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

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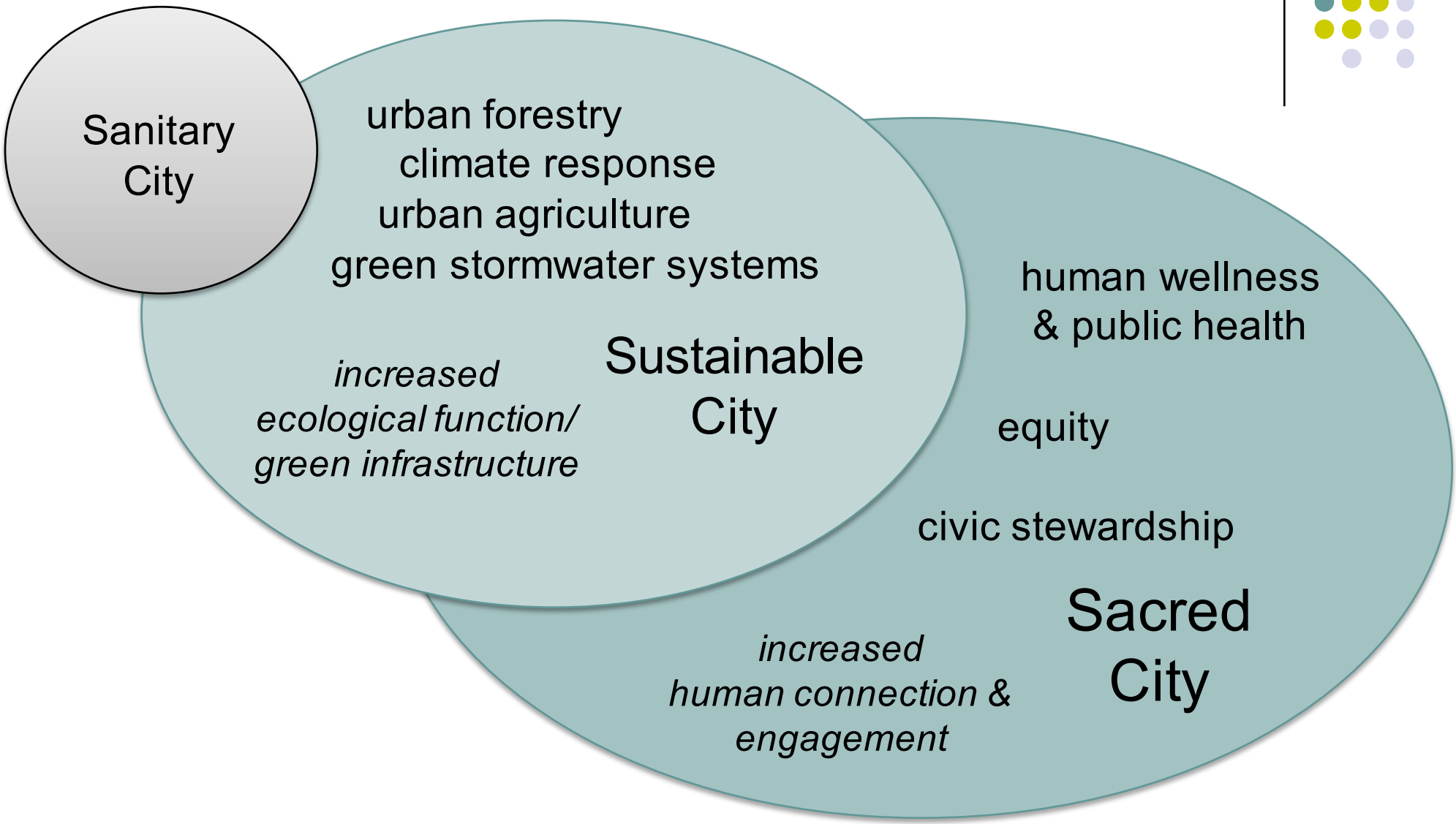
**GA Urban Forest Council Conference**
Savannah :: November 2015


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
Sacred City
increased human connection & engagement

