Trees Do It All!

Trees & Parks
Community Economics & Safety

Dr. Kathleen Wolf
College of Forest Resources, University of Washington
September 2008

www.cfr.washington.edu/research.envmind
Global Urbanization
1900 - 14% of humanity lived in urban areas, 2000 - 47%

Japan
compact cities
dynamic street life

public & non-motorized transportation
gas price & behavior change?

civic forests
sacred forests

native species & cultural stewardship
forest symbols
U.S. Urbanization

- time series modeling - past to future

- > 80% U.S. population lives in urbanized areas - future?


Nowak, J. Forestry, Dec. 2005
Small Changes, yet Big Change
Maintain the Big Picture

- trees are not only: hazard, risk, costs

One Park!

Baltimore
City Trees & Parks
Planning & Investment:

what?
how?
why?

City Trees & Parks
Benefits Categories

environmental
economic
psychological
social
physical self
Not just beauty . . .
environment, economics, social benefits

“malleable mental accounting”
Cheema & Soman, 2006, J of Consumer Psych

City Trees & Nature
Environmental Services

- Air pollutants reduction
- Nitrogen, phosphorus and sediment interception
- Carbon emissions reduction & sequestration
- Urban heat-island cooling
- Reduced “bad” ozone
- Stormwater runoff reduction
- Wildlife habitat
Wildlife Habitat

- including birds!
City Trees & Parks

Benefits Categories

- environmental
- economic
- psychological
- social
- physical self

City Trees & Nature

Community Economics

- Residential real estate values - 3-7% with trees in yard
- Residential real estate values - 5-20%, proximity to natural open space
- Commercial property rental rates - 7%
- Heating and cooling costs reductions
- Less frequent pavement replacement
- Improved consumer environments in business districts - 9-12% product spending
Research Question:
What is the response of consumers/shoppers to trees in CBD streetscapes?

Measures:
Visual preference
Place perceptions
Patronage behavior
Product pricing

research program, U of Washington
Wolf & collaborators, funded by US Forest Service

Image Categories (sorted by ratings)
(cities of 10-20 K population)

Pocket Parks
mean 3.72
(highest)

Full Canopy
mean 3.63

Scale: 1=not at all, 5=like very much,
26 images
Enclosed Sidewalk
3.32

Intermittent Trees
2.78

No Trees
mean 1.65 (lowest)
(high - 3.72)
1. Place Perceptions
   - Amenity and Comfort
   - Interaction with Merchants
   - Quality of Products
   - Maintenance and Upkeep

2. Patronage Behavior
   - travel time, travel distance
   - duration & frequency of visits
   - willingness to pay for parking
   
   most measures higher with trees

3. Product Pricing
   - higher willingness to pay for all types of goods
   - higher in districts with trees - 9-12%

2. Typical retail street in urban Japan
Namba Parks, Osaka
view from nearby hotel
interior retail space

ground level

small plazas, retail entry
passive nature experiences

Namba Parks: retail success & nature experience benefits
City Trees & Parks

Benefits Categories

- environmental
- economic
- psychological
- social
- physical self

City Trees & Nature

Human Health & Well-Being

- Improved surgery and illness recovery
- Higher job satisfaction and reduced absenteeism
- Lower crime rates in well landscape areas
- Stress & anxiety reduction in urban lifestyles
- Reduced violence and more constructive conflict resolution in domestic conflict
- Reduced ADHD symptoms
- Improved social ties in neighborhoods
Nearby Nature is necessary “human habitat”

source: UrbanPhoto

Nearby Nature - not distant places
City Trees & Parks

Benefits Categories

- environmental
- economic

- psychological
- social
- physical self

Workplace Nature Views

- **Well-being**
  - desk workers without view of nature reported 23% more ailments in prior 6 months

- **Job Satisfaction**
  - less frustrated and more patient
  - higher overall job satisfaction and enthusiasm

Plants in Workplace

- **Productivity**
  - 12% quicker reaction on computer tasks
  - Reports of being more attentive

- **Less Stress**
  - Lower systolic blood pressure

Lohr et al. 1996. J. of Environmental Horticulture

directed attention
we all
deserve a
corner office!

