

Department of Environmental Conservation



Scaling Up Stormwater Green Infrastructure in the Hudson Valley

Emily Vail

Hudson River Estuary Program, NYS Department of Environmental Conservation NYS Water Resources Institute at Cornell University

October 19, 2016

Presentation Outline

- Hudson River Estuary Program
- Survey barriers to green infrastructure in the Hudson Valley
- Improving implementation
- Monitoring performance
- Funding sources
- Next steps



Rain barrel workshop, Beacon

Hudson River Estuary Program

Six Benefits:

- Clean water
- Resilient communities
- Vital estuary ecosystem
- Estuary fish, wildlife, and their habitats
- Scenic river landscape
- Education, river access, recreation, and inspiration





Department of Environmental Conservation



Hudson River Estuary Watershed

 Hudson River Estuary watershed = 5,300 mi²



Department of Environmental Conservation

Stormwater Pollution in the Hudson Valley

- Urban runoff top cause of stream impairments in the Hudson River Estuary watershed
 - ~35% of streams (NYS DEC Priority Waterbodies List)
- 9 combined sewer systems
- Many green infrastructure demo sites
- How can we improve implementation at the municipal or watershed scale?



Building Capacity for Green Infrastructure

- Review local laws
- Watershed planning
- Build demonstration sites
- Website with local case studies
- Green infrastructure tours
- Presentations/workshops



Green Roof at Marist College, Poughkeepsie

- 2012 survey and <u>report</u>
- Inspired by <u>barriers/gateways report</u> from Clean Water America Alliance
- 127 responses from "implementers"
- Wide range of roles/GI practices
- At least 1 response from each of the 10 counties in the watershed



Bioretention at Newburgh Town Hall

What is the largest barrier to implementing green infrastructure in your community?

- Cost 30%
- Lack of knowledge 25%
- Unfamiliarity and resistance from local governments – 22%
- Last two categories often overlapped



Rain barrel at Greenburgh Nature Center



Do people have information they need?

- "Research hasn't proven benefits yet" was 2nd to lowest barrier (out of 20 options)
 - Municipalities ranked this substantially higher than average
 - Landscape architects, builders, and engineers ranked this higher than average



Rain garden at Ardsley Town Park

Differences based on location?

- MS4 lack of sites
- Non-MS4 regulatory and financial barriers
 - State/local laws unclear
 - GI is under-valued by developers
 - Unsure about effectiveness



Porous pavement, vegetated swale at Roeliff Jansen Community Library

- Local laws not restrictive
- Communities accept GI
- Local level of development review was major barrier
 - Planning boards
 - Conservation advisory councils (CACs)
 - Consultants
 - Building inspectors



Rain garden at Cornell Cooperative Extension Orange County

Next Steps from Survey

- More green infrastructure tours
- Targeted workshops for municipal audiences
- Planning board guide from Lower Hudson Coalition of Conservation Districts
- <u>CAC</u> guide from Pace University



Porous pavement in Carmel

Green Infrastructure Implementation

Scaling up – how can we see benefits at municipal or watershed scale?

- New development -Now part of routine development process
- Retrofits Improving existing infrastructure



Bioretention at Ulster County Dept of the Environment, Kingston

Improving GI in New Development

- Barrier: unfamiliarity and resistance from local government
- Targeted education/outreach
- Local laws and standards can be more specific to community's needs



Rain garden at Town of Mount Pleasant DPW Garage

Improving GI in New Development

- Planning boards
 - Protect natural areas first
 - Meaningful green infrastructure practices
 - Long-term maintenance
- CACs
 - Identify important natural resources (NRIs)



CareMount Medical, Kingston (L. Heady)

Improving Green Infrastructure Retrofits

- Barrier: cost
- Need to be more strategic in planning and implementation (with limited funds)
- What is the goal? (water quality, CSOs, flooding, etc.)
- How do you identify strategic practices or locations?



Constructed wetland, Wappingers Falls

Improving Green Infrastructure Retrofits

- Newburgh green infrastructure plan
- City of Newburgh, eDesign Dynamics, Clearwater
- 50 sites where GI could reduce CSOs



Green Infrastructure Performance

- Barrier: Research hasn't proven benefits yet
- Performance varies between and within types of GI practices
- Barrier to green infrastructure programs = uncertainty about performance and cost (U.C. Berkeley School of Law 2015)
- Few GI programs

Rain garden inlet at Vassar College, Poughkeepsie



Is it working?

- Design, installation, maintenance considerations
- Many potential benefits which are achieved? At what scale?
- Assessing performance
- Adaptive management, better decision-making



Bioretention at Vassar College

- Workshop (35 participants) at DEC Central Office, Albany – March 2016
- Perspectives from state agencies, municipalities, and researchers
- Discussion of strategies



Rain garden at Bard College

What information do you want to be available in the future to guide management decisions?

- Performance questions
- Role of stakeholders
- Policy implications



Swale at Village of Greenwood Lake

Performance questions:

- Identify goals and specific parameters
- Lack of long-term, consistent, reliable monitoring data
- Performance over different scales, spatial dimensions, time
- Co-benefits and economic values
- Case studies



Rain garden at Siena College, Colonie (K. Meierdiercks)

Role of Stakeholders:

- Communicating about GI
- Opportunities for projects to build capacity or meet local needs
- Understanding community perceptions, get buy-in



Rain barrel building workshop in Poughkeepsie

Policy implications:

- How can we institutionalize?
- Local standards
- State design criteria (urban areas, innovative approaches)
- Water quality vs. water quantity drivers



Green roof at senior housing in New York City

Scaling Up Green Infrastructure

Assess Local Conditions	 Water quality or quantity issues Local needs, barriers, or opportunities
Plan for Green Infrastructure	What is the goal?Strategic practices or locations?
Implement Practices	New developmentRetrofits
Monitor Performance	 Parameters to assess effectiveness Water quality, water quantity, cost/benefit, etc.
Share Findings	 Communities Scientists Policy-makers/ state agencies

Funding Opportunities

- Assess local conditions, plan for green infrastructure
 - <u>NYS DEC Hudson River Estuary</u> <u>Program</u> grants – Education and Local Stewardship Planning
 - Department of State Local <u>Waterfront Revitalization Program</u> – watershed planning grants



Stream daylighting, Village of New Paltz

Funding Opportunities

- Implement projects
 - EFC's <u>Green Innovation</u> <u>Grant Program</u>
 - EFC's <u>Integrated Solutions</u> <u>Construction Grant</u>
 - DEC's <u>Water Quality</u> <u>Improvement Program</u>



Pervious pavers at Kingston municipal lot

Funding Opportunities

- Monitor performance
 - Can be part of other grants
 - NYS Water Resources Institute <u>research grants</u>



Bioretention at SUNY New Paltz

Next Steps

- What are the key barriers in your communities?
- What role can you play in overcoming them?
- Are there local opportunities to educate, plan, implement, and assess green infrastructure projects?
- How can we share findings to move forward at local, regional, and statewide scales?



Thank You!

- Emily Vail
- Watershed Outreach Specialist
- Hudson River Estuary Program
- emily.vail@dec.ny.gov
- (845) 256-3145

Connect with us:

Facebook: www.facebook.com/NYSDEC Twitter: twitter.com/NYSDEC Flickr: www.flickr.com/photos/nysdec



New York State Water Resources Institute Cornell University



Department of Environmental Conservation