# 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

08/04/2005

Baltimore: Public Works Museum
STORM DRAIN

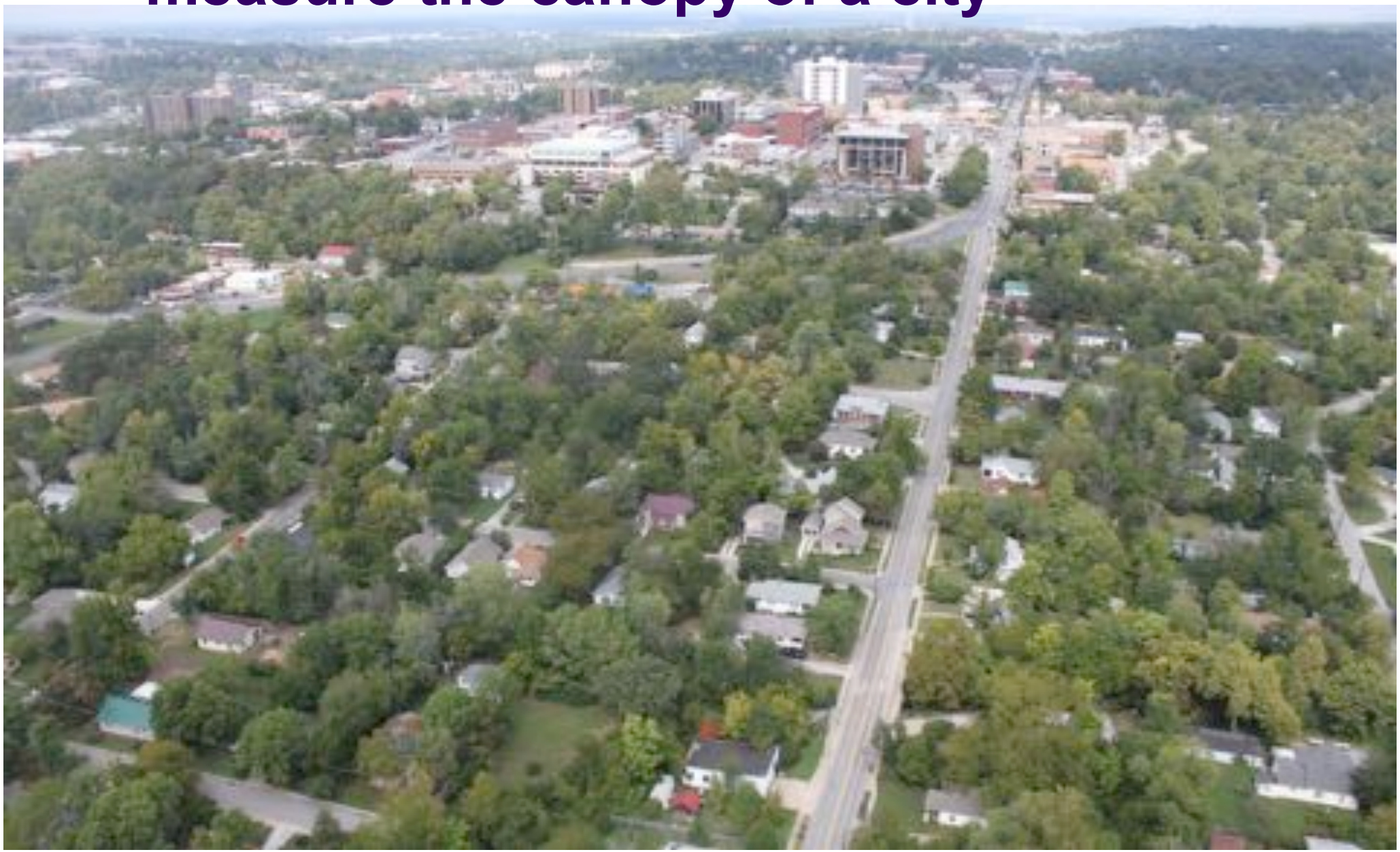
SANITARY
STORM DRAIN

# 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



i-Tree™

**Eco (UFORE)**

**Streets (STRATUM)**

**Hydro**

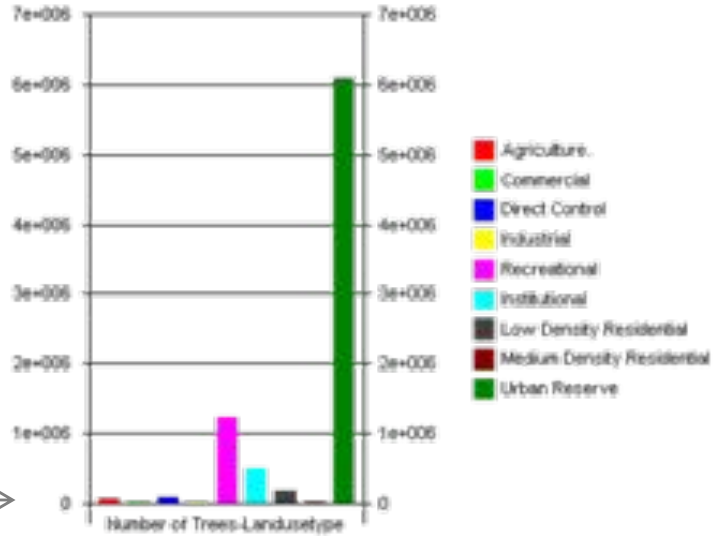
**Vue**

**tools provided by USDA Forest Service**

**STRUCTURE**

**FUNCTION**

**VALUE**




**MANAGEMENT**

photo credits: Seattle i-Tree Training by Al Zelaya

