Trees and the Urban Roadside

Designing for People, Community & the Economy

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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 roadsides.

Civic Ecology
Studies of human behaviors and benefits when people are active in the environment.

International Urban Greening
Scientific explorations of people and urban nature in other nations.

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

Research Director
Kathleen L. Wolf, Ph.D.
Trees and the Urban Roadside

Designing for People, Community & the Economy
Global & National Trends

Urbanization & Human Populations
Global Urbanization
1900 - 14% of humanity lived in urban areas, 2000 - 47%
About 80% US of population in urbanized areas (US Census)

Each year!
3 M people
1 M homes
10,000 miles road (NOAA 2004)
National Trends - Urbanization

time series model - past to future
U.S. Urban Land Cover (2030)
Urban Ecosystem Analyses
1999-2005 - about 30 studies
1999 Pugetropolis Region
Scientific Research
What Do We Lose?
benefits and functions of trees in cities
Urban Trees & Forests
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
Urban Nature
Community Economics

- Improved consumer environments in business districts - 9-12% product spending
- 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%
- Air pollution mitigation
- Heating and cooling costs reductions
- Less frequent pavement replacement
Urban Nature

Human Functioning Benefits

- Improved surgery and illness recovery
- Higher job satisfaction and reduced absenteeism
- Lower crime rates in well landscape areas
- Stress reduction in urban lifestyles
- Reduced violence and more constructive conflict resolution in domestic conflict
- Reduced ADHD symptoms
Benefits and Functions Across Landscape Contexts

- Industrial
- Central city
- Suburban
- Exurban/rural
Urban Forestry and CSS

First Survey
Roadside Preferences
Six semi-urban roadsides
(motel, car lots, mall, RV, commercial)

6 base images
digitally edited,
36 images,
ratings 1-5
Scene Ratings
36 scenes - rated 1-5

highest rated scene
mean 4.54

lowest rated scene
mean 1.43
Five Preference Categories

descriptions & mean ratings

Category 1:
Harsh Edge
driver mean: 1.53
business mean: 1.67

Category 2:
Prominent Buildings
driver mean: 1.74
business mean: 1.80
Five Preference Categories (cont.)
descriptions & mean ratings

Category 3:
Ornamental Frame
driver mean: 2.78
business mean: 2.96

Category 4:
Tree Buffer
driver mean: 2.87
business mean: 2.95

Category 5:
Tree Screen
driver mean: 3.87
business mean: 3.85
Visual Preferences

• lower without trees, higher with trees
  • full vegetation screening preferred
    • compromise? use vegetation to frame views
      • complexity & sensory attention

roadside vegetation & visual quality
Comparing Preference Categories

Category 1: Harsh Edge
low preference

Category 2: Prominent Buildings
low preference

Category 5: Tree Screen
high preference
Comparing Preference Categories

Category 3: Ornamental Frame mid-level preference

Category 4: Tree Buffer mid-level preference
Urban Forestry and CSS

Second Survey
Community Image
Two Community Scenarios

Community 1: little planning for landscape or green space

Community 2: has done planning for landscape and green space
Consumer Cues

Consumer Environment Attributes

Analysis Categories

Means comparisons, t-Test, p<.05
# Product Pricing

## Two Community Scenarios - Pricing Patterns

<table>
<thead>
<tr>
<th>Product/Service</th>
<th>Green Mean</th>
<th>No Mean</th>
<th>% Diff</th>
<th>t-test*</th>
</tr>
</thead>
<tbody>
<tr>
<td>flower bouquet</td>
<td>17.16</td>
<td>15.61</td>
<td>10%</td>
<td>0.005</td>
</tr>
<tr>
<td>pair of sunglasses</td>
<td>18.87</td>
<td>15.78</td>
<td>20%</td>
<td>0.01</td>
</tr>
<tr>
<td>take-out sandwich for lunch</td>
<td>4.93</td>
<td>4.49</td>
<td>10%</td>
<td>0.0005</td>
</tr>
<tr>
<td>pair of sports shoes</td>
<td>47.07</td>
<td>43.81</td>
<td>7%</td>
<td>0.005</td>
</tr>
<tr>
<td>lightweight jacket</td>
<td>38.04</td>
<td>34.82</td>
<td>9%</td>
<td>0.0005</td>
</tr>
<tr>
<td>sit-down dinner for two</td>
<td>34.08</td>
<td>30.69</td>
<td>11%</td>
<td>0.0005</td>
</tr>
<tr>
<td>motel room for two for one night</td>
<td>62.78</td>
<td>57.09</td>
<td>10%</td>
<td>0.0005</td>
</tr>
<tr>
<td>3 bedroom, 2 bath home</td>
<td>145,067</td>
<td>130,737</td>
<td>11%</td>
<td>0.0005</td>
</tr>
</tbody>
</table>
Place Perceptions

