city to the sustainable city. Local Environment
measure the canopy of a city
Eco (UFORE)
Streets (STRATUM)
Hydro
Vue

tools provided by USDA
Forest Service

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

Image courtesy of the Center for Urban Forest Research
Trees & Stormwater Runoff

credit: City of State College, PA
Stormwater Management

Pierce County WA, Chambers Creek Properties
Pierce County WA, Chambers Creek Properties - 4 year growth
Thornton Creek Water Quality Channel (Seattle, SvR Design)
1 hectare, treats runoff from 275 hectares
the Chenoggye freeway in Seoul
~ 1970-2005
Chenoggyeon – 8.4 km, $900 M

initial public criticism!
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
Converting Gray to Green
High Line Railway - W Manhattan
- between 2003 and 2011
- nearby property values increased 103% (despite the deep recession)
- $2 billion was invested in nearby properties development
sacred city

civic sacred

health & wellness

reflection, contemplation, 
& mindfulness, spirituality

giving back, stewardship, gratitude
Trees are the earth's endless effort to speak to the listening heaven.

Rabindranath Tagore, *Fireflies*, 1928
Gulfport, MS :: Katrina survivors
‘forest bathing’, Kyoto, Japan
sustainable city

ecological function, green infrastructure, & ‘revealed’ processes

Pincetl, S. 2010. From the sanitary city to the sustainable city. Local Environment
in cities . . . .

expensive land values
reduced public funds
increasing community needs
new parks??

SO . . . . .
multi-tasking nature
creating co-benefits
Tanner Springs Park
Portland OR
linked to active living network
neighborhood
social cohesion

environmental
education &
social learning
Research Opportunity
Urban Drainage

- City of Seattle sewer and stormwater drainage systems
Separated Sewer System
Combined Sewer Systems
Change & Water Quality

- King County/City of Seattle CSOs (combined sewer overflows)
- EPA consent decree
- decision – green stormwater infrastructure
- co-benefits
Analysis :: Surface Infiltration Potential

public & private lands
green
stormwater infrastructure strategies
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.\(^24\)

- Shoppers claim that they will spend 9% to 12% more for goods and services in central business districts having high quality tree canopy.\(^24\)

- 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.\(^24\)
Determinants of Health
Study Planning

- neighborhood green stormwater infrastructure installation - 2016
- consent decree co-benefits
- human health & wellness
- pre/post analysis
- measures? property value, physical activity, social capital, mental health, school performance
Design Opportunities
Design Elements ::
Attention Restoration Theory

- being away
- ‘soft’ fascination
- extent
- compatibility
design concept

biodiversity &
soft fascination
place making: vertical + horizontal surfaces
design concept
design concept

bring people in!
let them see nature!
Stormwater Report, online April 2014 (search health)

co-benefit design opportunities
Sanitary City

urban forestry
climate response
urban agriculture
green stormwater systems

increased ecological function/
green infrastructure

Sustainable City

human wellness
& public health
equity
civic stewardship

increased human connection & engagement

Sacred City
Human Dimensions of Urban Forestry and Urban Greening

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

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 roadways.

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...

Projects Director
Kathleen L. Wolf, Ph.D.

www.naturewithin.info