Traffic Safety & City Trees: Finding a Livable Balance

Partners in Community Forestry

Kathleen Wolf, Social Scientist, Forest Resources, U of WA
Why Street Trees?

- Transportation Perception: Primary Benefit of Landscaping is to Enhance Beauty

- Evolving Understanding: Street Trees offer Environmental, Economic, and Social Benefits

Recommendation: Do not compromise Safety, but Engineering & Landscape professionals need to work together to Identify Strategies to Safely Incorporate Street Trees
Presentation Format

- Trees, Livability & Value
- City Trees and Safety
- Design Solutions

Ecosystem / Environmental Services

- Stormwater Absorption & Quality
- Air pollutants reduction
- Nitrogen, phosphorus and sediment interception
- Carbon emission reduction, storage and sequestration
- Urban heat-island cooling
- Reduced “bad” ozone
- Wildlife habitat creation
Human Well-Being Benefits

• Stress reduction in urban lifestyles
• Higher job satisfaction and reduced absenteeism
• Reduced violence and more constructive conflict resolution in domestic conflict
• Improved surgery and illness recovery
• Greater creativity and modeling behavior in children’s play
• Reduced ADHD symptoms

Economic Incentives

• Improved consumer environments in business districts: + 9-12% product spending
• Residential real estate values:
  + 3-7% with trees in yard
  + 5-20% proximity to natural open space
  + 9% when adjacent to street tree plantings
• Commercial property rental rates: + 7%
• Air pollution mitigation
• Heating and cooling cost reductions
Tree Values & Benefits

- Ecosystem / Environmental Services
- Public Goods & Valuation
- Human Dimensions & Benefits

City Trees & Retail Behavior
Willing to pay 9-12% more
Wolf, J Forestry 2006, J Arb 2005
Physical Activity & 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 annual billion medical costs (1995)
  - 9.4% of all U.S. medical costs

Obesity Trends* Among U.S. Adults
2004

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

Doubling of adult obesity rate since 1980.
A brisk walk in the park keeps Mary in shape between dog-sitting duties and her regular workouts. 

Dogs also benefit from regular exercise. Columbia resident Catie Snoke, pet parent to four dogs, especially enjoys walking in Crescent Park.
parks, open spaces & trails

Provide Continuous Pedestrian Facilities

Durham, NC
Walking and Bicycling: International Comparisons

Pucher, AJPH 93:1509, 2003
Walkable Neighborhoods

Make Room for Pedestrians
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Problem!

- Drivers run off the road and crash into trees
Distribution of Crashes

Total 2002 motor vehicle crashes: 6,316,000
collisions with trees - 1.9% (120,000 per year)

Injury Comparison

<table>
<thead>
<tr>
<th>All accidents</th>
<th>Trees only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No injury</td>
</tr>
<tr>
<td></td>
<td>61%</td>
</tr>
<tr>
<td></td>
<td>29%</td>
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</table>
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 Injury and Fatality</td>
<td>13%</td>
<td>0.9%</td>
<td>4.1%</td>
<td>0.04%</td>
</tr>
<tr>
<td>Fatality</td>
<td>*43,005 (6.6%)</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

Bratton and Wolf, Trans Research Board, 2005

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>

fatal urban tree crash
1: 100,000
Urban/Rural Crash Rates

Injury, Urban and Rural Differences

2001 Traffic Data

Injury Severity

Frequency

Rural
Urban

Location

Exhibit 14

No injury
Possible injury
Non-incapacitating injury
Incapacitating injury
Fatality

Exhibit 15
Behavior & Safe Driving!

- Crashes occur on weekends, late evening hours
- Winding rural roads, vehicle leaves road on outside of curves
- Male traffic fatalities outnumber female 2 to 1
- Drunk driving - about 50% of all traffic fatalities
- Seat belt use reduces risk of death by 42%
- Travel speed exceeds posted speed - about 30% of fatalities
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Is this so bad?
Streets Focus on High-Speed

Poor Livability Factor

Streets Focused on Vehicles

No room for people - Utility Encroachments
Complete the Streets!
cars/pedestrians/bikes

Home Zones (Dutch “woonerf”) Integrating the Street into Everyday Life
Home Zones
Traffic Calming
Green Streets
Festival Planning
Play Spaces
Multi-modal
Transport

Psychological Traffic Calming
“body language of the street”
“mental speedbumps” D. Engwich

- complete streets
- home zones
Closing Thoughts

- Community Benefits of Vegetation are Extensive and Well Documented

- Safety on Urban Streets is Very Important

- If Safe Methods are not Developed, then Unsafe Applications will Continue to Occur

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Closing Thoughts

- Design Engineers Understand the Safety Concerns of Street Trees

- Urban Forestry Professionals Understand Tree Form and Function

- Urban Forestry Community willing and waiting to collaborate for Safe Solutions
www.cfr.washington.edu/research.envmind