Animating Market Forces for Sustainable Stormwater Management and Enhanced Ecosystem Services

A study conducted by the City of Portland Bureau of Environmental Services and funded by the US Environmental Protection Agency

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Portland Bureau of Environmental Services
City of Portland, Oregon

- 556,370 residents
- 92,850 acres of land area
- 14,145 acres of urban development
- 8,603 acres of local streets
- 4,074 miles of local streets
- 861 miles of combined sewers (pink)
- 932 miles of separated sanitary sewers (red)
- 568 miles of separated storm sewers, storm channels, ditches and culverts (green)
- 9200 sumps (blue)
Natural Hydrologic Cycle

- 35% Evaporation
- Transpiration
- 64% Infiltration
- 1% Surface Runoff
Existing Hydrologic Cycle

- Evaporation: 11%
- Transpiration: 25%
- Infiltration: 64%
- Surface Runoff: 25%
Restored Hydrologic Cycle

- Evaporation: 16%
- Transpiration: 16%
- Infiltration: 64%
- Surface Runoff: 20%

Restored Hydrologic Cycle
Portland Manages Multiple Mandates

- Threatened Salmon and Steelhead
  Endangered Species Act (ESA)

- Municipal Storm Sewers
  Clean Water Act
  NPDES (MS4)

- Groundwater
  Safe Drinking Water Act

- Combined Sewer Overflows (CSOs)
  Clean Water Act
  Big Pipe Project
• Add ecoroofs
• Construct Green Street facilities
• Plant yard trees and street trees
• Remove invasive weeds and increase restoration planting
• Replace culverts that block fish passage
• Protect natural areas
Sustainable stormwater management promotes watershed health by following five basic principles...

1. **Manage runoff as close as possible to its source.**
2. **Mimic simple and natural hydrologic functions.**
3. **Integrate runoff into the built environment.**
4. **Design for multiple and sustainable benefits.**
5. **Act early to avoid costly mitigation and restoration.**
All sustainable stormwater management is local... and increasingly private.
Portland’s Stormwater Marketplace
Current Examples of Market-Oriented Initiatives

- Development Density Bonuses
- Discounted Utility Charges
- Downspout Disconnection Program
- Leveraged Local Improvement Projects
- Watershed Stewardship Grants
Stormwater Marketplace Program Feasibility Study

- BMP Cost and Effectiveness Data
- Decision Analysis Tool
- Market Research
Putting Together the Pieces
Market Research Survey
Methodology Overview

- **Qualitative Interviews**
  - Telephone-based
  - Commercial, institutional, multi-family housing property owners
  - Single-family homeowners
  - Have and have not participated in City-sponsored programs
- **Quantitative Survey**
  - Web-based
  - 218 total participants
  - **Focus Group Sessions**
  - In-person sessions with 3rd-party researchers
  - 2 sessions, 8 participants each
Market Research Survey

General Findings

- Awareness of the issue is high
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- **Stormwater incentives can have substantial economic stimulus effects**
In Their Words

General Responses

Non-Residential

Residential
In Their Words

Barriers to Participation

Non-Residential

made change without participating
costly process
more information
hassles
contradictory information
other priorities
bad fit

Residential

need more information
other priorities
Cost
offer alternative to downspouts
permitting process too long
incentive or credit
portable pads
bad fit
hassle

Portland Bureau of
Environmental Services
City of Portland, Oregon
Property Owner Suggestions

- Green Street of Dreams
- Tours of Demonstration Properties
- More-detailed website
- DIY instructions
- Permit information
- Contractor referrals
- Virtual tours
ProjectDX links property owners to watershed goals, stormwater management techniques and a local marketplace of stormwater goods and services.
ProjectDX Networking

Contractors and Service Providers

City of Portland Utilities

Property Owners

Portland Bureau of Environmental Services
City of Portland, Oregon
Next Steps... animating the stormwater marketplace

Utilize new understanding consumer motivations to remove obstacles to action in private stormwater investments

Expand the local economy of stormwater product suppliers and service providers

Use information technologies and social marketing to link property owners to information, incentives and resources.
Decision Tool Software

- Excel-based model for selecting proper mix of BMPs
- Fed by Bureau-collected cost and performance data
- Three performance tiers
  - Tier I: cost and volume reduction
  - Tier II: flow reduction and pollutant management
  - Tier III: Ecosystem services
## BMP Summary

### Levels of Parameter Certainty:

- **Display:**
  - Tier 1
  - Tier 2
  - Tier 3
  - ALL

### Ecosystem Services

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<th>Carbon Sequestration</th>
<th>Flood Storage</th>
<th>Avian / Terrestrial Habitat</th>
<th>Aquatic Habitat</th>
<th>Urban Heat Island</th>
<th>Aesthetics / Quality of Life</th>
<th>TOTAL Ecosystem Score</th>
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