# Reducing Stormwater Runoff

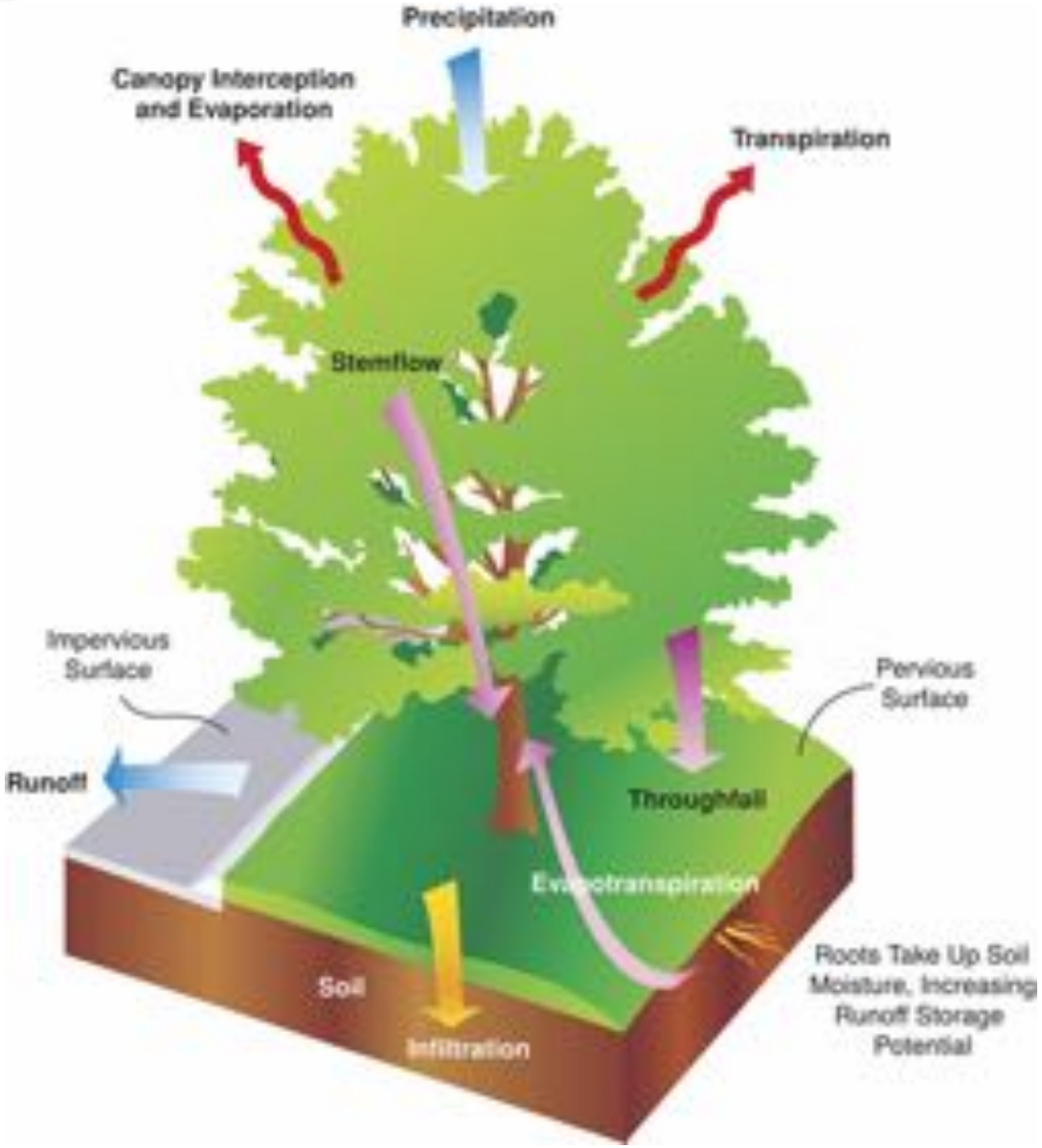



Image courtesy of the Center for Urban Forest Research

# 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

# Stormwater Management

**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

# The High Line :: June 2009

- 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,
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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

