Addressing barriers to green infrastructure in the Hudson River Estuary watershed

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Presentation Outline

• Hudson River Estuary Program
• Green infrastructure
• Identifying barriers
  – Technical
  – Regulatory
  – Financial
  – Community
• Addressing barriers
Hudson River Estuary Program

Core Mission

- Ensure *clean water*
- Protect and restore fish, wildlife, and their *habitats*
- Provide water recreation and river *access*
- Adapt to *climate change*
- Conserve world-famous *scenery*
Hudson River Estuary Program Area

New York City

Albany
Green Infrastructure

- Network of natural and engineered systems that mimic natural processes to provide ecosystem services
- Manage runoff by maintaining or restoring natural hydrology
  - allow stormwater to *infiltrate* and be used by plants
Updated Guidance from NYS

- August 2010 - Updated New York State Stormwater Management Design Manual
- Chapter 5 – Green Infrastructure
- New development required to incorporate/consider green infrastructure

http://www.dec.ny.gov/chemical/29072.html
Barriers and Gateways to GI

- Published by Clean Water America Alliance in September 2011
- Information based on national survey
- Over 200 entities responded, from a variety of sectors
- [http://www.cleanwateramericaalliance.org](http://www.cleanwateramericaalliance.org)
Types of Barriers

• **Technical** and physical barriers
  – Lack of technical knowledge/expertise
  – Lack of design standards
  – Lack of data/knowledge of green infrastructure

• **Legal and regulatory** barriers
  – Local rules can be lacking, conflicting, or restrictive
  – State or federal rules can be complicating or conflicting
Types of Barriers

• **Financial barriers**
  – Perceived high cost
  – Lack of funding
  – Upfront and maintenance costs

• **Community and institutional barriers**
  – Insufficient/inaccessible information for political leaders, developers, landscapers, and the public
  – Lack of cooperation
  – Community values that under-appreciate GI
What are barriers in the Hudson River Estuary watershed?

- Personal communication
- Informal survey at the end of a GI bus tour
- Working on more comprehensive survey to send out, based on “Barriers and Gateways” survey
Technical Barriers

- Barriers:
  - “Education of contractors”
  - “Lack of knowledge by other boards”
  - “It’s just hard to get builders to do anything outside of what they have always done”
  - “Need more expertise on plants”

- Lack of technical knowledge or expertise
Technical Barriers:

Green Infrastructure Guidance

- NYS Stormwater Management Design Manual – guidance for designing green infrastructure
- May need to create or update guidance materials for local officials
# Technical Barriers:

## Hudson Valley Native Plant Lists

<table>
<thead>
<tr>
<th>Hudson River Estuary Native Plants for Intensive Green Roofs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plant</strong></td>
<td><strong>Tolerance</strong></td>
</tr>
<tr>
<td>Northern bush honeysuckle</td>
<td>Sun to partial shade</td>
</tr>
<tr>
<td>Diervilla ionica</td>
<td>Dry</td>
</tr>
<tr>
<td>Wintergreen</td>
<td>Sun to shade</td>
</tr>
<tr>
<td>Gaultheria procumbens</td>
<td>Dry to moist</td>
</tr>
<tr>
<td>Black huckleberry</td>
<td>Acidic, sandy or sandy</td>
</tr>
<tr>
<td>Gaylussacia baccata</td>
<td></td>
</tr>
<tr>
<td>Dwarf juniper</td>
<td>Sun</td>
</tr>
<tr>
<td>Juniperus communii, v. depressa</td>
<td>Dry to excessively drained</td>
</tr>
<tr>
<td></td>
<td>Sandy or rocky</td>
</tr>
<tr>
<td>Fragrant sumac</td>
<td>Sun to partial shade</td>
</tr>
<tr>
<td>Rhus aromatica</td>
<td>Dry to moist</td>
</tr>
<tr>
<td>Carolina Rose</td>
<td>Acidic to limestone</td>
</tr>
<tr>
<td>Rosa carolina</td>
<td></td>
</tr>
<tr>
<td>Northern dewberry</td>
<td>Sun to shade</td>
</tr>
<tr>
<td>Rubus flagellaris</td>
<td>Moist to dry</td>
</tr>
<tr>
<td></td>
<td>Various</td>
</tr>
</tbody>
</table>

## Hudson Valley Native Plants for Green Infrastructure, Including Rain Garden, Stormwater Planters, Vegetated Swales, and Bioretention Areas