- positive consumer cues with trees
  - positive judgments of business quality
    - appealing place character
      - next? benefit/cost analysis

vegetation quality & cues to experience
The Experience Economy

Work Is Theatre &
Every Business a Stage

B. JOSEPH PINE II
JAMES H. GILMORE

retail & place marketing
Roadside Trees? Why Not?
Visibility:
customers have to see us
Debris:
we want “low maintenance”
## Roadside Trees & Safety

### U.S. traffic accident rates in 2002

<table>
<thead>
<tr>
<th></th>
<th>U.S. Total</th>
<th>Tree Accidents</th>
<th>Urban Accidents</th>
<th>Urban Tree Accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Accidents</td>
<td>*6,316,000 (100%)</td>
<td>1.9%</td>
<td>37%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Incapacitating</td>
<td>13%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injury and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatality</td>
<td>*43,005 (0.6%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.2%</td>
<td>0.9%</td>
<td>4.1%</td>
<td>0.04%</td>
</tr>
<tr>
<td></td>
<td>*3,258 (&lt; 0.001%)</td>
<td>0.1%</td>
<td>0.4%</td>
<td>&lt; 0.001%</td>
</tr>
</tbody>
</table>

* NHTSA (2004) - %s may differ due to sampling and analysis procedures

### Annual Fatality Risks:

M. Norris, Australia ISA, 2005

<table>
<thead>
<tr>
<th>Risk</th>
<th>Individual risk per person per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking (20 cigarettes a day)</td>
<td>1:200</td>
</tr>
<tr>
<td>Cancers from all causes</td>
<td>1:500</td>
</tr>
<tr>
<td>Drinking alcohol</td>
<td>1:2,500</td>
</tr>
<tr>
<td>Travelling by Motor vehicle</td>
<td>1:7,000</td>
</tr>
<tr>
<td>Travelling by Train</td>
<td>1:33,000</td>
</tr>
<tr>
<td>Travelling by Aeroplane</td>
<td>1:100,000</td>
</tr>
<tr>
<td>Fires and accidental burns</td>
<td>1:100,000</td>
</tr>
<tr>
<td>Cataclysmic storms and storm flood</td>
<td>1:5,000,000</td>
</tr>
<tr>
<td>Lightning strike</td>
<td>1:10,000,000</td>
</tr>
<tr>
<td>Meteorite</td>
<td>1:1,000,000,000</td>
</tr>
</tbody>
</table>

Urban tree crash: 1: 100,000
No sir, I was not talking on my cell phone.... I was watching a TV show on my iPod....
Roadside Trees, Landscape & Public Health

Greatest Generation?
The Biggest Generation!
An Urgent Issue!
Physical Inactivity & Obesity

majority of Americans not active enough

goal-30 minutes per day of moderate activity

risk factor 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

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Obesity Trends* Among U.S. Adults

1992

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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)
Obesity Trends* Among U.S. Adults

2004

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

Source: Behavioral Risk Factor Surveillance System, CDC.
Fat for Life?
Six Million Kids Are Seriously Overweight. What Families Can Do.
By Geoffrey Cowley & Sharon Begley
A brisk walk in the park keeps Moby II in shape between dog shows. His owner, Columbus resident Cathy Sorenbo, got up early to give her 5-year-old Doberman his regular workout. They typically log 13 miles in Berliner Park.
Walking and Bicycling: International Comparisons

Pucher, AJPH 93:1509, 2003

Percent of trips by walking and biking, 1995

<table>
<thead>
<tr>
<th></th>
<th>USA</th>
<th>Germany</th>
<th>Netherlands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent</td>
<td>7</td>
<td>34</td>
<td>46</td>
</tr>
</tbody>
</table>

Pedestrian fatalities per 100 million trips, 2000

<table>
<thead>
<tr>
<th></th>
<th>USA</th>
<th>Germany</th>
<th>Netherlands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatalities</td>
<td>17</td>
<td>5.2</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Pucher, AJPH 93:1509, 2003
make room for pedestrians
walkable city places
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