Water Quality Trading in the Non-Tidal Passaic River Watershed

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Project sponsored by: USEPA Targeted Watershed Grant Program
& Rutgers, The State University of New Jersey
Project Goal

• Develop, implement, and evaluate a Water Quality Trading program for Non-tidal Passaic River Watershed that:
  − Adheres to USEPA policy on Water Quality Trading
  − Meets NJDEP requirements
  − Implements TMDL
  − Reduces cost of compliance with Clean Water Act
  − Establishes incentives for voluntary reductions that could also achieve ancillary environmental benefits such as expedited load reductions
NJDEP Phosphorus Criteria = 0.1 mg/l for streams and 0.05 mg/l for lakes

- Solution requires lower total discharge of phosphorus from all sources
- 24 Major WWTPs and 84 Municipal Separate Storm Sewer Systems (MS4s) in Upper Passaic Basin
- A Total Maximum Daily Load (TMDL) is near completion to address the impairments in the Upper Passaic River Basin
- Possibility of site-specific criteria as alternative
Water Quality Trading

- High cost to upgrade each wastewater treatment plant to achieve TMDL reductions
- Team led by Rutgers proposed water quality trading program as solution
- Alignment with USEPA Trading Policy (January 2003)
- USEPA Office of Water FY 2007 goal of 33% increase of permits that allow trading
Project Partners

• Multidisciplinary team
  – Rutgers Univ. (science, engineering, policy)
  – Cornell Univ. (economics)
  – NJ Dept of Environmental Protection (NJDEP)
  – Passaic River Basin Alliance (WWTP association)
  – NJ Association of Environmental Authorities
  – NJ League of Municipalities
  – EPA (funding source)

• University presence acts as neutral party and provides research based approach
Plan for Passaic Trading Program

• Three year plan
• Primary focus on point source/point source trades but will investigate point to nonpoint source trading
• Plan has three phases
  – Characterization and assessment
  – Trading Program Development
  – Implementation and Evaluation
Project Status

• Phase 1 (Characterization and Assessment) near complete
• Phase 2 (Trading Program Development) already in progress; tasks completed:
  ✓ Trading ratios derived from water quality model
  ✓ 2 proposals for trading framework
  ✓ Preliminary economic model
  ✓ Feasibility analysis of trades with MS4s
• What are the restrictions on trading necessary to protect and improve water quality?

• Two possible approaches
  – Same tributary framework
    • Most conservative approach
  – Cross tributary framework
    • More flexible approach
Same tributary framework

• Aims to protect all reaches; assumes excessive P anywhere is a water quality concern
• Seller must be upstream of buyer, and must be “physically connected” to buyer
  – Apply trading ratio
Cross tributary framework

- Aims to protect TMDL endpoints; assumes excessive P is only a water quality concern at the TMDL endpoints.
- Group WWTPs into “management areas”. A management area is bounded by a TMDL endpoint. **Purpose of management area concept is to protect TMDL endpoints.**
  - Within the management area, buyers and sellers can trade bidirectionally. For trades between management areas, seller must be upstream.
  - Apply trading ratio
Pompton Management Area

- Endpoint is Wanaque South Intake
- Endpoint is only hot spot concern in the Pompton Management Area
- 3 WWTPs with total 12.5 MGD capacity
- WWTP discharge is attenuated as it flows toward endpoint
• Cornell Univ. team developed economic model to identify trading scheme that can best minimize treatment costs
• Model design is adapted from landmark Hung and Shaw (2005) paper
• Model uniquely includes marginal abatement costs and incremental capital costs
• Watershed-specific cost data not yet available, so data from other studies was applied
• Considered multiple scenarios based on potential TMDL allocations and trading zones
Economic Model Findings

• Sufficient incentives for limited but important multi-year bilateral or trilateral deals

• A phased in TMDL cap will reduce costs of TMDL implementation

Allows flexibility in the timing of capital investments (e.g. Long Island Sound)
NPS and MS4 Trade Opportunities

- Peckman River as MS4 trade opportunity
- Ancillary benefits to TP from NPS trades that reduce fecal coliform
- Feasibility analysis of MS4 trading
  - Trade opportunities exist between small WWTPs discharging less than 1 MGD at high phosphorus effluent and proximate MS4s.
Next steps

• Incorporate final TMDL allocations into economic model
• Conduct trading scenario simulations
• Develop best permitting system for this program