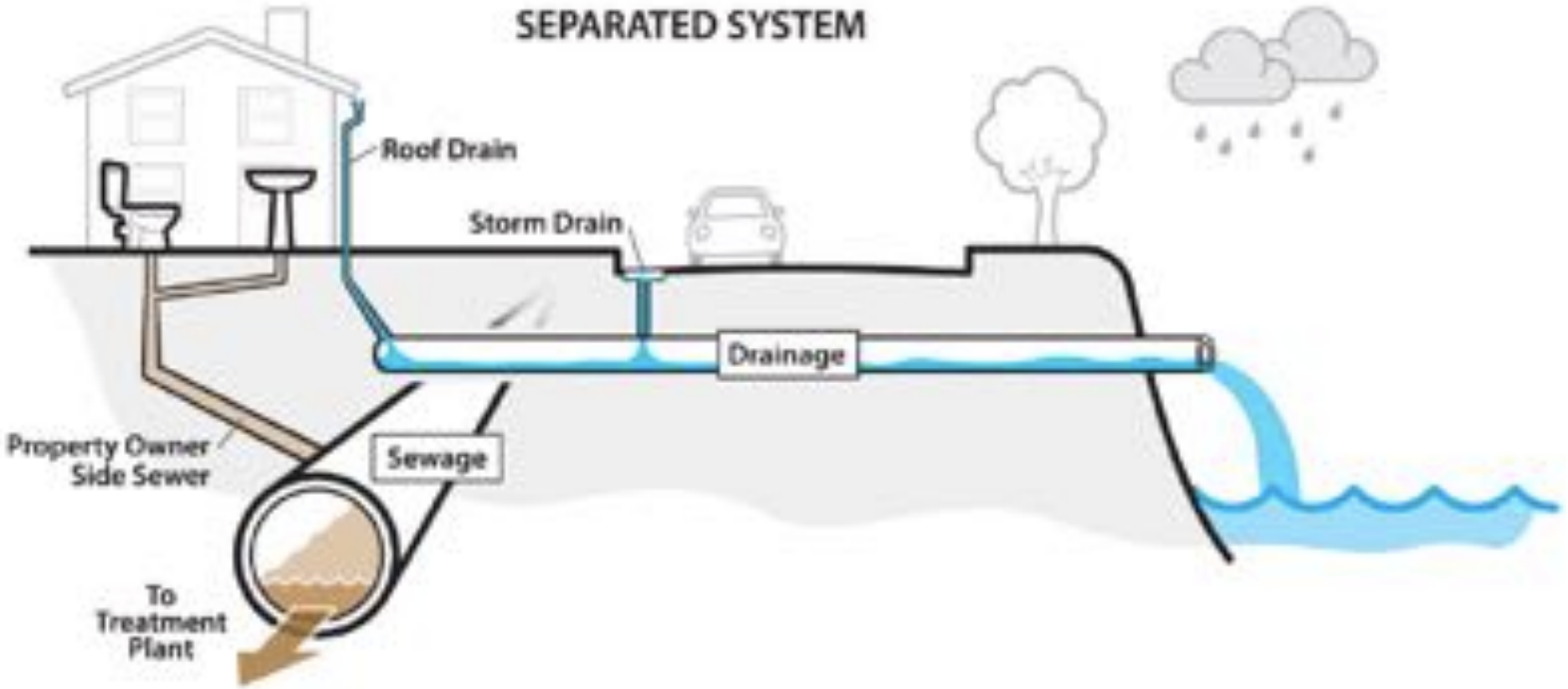
environmental
education &
social learning