bottom-line
$$ benefits of
small city
parks

Green Roof - Chicago City Hall

high-rise nature,
preferred views
Tokyo Metropolitan Assembly Hall

- Ecos, Sept-Oct 2004

Nashville, mixed use bldg  roof gardens/ecosystems
Parking Structure - Kobe, Japan

engineered nature & forests

social & market values?
Namba Parks, Osaka
view from nearby hotel

Wellness & Healing

- Surgery Recovery
  - shorter post-operative stays
  - less use of potent pain drugs, better attitude

- Lifestyle Recovery
  - attentional fatigue restored
  - relationships and career coping

Roger Ulrich. Texas A &M. Studies on nature and medical recovery

Healing Gardens
- institutional design -

U of WA Hospitals Surgery Pavilion
Roadside Landscape & Traffic Stress Response

- Roadside Features - Driving Simulations
  - Forest, golf course, strip mall

- Physiological Response
  - E.g. heart beat, blood pressure

- Results
  - Nature scenes - return to baseline faster, less response to new stressors
  - Immunization effect


Americans travel 2.3 billion miles per day on urban freeways & highways
Effects of gardening to frontal cortex

Elders & Horticulture Therapy
方法

実験1:
課題①: 2種の土を混ぜる
課題②: 土を鉢に入れる
課題③: 花を鉢に植える

図. 各課題の手順(数字は秒)

方法

実験2:
課題④: 左右の腕を体の前で弧を描くように動かす
フォルダ装着位置は、額の正中位で且つ眉から1cm上とした。

City Trees & Parks
Benefits Categories

- environmental
- economic
- psychological
- social
- physical self
http://www.treeclimbing.jp/

physically disabled & tree climbing!
recreational tree climbing (& tree therapy)
Social Benefits

- studies at the University of Illinois, Landscape and Human Health Laboratory

Dr. Frances Kuo
Research Director

http://www.lhhl.uiuc.edu/

Chicago Public Housing with & without green spaces

Wm. Sullivan & F. Kuo
University of Illinois
lower levels of fear
less violent & aggressive behavior
more self-discipline for girls
reduced ADHD symptoms
better neighbor relationships
better coping with life’s challenges
fewer reported crimes

Balancing Environmental Performance and Crime Deterrence in Seattle Parks

Richard Gelb, Seattle Parks
Trish Byers, MLA, UW
Considering Environmental Performance and Safety Together

Greater urban density? We need:
More urban green spaces,
Better environmental performance within and among urban green spaces,
Safer design of urban green spaces

CPTED History
(Crime Prevention Through Environmental Design)

1960s - crime & physical environment: The Death and Life of Great American Cities by Jane Jacobs and Defensible Space by Oscar Newman


1990s - second generation CPTED, situational/social: Greg Saville and Gerry Cleveland
Core Principles

natural surveillance: “eyes on the park”
access control: physical guidance in and out
territorial reinforcement: expressions of ownership
target hardening: less access by offender

Identifying Best Use for Each Area within the Park (Site Analysis)

Identify areas within the park that:

**Environmental**
- Are the most capable of supporting ecological function and/or restoration.
- Have ecological importance (e.g. salmon-bearing streams)
- Are the most isolated from human activity in the park or the neighborhood
- May have natural barriers to protect ecological function

**Safety**
- Are hotspots for safety concerns
- Are the easiest for people to gather for picnics, play, etc.
- Are the least isolated
- Lend themselves to uses like community gardens or sports
- Are the easiest to landscape and maintain
- Are already hardscaped
Design Strategies

- Habitat and tree steward areas clustered in less accessible area.
- Comfort station and play area clustered together and near street for natural surveillance.

Bradner Gardens  
Othello Park
Fencing is aesthetically pleasing and limits access to openings in the fence. The fencing material does not obstruct visibility from the street. The bench creates more opportunity for surveillance.

Boardwalk directs traffic. It encourages park users to enjoy natural areas without trampling habitat.

Design Strategies

Signage such as posted hours and rules indicates ownership in the park.

Symbolic boundaries indicate ownership.

Freeway Park

Flo Ware Park
Design Strategies

**Legitimate activity generators push out unwanted activities.**

**When neighbors create art for a park, they are more likely to protect it from vandalism.**

Off Leash Area, Denny Regrade Park

Bradner Gardens

Balancing Environmental Performance and Safety

1. *Reduction of midstory plants* may create sightlines, but may not be optimal for habitat creation.

