Using Market Forces to Implement Sustainable Stormwater Management

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Portland’s Stormwater System

- 861 miles of combined sewers (pink)
- 932 miles of separated sanitary sewers (red)
Portland’s “Big Pipe” Isn’t Big Enough
Monthly Household Stormwater User Fee

MAJOR STORMWATER EVENTS
1972 - Federal Clean Water Act
1973 - Federal Endangered Species Act
1974 - Federal Safe Drinking Water Act
1976 - Failed effort to control flooding on Johnson Creek
1977 - Portland establishes Stormwater Management Utility
1978 - City begins $23 million upgrade of East Portland sumps
1991 - Water quality regulations set for Fanno Creek
1991 - Court order to stop CSOs into the Willamette River
1996 - EPA approves first stormwater plan for Portland
1998 - Water quality regulations set for the Columbia Slough
1998 - Steelhead Trout listed as an endangered species
1999 - Chinook Salmon listed as an endangered species
2000 - Portland Harbor is listed as a Superfund site
2001 - Oregon DEQ sets rules for sumps and injection wells
2004 - Oregon DEQ approves new, expanded stormwater permit
Project Overview

Phase One
Feasibility

Phase Two
Market Analysis

Phase Three
Pilot Test
Project Support Tools

• Explicit model for combined sewer systems

• GRID model for pollutant load estimation

• Stormwater BMP effectiveness evaluation

• Simplified scenario evaluation tool
Directly Connected Subcatchments
Surface Water Subcatchments
Calibration

Flow (CFS) vs Rainfall (inches) for different dates from 29-Oct-01 to 31-Oct-01.

Lines represent:
- Monitor
- Explicit Model
- Yeon RG
Verification
Example Residential Area in 200 ft. Grids
Impervious Surface
Vegetative Cover
Land Use

 NJ97  |  NK97  |  NL97
------|-------|-------
 NJ98  |  NK98  |  NL98

Zoning:
- POS
- SFR
- COM
- MFR
BMP Effectiveness Evaluation

- Master spreadsheet by BMP – collected/derived information for all BMPs
  - Structural, non-structural, instream
  - Variety of pollutants and conditions
  - Information sources
  - Range of BMP effectiveness values and associated conditions at extremes
  - Default values
  - Qualifications
  - Certainty (H, M, L)
Putting the Pieces Together

- Private Property Investments
- Street System Investments
- Stormwater and Development Regulations
- Discharge Permit Fees
- Public Education, Consultation and Acceptance

Portland's Stormwater Marketplace
Next Steps…

• Evaluation Tool Development
  – Establish inputs (BMP constraints, performance, costs)

• Development of Base Case
  – Establish base case (current plan)
  – Input into and test evaluation tool (calibrate as needed)

• Development of Market Case
  – Establish market case
  – Input into evaluation tool

• Marketplace Strategies Evaluation

• Base Case and Market Case Comparison
Surprising Results

• Challenge of documenting project costs
  – Site issues/perspectives create significant variation

• Challenge of documenting benefits
  – Site issues/treatment trains create significant variation

• Smaller scale analysis not always easier
  – Fewer planned BMPs reduced power of analysis

• More interest in markets than models
  – Quantification must precede policy but…
How CNS Has Helped

• Allowed work to proceed
  – Work would not be done without the grant

• Increased visibility
  – Interest in/knowledge of ecosystem services increased

• Created collaboration among city bureaus
  – Engineers and planners working together to conduct analysis

• Provided networking opportunities
  – Contacts in Maryland, Ohio, Washington(s), Michigan
Desired Feedback

• Help documenting/checking assumptions
  – How can we reduce the level of uncertainty?

• How best to create regulatory flexibility
  – How can we get regulatory agencies to experiment?

• How to simplify the presentation of the project
  – How can we make the project relevant to regular folks?

• Thoughts on greatest threats/risks of approach
  – What are we neglecting or forgetting?