# Research Opportunity

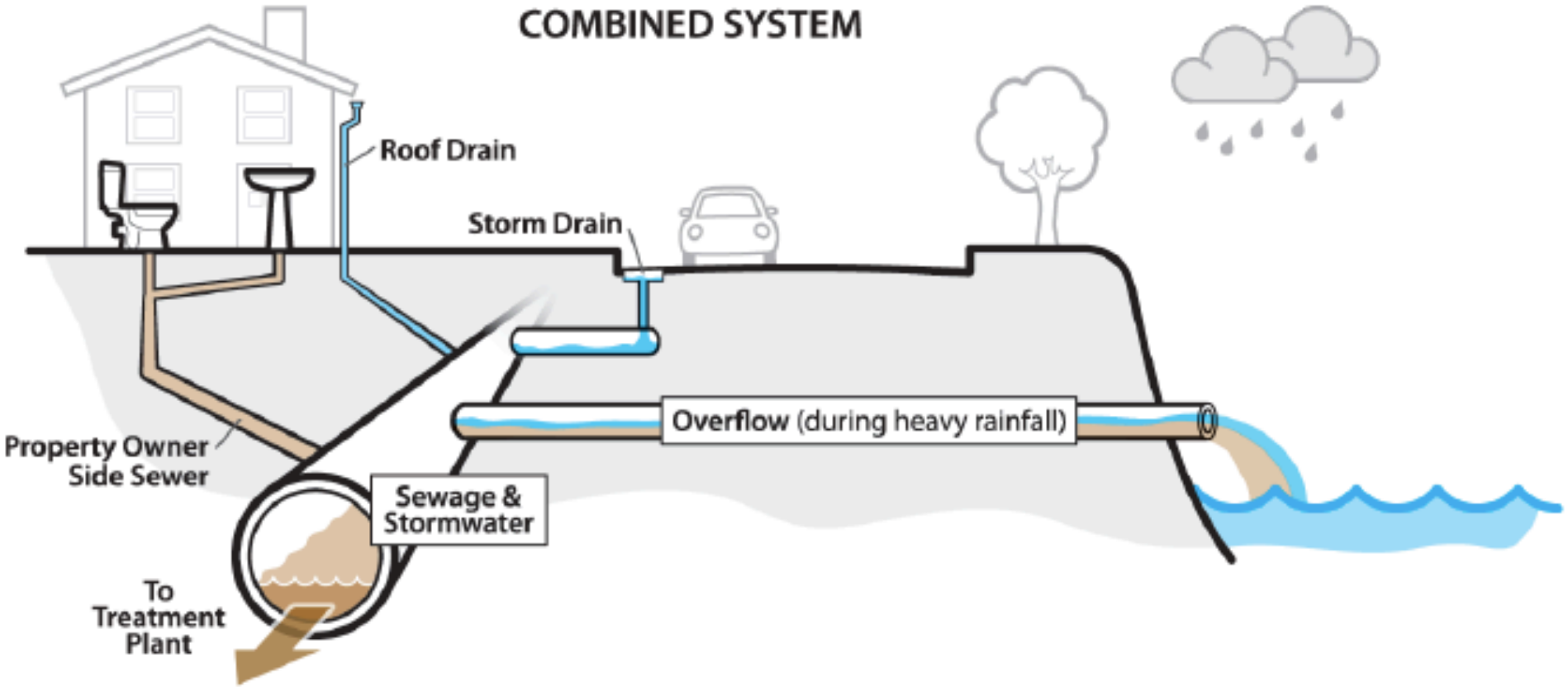
# Urban Drainage

- City of Seattle sewer and stormwater drainage systems

# Separated Sewer System

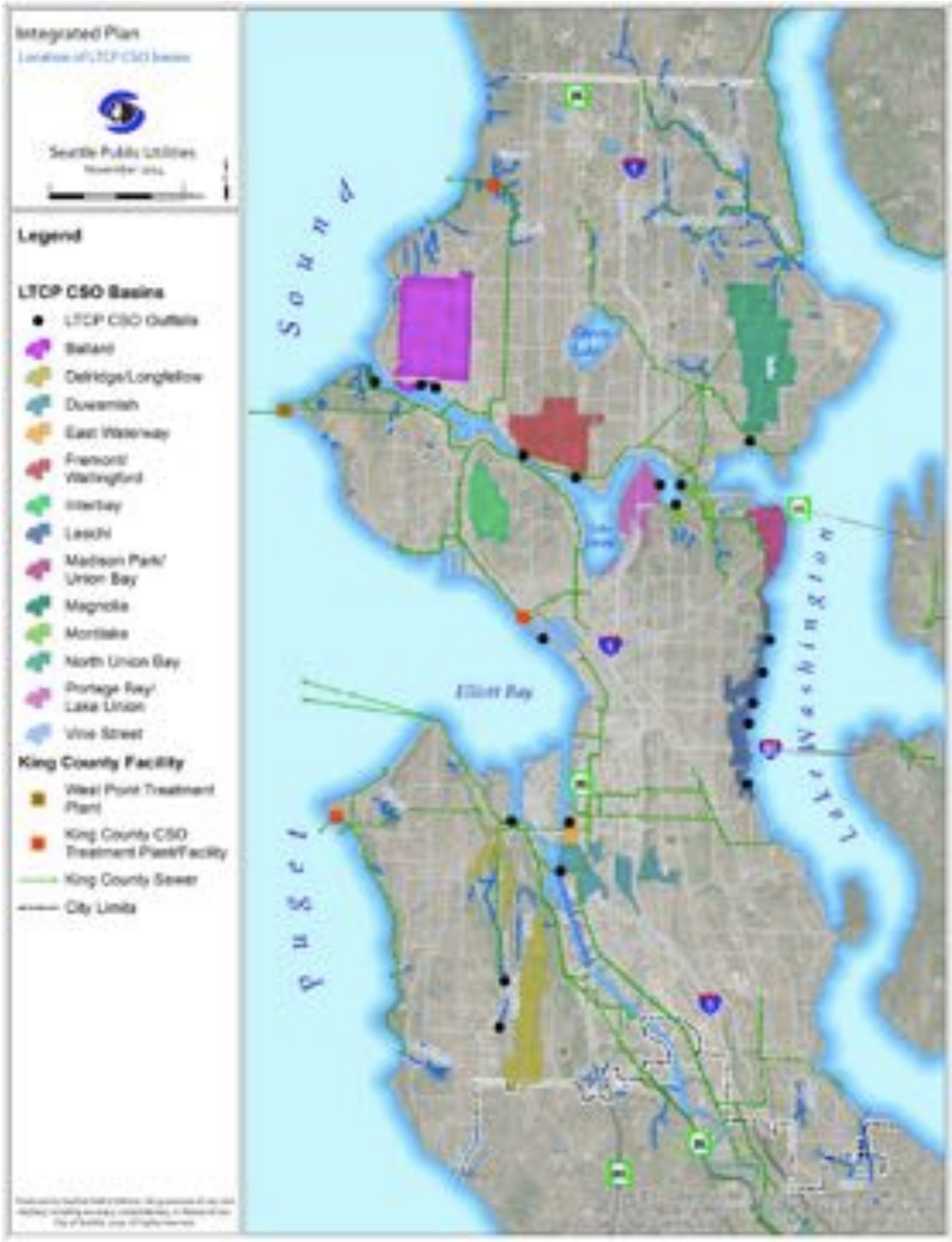


# Combined Sewer Systems



# 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

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

RSS Feed Print

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