   **Solution:** Use less dense midstory plant material and clear sightlines between 3’ and 7’ where needed especially hot spots.

   2. *High human usage levels* result in stressed/trampled plant communities. *Increased irrigation can reduce this stress but does not promote water conservation.*

   **Solution:** Develop a low barrier/fence vocabulary and place paths where humans are most likely to carve paths anyway.
City Trees & Parks
Benefits Categories
- environmental
- economic
- psychological
- social
- physical self

public health & human habitat

Physical Inactivity & Obesity
majority of Americans not active enough
goal-30 minutes per day of moderate activity
to reduce risk factors for chronic diseases
(heart, stroke, cancer, diabetes)
significant costs to national health services

310-580,000 deaths per year
$100 billion medical costs (1995)
9.4% of all U.S. medical costs
Obesity Trends* Among U.S. Adults

1985

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)

Obesity Trends* Among U.S. Adults

1986

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults

1987

(*BMI ≥ 30, or ~ 30 lbs overweight for 5’ 4” person)

Obesity Trends* Among U.S. Adults

1988

(*BMI ≥ 30, or ~ 30 lbs overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults

1989

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)

Obesity Trends* Among U.S. Adults

1990

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults

1991

(*BMI ≥ 30, or ~ 30 lbs overweight for 5’4” person)

Obesity Trends* Among U.S. Adults

1992

(*BMI ≥ 30, or ~ 30 lbs overweight for 5’4” person)
Obesity Trends* Among U.S. Adults

1993

(*BMI ≥30, or ~ 30 lbs overweight for 5’4” person)

Obesity Trends* Among U.S. Adults

1994

(*BMI ≥30, or ~ 30 lbs overweight for 5’4” person)
Obesity Trends* Among U.S. Adults

**1995**

(*BMI ≥ 30, or ~ 30 lbs overweight for 5’ 4” person)

Obesity Trends* Among U.S. Adults

**1996**

(*BMI ≥ 30, or ~ 30 lbs overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults

1997

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)

Obesity Trends* Among U.S. Adults

1998

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults

1999
(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)

Obesity Trends* Among U.S. Adults

2000
(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults

2001

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)

Obesity Trends* Among U.S. Adults

2002

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults

2003

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)

Doubling of adult obesity rate since 1980.

Source: Behavioral Risk Factor Surveillance System, CDC.

Obesity Trends* Among U.S. Adults

2004

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)
Durham, NC

parks, open spaces & trails
UPDATED: City Park Facts

The total area covered by urban parkland in the United States exceeds one million acres, with parks ranging in size from the jewel-like 1.7-acre Pearl Office Square in Boston to the gargantuan 499,120-acre Chugach State Park in Anchorage. And their usage dwarfs that of the national parks — the most popular major parks, such as Lincoln Park in Chicago receive upwards of 20 million users each year, and New York’s Central Park gets about 25 million visits annually - more than five times as many to the Grand Canyon.

Some cities have plenty of parkland that’s well distributed around town; others have enough land but an inequitable distribution; others are short of even a basic amount of park space for their citizens.

Through an annual survey, the Center for City Park Excellence maintains the nation’s most complete database of park facts for the largest 75 U.S. cities. With the help of CCPE data, you can see how your city compares to others. (Cities are divided into different population density classes in some of the below reports. A report is available that shows the densities and explains the classifications.)
Nature, Human Health & Walkable Neighborhoods

- Outcomes: Elderly People & Walking
  - less illness
  - lower mortality rate

- Environments: Neighborhood Streets (Tokyo)
  - tree - lined
  - parks

Our ability to perceive quality in nature begins, as in art, with the pretty. It expands through successive stages of the beautiful, to values as yet uncaptured by language.

Aldo Leopold

from grassroots to power
a movement for social & environmental change
Urban Forestry
Benefits Categories

- environmental
- economic
- psychological
- social
- physical self

good human habitat &
safe, economically
vital cities

Science & Community Change:
Tech Transfer, Urban Forestry & Local Government Policy

Kathleen Wolf, Ph.D.
Univ of Washington, Seattle
kwolf@u.washington.edu

research sponsor: U.S. Forest Service