Greenways as an alternative to traditional infrastructure

Green Infrastructure
What is a Greenway?

• Little (1990) - A linear open space along a natural or human made corridor.

• Fabos - linked corridors… “nature’s superstructure”

• NRPA - tie parks together offering some nature based recreation.

• Key Characteristics: Linear and Connective
The Evolution of Greenways

• Generation 1 pre 1700’s - circa 1960: axes, boulevards, parkways
• Generation 2 circa 1960 – 1985: trail oriented recreational greenway
• Generation 3 circa 1985 – present: multiple objective greenway
What is Infrastructure?

• infrastructure *n.* basic installations and facilities such as roads, power plants, sewerage, transportation and communications systems, etc.
Houston, TX
Green infrastructure

- interconnected network of: “waterways, wetlands, woodlands, wildlife habitats, greenways, parks, working farms, ranches and forests; and wilderness and other open spaces that support native species and natural ecological processes, sustain air and water resources and contribute to the health and quality of life for America’s communities and people (The Conservation Fund, 2004).”
Proposed Infrastructure in New England

Much like a system of freeways, greenways can link people and places.
Greenway Infrastructure in New York City

New York City Greenway System

- Existing Greenway
- Future Greenway
- In Development

Adapted from the original 1993 "Greenway Plan for New York City" produced by the Department of City Planning.
Green infrastructure in College Station is largely floodplains as represented in dark green.
TAMU West Campus

White Creek is a greenway with potential to connect the Bush School and Library to AGLS, Mays, Horticulture and others.
Greenway Infrastructure Maintained During Development: Ecological Benefit
Multiple Objectives of a Modern Greenway Infrastructure

• Help manage stormwater & water quality
• Enhance recreation, health & fitness
• Provide transportation choices
• Maintain an ecological balance
• Provide better visual quality
• Enhance the economy
Green Infrastructure for Stormwater

More land inundated for longer time

Controlling a creek is hard over time.
Buffers between waterways and development are essential and should be at least the width of the floodplain.
Floodplain Benefit of Green Infrastructure

- Average cost of constructing floodwater storage is $13,000 per acre foot. (one acre of land with where water can sit at 1 foot deep)
- Acre of undeveloped floodplain gives 4 acre feet of storage (assumes area allows 4 feet of water depth in a flood).
- Estimated value of floodplain storage in an urban setting is about $52,000 per acre. (4x $13,000 = $52,000)

Source: Sheaffer et al. 2002
Water quality

• Increase in paved surface increases runoff and non-point source pollution
  – Infiltration is 50% on natural surface and 15% on 75-100% paved surface
  – Surface vegetation filters trash and large material
  – Aquifer and surface water recharge affected
  – [http://www.asla.org/sustainablelandscapes/Vid_Watermanagement.html](http://www.asla.org/sustainablelandscapes/Vid_Watermanagement.html) (link to ASLA animation)
Green Infrastructure for Recreational Use
Recreation Participation: 2005 Data on Texans

- 78% of Texans walked for pleasure (#1)
- 54% viewed or photographed natural scenery
- 35% bicycled for recreation
- 29% viewed or photographed birds
- 27% went fresh water fishing
- 23% engaged in outdoor team sports (#25)
- 12% went horseback riding

Source: National Survey on Rec. and Environment
Green Infrastructure for Health and Fitness

- CDC recognizes inactivity as key contributor to health problems, especially in children.
- Access to safe walking and riding has diminished.
- Urban trail users in Texas have rated the fitness benefits of trails 1st among Quality of Life items.
- Urban forests help to cool and cleanse the air. http://www.asla.org/sustainablelandscapes/Vid_UrbanForests.html
Infrastructure for Alternative Transportation

• ISTEA, TEA-21, SAFETEA-LU Transportation Enhancements have driven greenway trail development.

• 25% of an urban trail user sample in two Texas cities commuted by greenway trails at least occasionally.

Hudson River Greenway
New York City
16 miles of trail along western edge of Manhattan
Infrastructure that Enhances Ecology

1) Habitat for wildlife
2) Filters pollutants (trash in plants and toxins in soils and plants)
3) Help control invasives (e.g., kudzu)
4) Source of biodiversity (larger areas provide habitat for native plants and animals)
5) Corridor for travel (animal hallways)
6) Restore brownfields

http://www.asla.org/sustainablelandscapes/Vid_Brownfields.html (link to ASLA animation)
Greenway infrastructure can add visual quality to the urban environment
Visitors Pay for Visual Quality

Pay for view from a window, restorative value!
Hotels on a Greenway

Lady Bird Lake Greenway, Austin –
Four Seasons $35 a night more for view of greenway
(13% increase)
Hyatt $25 a night more for view of greenway
(11% increase)
Residents Pay for Visual Quality and Access

Property values are higher when close to natural areas associated with green infrastructure
Infrastructure to help attract and diversify economic development

Renting bicycles in Chicago’s Millennium Park
Park – Greenway – Green Infrastructure Relationship

• Greenways are linear – Parks are patches
• Greenways connect – Parks stand alone

Green infrastructure is the combination of both types of land use. Greenways connect parks, other open spaces, green roofs and green streetscapes with ecological, recreational and economic values to create green infrastructure.
Summary: green infrastructure in urban areas

- Softens the otherwise “hard” landscape and adds to a sense of place.
- Connections for people
  - recreation & fitness supported
  - transportation choices offered
- Ecological balance
  - wildlife habitat and travel corridor
  - flooding and water quality
  - helps climate: temperature and CO₂
- Enhance/diversify the economy
  - visual quality increases value, diversifies business
Approach: a spectrum of greenways

Classified greenways according to:

A. Functions greenway would serve

B. Developed character
# Key characteristics

<table>
<thead>
<tr>
<th>connectivity</th>
<th>What was being connected? people, wildlife, water</th>
</tr>
</thead>
<tbody>
<tr>
<td>width</td>
<td>floodway, floodplain, other riparian areas (tributaries etc.)</td>
</tr>
<tr>
<td>access</td>
<td>For whom and how much? recreation, transportation, wildlife protection</td>
</tr>
<tr>
<td>trail type</td>
<td>Wide and hard, narrow and soft?</td>
</tr>
<tr>
<td>level of development</td>
<td>Appropriate to surroundings and land use plan</td>
</tr>
</tbody>
</table>
# Greenway classification

| Type       | Functions                  | Characteristics          |  |
|------------|----------------------------|--------------------------|  |
|            | **prim.** | **sec.** | **type** | **level of dev.** |  |
| Urban      | A,B,C,D,E | F,G       | many     | floodway          | wide/hard | commercial |  |
| Suburban   | A,B,C,E   | D,F,G     | homes    | floodplain        | softer    | residence  | to commercial |  |
| Rural      | A,B,E,G   | C,D,F     | limited  | floodplain & other sig. areas | narrow | little to no | development |  |

Functions: A-flood control; B-recreation; C-transportation; D-economics; E-Aesthetic F-utility corridor; G-ecological/wildlife
Planned Green Infrastructure

• **Urban Greenway** - economic development, flood control, aesthetics, transportation and recreation.

• **Suburban Greenway** - neighborhood development, recreation, transportation, flood control, aesthetics.

• **Rural Greenway** - wildlife habitat, recreation, flood control, aesthetics.
Greenway Resources Classified