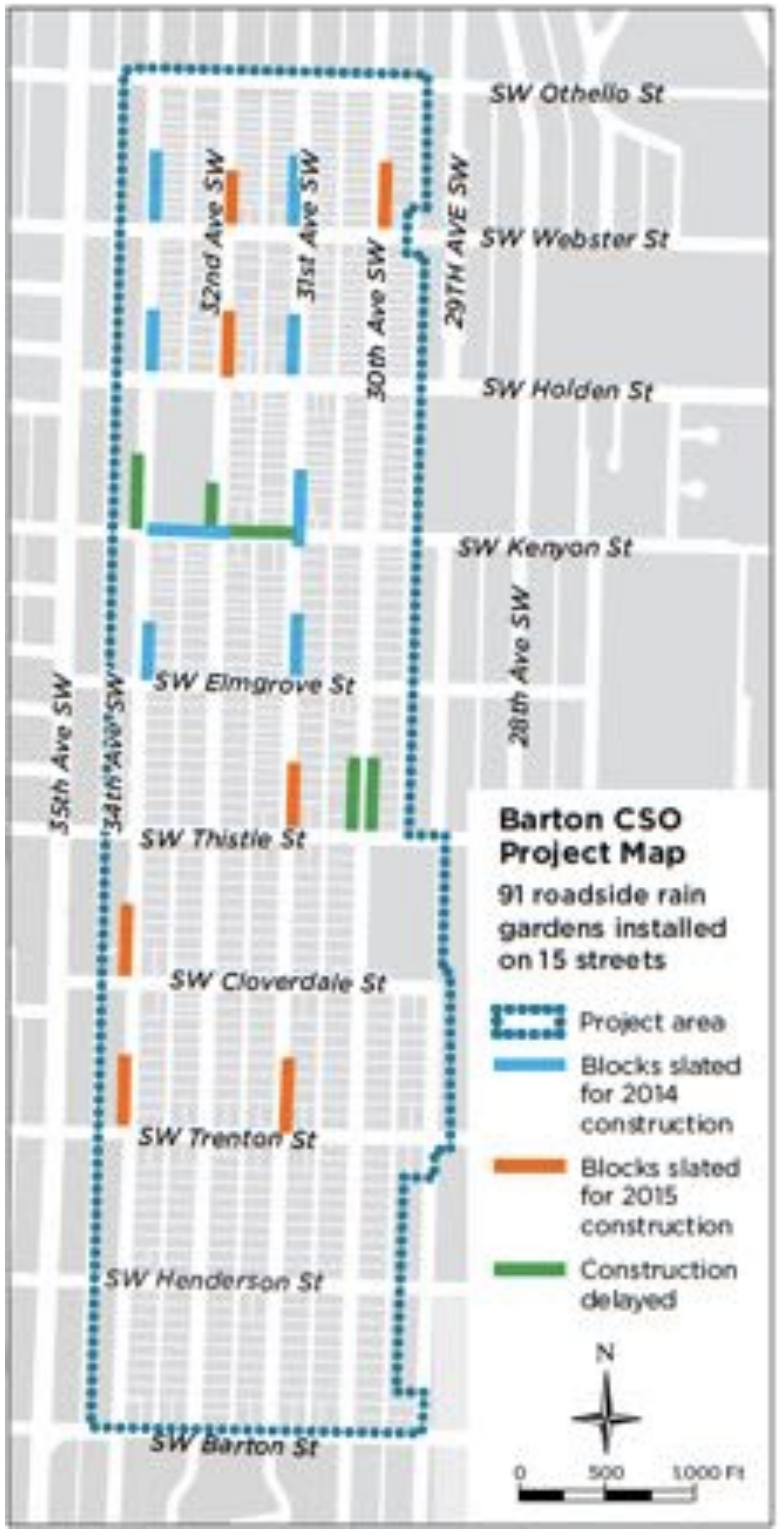
- The presence of larger trees in yards and as street trees can add from 3% to 15% to home values throughout neighborhoods.
- Averaging the market effect of street trees on all house values across Portland, Oregon yields a total value of $1.35 billion, potentially increasing annual property tax revenues $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]