<table>
<thead>
<tr>
<th>Plant Common Name</th>
<th>Scientific Name</th>
<th>Bloom Season</th>
<th>Light</th>
<th>Soil Type</th>
<th>Max Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED CEDAR</td>
<td>Juniperus virginiana</td>
<td>Yellow Green</td>
<td>Sun</td>
<td>Sand</td>
<td>45 ft</td>
</tr>
<tr>
<td>BLACK GUM</td>
<td>Nyssa sylvatica</td>
<td>Yellow Green</td>
<td>Sun</td>
<td>Sand</td>
<td>60 ft</td>
</tr>
<tr>
<td>RED MAPLE</td>
<td>Acer rubrum</td>
<td>Yellow Green</td>
<td>Sun</td>
<td>Clay</td>
<td>60 ft</td>
</tr>
<tr>
<td>SHRUBS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highbush blueberry</td>
<td>Vaccinium Corymbosum</td>
<td>Yellow Green</td>
<td>Sun</td>
<td>Clay</td>
<td>10 ft</td>
</tr>
<tr>
<td>Black chokeberry</td>
<td>Photinia melanocarpa</td>
<td>Yellow Green</td>
<td>Sun</td>
<td>Clay</td>
<td>8 ft</td>
</tr>
<tr>
<td>Bayberry</td>
<td>Myrica pensylvanica</td>
<td>Yellow Green</td>
<td>Sun</td>
<td>Clay</td>
<td>8 ft</td>
</tr>
<tr>
<td>Maleberry</td>
<td>Lysaea ligustrina</td>
<td>Yellow Green</td>
<td>Sun</td>
<td>Clay</td>
<td>13 ft</td>
</tr>
<tr>
<td>Arrowwood</td>
<td>Viburnum dentatum</td>
<td>Yellow Green</td>
<td>Sun</td>
<td>Clay</td>
<td>10 ft</td>
</tr>
<tr>
<td>Red chokeberry</td>
<td>Photinia arbutifolia</td>
<td>Yellow Green</td>
<td>Sun</td>
<td>Clay</td>
<td>10 ft</td>
</tr>
<tr>
<td>Currently DRAFTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Hudson Estuary Trees for Tribs

- Stream buffer restoration
- Free native trees and shrubs to plant along tributaries to the Hudson River
- Watershed groups, land trusts, municipalities, schools, non-profits, landowners, and more
Technical Barriers:

Hudson Estuary Trees for Tribs

- Plantings in the spring and fall
- We provide plant material and technical assistance:
  - Planting plan
  - Plant selection
  - Site prep

http://www.dec.ny.gov/lands/43668.html
Technical Barriers:

Hudson Estuary Trees for Tribs

- 60,000 feet of stream buffers replanted
- 22,000 native trees and shrubs
- 2,900 volunteers
- 180 sites
Regulatory Barriers

- Barriers:
  - “Road widths, set-backs are too large”
  - “Local regulation issues”
- Codes, ordinances, or regulations, especially at the local level
Regulatory Barriers: Better Site Design Roundtables

- NYS Code and Ordinance Worksheet (based on Center for Watershed Protection)
- Identify legal barriers and opportunities to revise
- Case studies and recommendations
  - Wappinger and Clinton

http://www.dec.ny.gov/lands/42053.html
Financial Barriers

• Barriers:
  o “People-hours”
  o “Initial cost and cost of maintenance”
  o “Education of benefits and economic breakdowns”
  o “Costs!”

• Lack of funding for implementation, maintenance
Financial Barriers:

Small Grants for Watershed Partners

- Rain gardens and stormwater planter - Groundwork Hudson Valley
- Better Site Design Roundtable using COW – Wallkill River Task Force and Saw Mill River Coalition
Financial Barriers: Small Grants for Watershed Partners

- Rain barrel workshop - Cornell Cooperative Extension Dutchess County
- Green infrastructure video on local projects – Lower Hudson Coalition of Conservation Districts
Community Barriers

• Barriers:
  o “Inertia and unfamiliarity”
  o “Lack of knowledge and interest”
  o “Habits” & “Ignorance”
  o “Getting everyone on board”
  o “Public and private entities are still not ‘sold’ on the GI approach”

• Not understanding if or how green infrastructure practices work

• Lack of appreciation
Community Barriers:

Green Infrastructure Examples Website

http://www.dec.ny.gov/lands/58930.html

Vassar College Rain Garden

Description
This rain garden is an example of green infrastructure in an institutional setting. The runoff from the maintenance building is directed to the rain garden where is infiltrated into the ground.

Site Location
- **Site Address**: Hooker Ave. Poughkeepsie, NY 12601
- **Town**: Poughkeepsie
- **County**: Dutchess
- **Land Use of Site**: College Campus
- **Can Site be visited?**: Check with College
- **Location on Site**: North of first building on the right after entering the athletic complex from Hooker Avenue

Practice Information Details
- **Intent of Design**: Treat parking lot runoff through infiltration and biological uptake.
- **Stormwater Management Capacity**: 152 Cubic Feet
- **Year of Installation**: 2007
- **Plant Material Used**: Unknown
- **Annual Operational and Maintenance**: Weeding and replacement of any dead vegetation.
- **Required Zoning Change or Special Permit**: None
Community Barriers:

Green Infrastructure Examples

• Over 50 projects, engineered and natural features
Community Barriers:

Green Infrastructure Bus Tours

• Demonstration projects in Dutchess County
• Explain how they work, show that GI is viable option
• Information for municipal audience
• Tour also included
  - costs/benefits
  - local ordinances
  - maintenance
Community Barriers:

Green Infrastructure Bus Tours
Community Barriers:

Trainings on Green Infrastructure

- Presentations for municipalities
- HREP Biodiversity Program covers larger-scale GI
- Planning a roundtable for GI implementers
  - Challenges and future opportunities for regional coordination
- Survey to continue to identify training needs
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