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

# 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

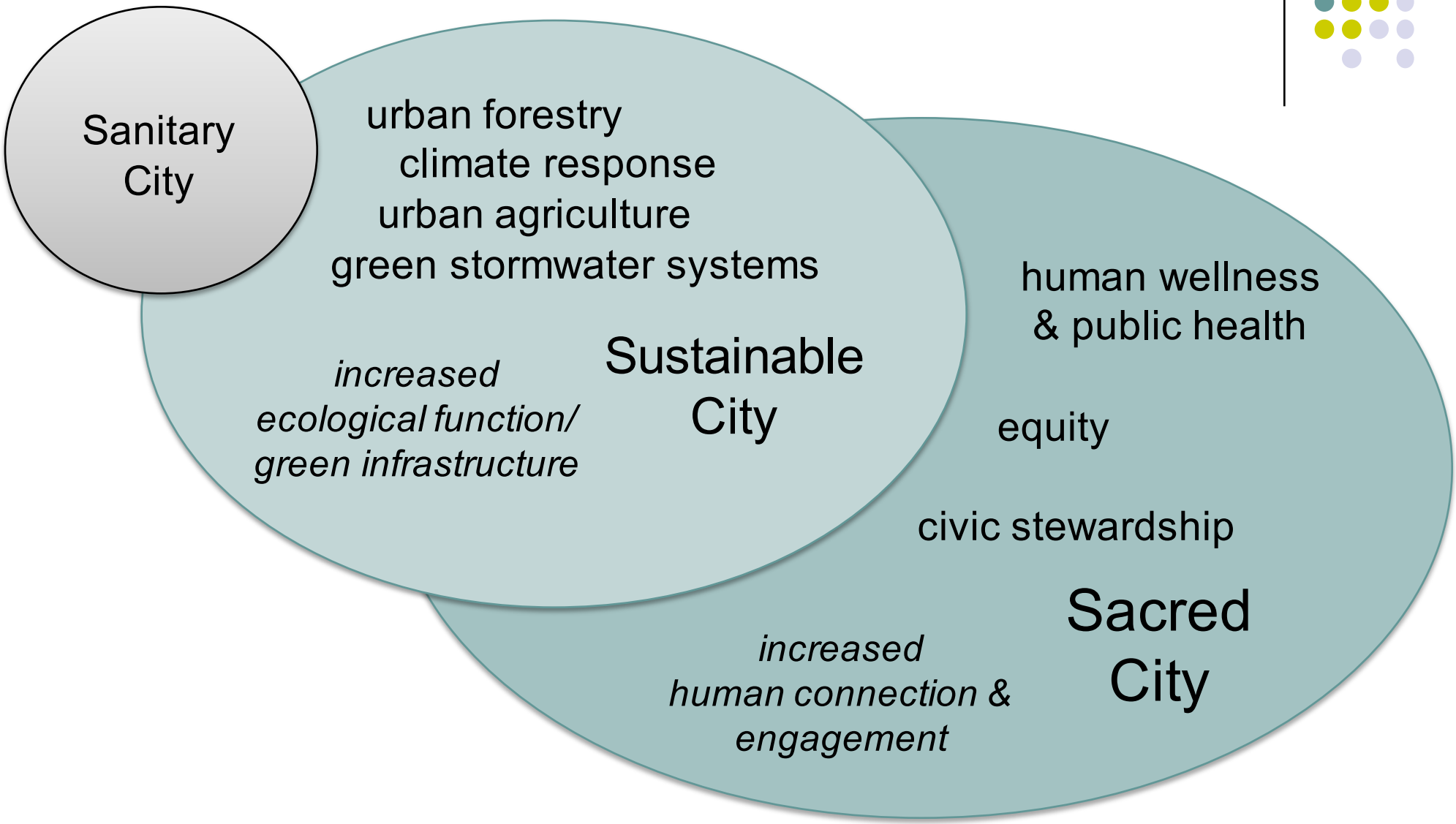
# design concept

## bring people in!

# let them see nature!

**Stormwater Report, online April 2014 (search health)**

# co-benefit design opportunities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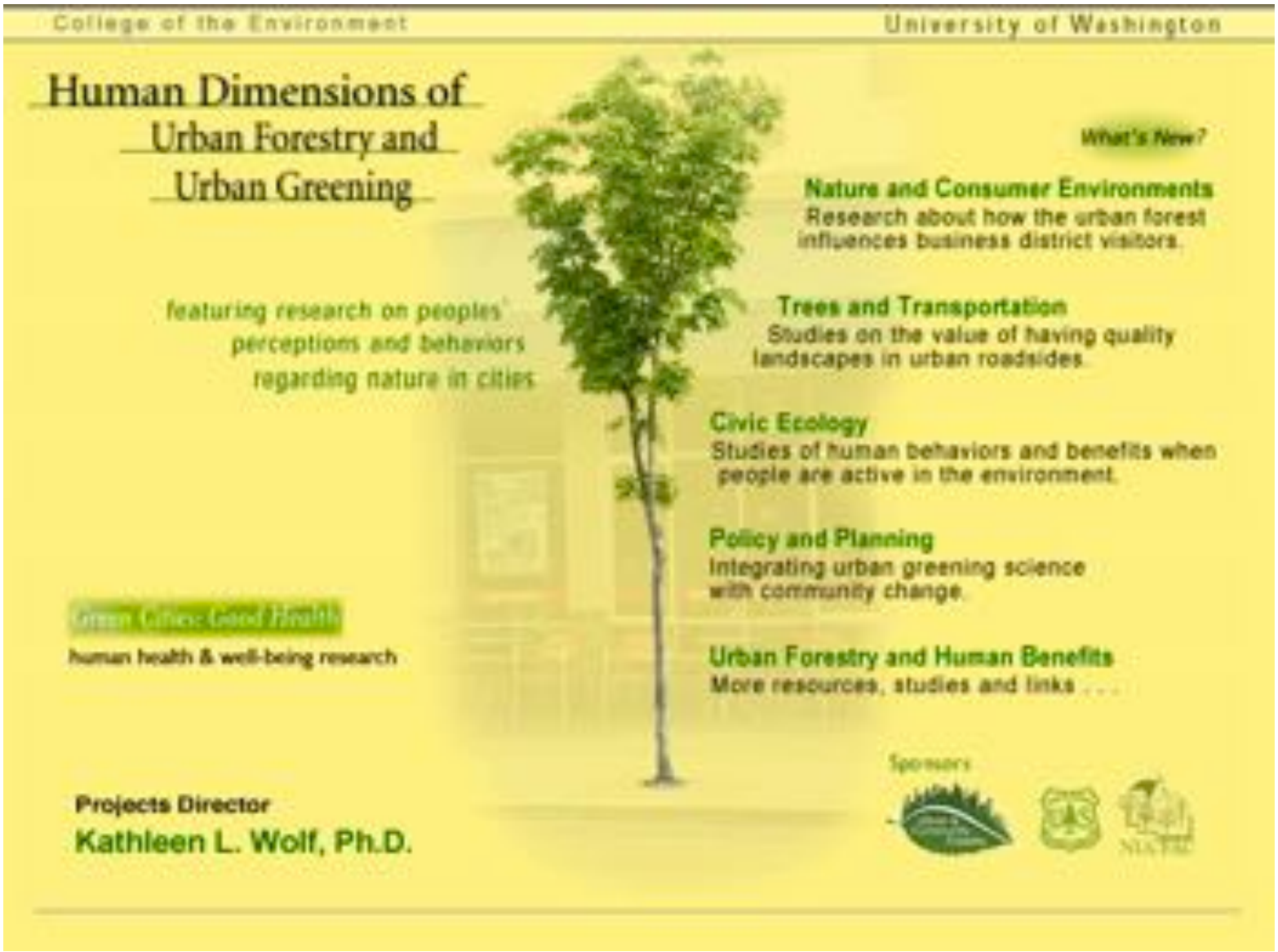


**www.naturewithin.info**