



# Fact sheet

## Point/Nonpoint Source Water Quality Trading Program for New Jersey

*Christopher C. Obropta, Ph.D., Extension Specialist in Water Resources & Gregory Rusciano, Graduate Assistant in Bioresource Engineering*

*Trade this...*



*A wastewater treatment plant discharge*

Water quality trading may play a significant role in obtaining cost-effective reductions that will assist New Jersey to successfully meet its goals to improve and preserve water quality. Although trading may be appropriate for many pollutants such as nitrogen and total suspended solids, an immediate need in New Jersey is phosphorus. As the New Jersey Department of Environmental Protection (NJDEP) moves toward assigning total phosphorus effluent limitations of 0.1 mg/l for point source discharges to waterways that are impaired for phosphorus, a potential for “point-nonpoint” source trading becomes a very attractive supplement or alternative to treatment plant upgrades. A trading policy provides profitable opportunities for sources with low treatment costs to reduce their loading beyond legal requirements, generate a credit, and sell these credits to dischargers with high treatment costs.

*...for this.*



*A goose control buffer in a municipal park*

This flexibility produces a less expensive outcome overall while achieving the desired environmental target. In addition to the economic benefits, a “point-nonpoint” source trading program may have the potential to provide ancillary effects such as wetland restoration or the implementation of Best Management Practices (BMPs) that improve wildlife habitat in addition to improving water quality. This can be accomplished by building natural systems to treat nonpoint source pollution instead of building concrete tanks and other components at the wastewater treatment plant.

A methodology has been developed by the Rutgers Cooperative Extension Water Resources Program to identify potential water quality trading opportunities within a watershed. This method is both scientifically and economically feasible for total phos-



phorus. The focus of the trading opportunities is in areas where Total Maximum Daily Loads (TMDLs) have already been prepared or are pending. Since “point-nonpoint” trading opportunities can potentially yield economic and wildlife habitat benefits, especially in areas where agricultural land use is significant, this methodology focuses on these opportunities. Using available databases and Geographic Information System (GIS) data, sub-watershed basins are initially identified as potential candidates for point-nonpoint source trading. Each of these sub-watershed basins are then evaluated based upon point source loadings, nonpoint source loadings, land use/land cover characteristics, riparian buffer conditions, and soil properties. Based upon this evaluation and an examination of the economic parameters for each sub-watershed basin, individual basins are identified as having the highest potential for successfully implementing a point-nonpoint source trading program that could restore water quality in its waterways.

### Benefits of Trading

- **Cost Savings:** An efficient, cost-effective way to reduce pollution in a watershed, compared to traditional regulatory approaches.
- **Incentive to Reduce Pollution beyond Current Limits:** Trading may lower overall pollution loads in a watershed. For example, a source receives credits by voluntarily reducing pollution loads (i.e., load reductions beyond those that may be required through a Total Maximum Daily Load (TMDL)). The source then sells those credits to a source that cannot inexpensively reduce their own pollutant loads. The ability to receive and sell pollutant credits becomes a financial incentive to reduce pollution.
- **Incentive for Technological Innovation:** The dischargers need adequate monitoring techniques to demonstrate pollutant reduction. Trading can provide incentives for dischargers to explore new reduction technologies and monitoring technologies.
- **Water Quality Emphasis:** Trading emphasizes meeting water quality outcomes rather

than the installation of a particular type of control technology. Provides greater flexibility to discharger.

- **Independent Groups can Participate:** In a similar fashion when nonprofit groups purchase open space for preservation, watershed groups can purchase and retire pollutant credits.

### Point-Nonpoint Trading Examples

A municipal wastewater treatment plant is currently discharging to a waterway that is exceeding the instream total phosphorus standard of 0.1 mg/l. The NJDEP requires wastewater treatment plants that discharge to phosphorus impaired waterways to satisfy the instream standard at the end of their effluent pipe. The treatment plant is currently discharging treated effluent with a total phosphorus concentration of 2.0 mg/l. The treatment plant has several options:

1. Upgrade their facility to consistently achieve an effluent concentration of 0.1 mg/l.
2. Enter into a point-nonpoint source trade that will provide financial incentives to a nonpoint source to implement stormwater controls that will achieve the same reductions as upgrading the treatment plant.
3. Implement a combination of #1 and #2.

*Option 1: Upgrade their facility to consistently achieve an effluent concentration of 0.1 mg/l.*

Although the treatment plant can consistently achieve an effluent limitation of 1.0 mg/l through the addition of chemicals to promote the precipitation of phosphorus, this will generate more sludge and increased annual operation costs, but will not result in significant capital costs to upgrade. To upgrade from 1.0 to 0.1 mg/l, a costly filtration system would be required. For a 3 million gallon per day (MGD) plant, cost estimates have ranged from \$2 to \$3 million dollars in capital costs and an increase of \$80,000 to \$100,000 in annual operating and maintenance costs.

Even if the treatment plant adds the costly filtration system, the technology is the latest available technology, and there is some question whether this system can consistently achieve the limitation of 0.1 mg/l, thereby placing the treatment plant in jeopardy of violating their permits and subjecting them to fines.

***Option 2:** Enter into a point-nonpoint source trade that will provide financial incentives to a nonpoint source to implement stormwater controls that will achieve the same reductions as upgrading the treatment plant.*

This option would be preferable to the treatment plant, provided there are sufficient nonpoint sources that can be treated with stormwater BMPs within the watershed to provide an adequate trade. Due to the uncertainty in the removal rates of stormwater BMPs such as riparian buffers, stormwater treatment wetlands, infiltration systems, the NJDEP will require a trading ratio for all point-nonpoint trades. Typical ratios range from 1.5 to 3 (i.e., if the treatment plant is trading a load reduction of 1,000 pounds per year of total phosphorus, they would be required to purchase credits for 3,000 pounds per year in nonpoint source control for a required trading ratio of 3). Initial calculations performed in the Raritan Basin Watershed indicate that this option will not be feasible in many of the subwatersheds of the region. There simply are not enough nonpoint sources.

It is important to note that many trading opportunities will be conducted within the context of a TMDL. If a TMDL already requires nonpoint source reductions in a watershed, a treatment plant will have to implement trades beyond these existing requirements.

***Option 3:** Implement a combination of #1 and #2.*

This appears to be the best option. The treatment plant upgrades to achieve an effluent concentration of 1.0 mg/l. A point-nonpoint source trade will be conducted to trade the load from 1.0 to 0.1 mg/l to nonpoint source controls. This trade can be with farmers, residential development, and/or commer-

cial/industrial development. If the treatment plant is owned by the municipality, the municipality can trade with itself and implement nonpoint source controls throughout the municipality to avoid costly treatment plant upgrades, thereby saving the tax payers money. The treatment plant can also trade with farmers. Because inadequate funds are available from USDA's Environmental Quality Incentives Program (EQIP), trading would offer another funding source or increase funding available to farmers for implementing nonpoint source pollution controls. The nonpoint source controls need not be structural controls. For example, the treatment plants could fund a certified crop advisor to help the farmers develop and implement comprehensive nutrient management plans (CNMPs) to better manage their fertilizer applications. CNMPs can result in well-documented reductions in phosphorus applied to farm fields. Nonpoint source reductions also might be achieved by developing a regional composting facility for small horse farmers, paying farmers to use a winter cover crop to minimize crop erosion, and paying farmers to haul manure to farms that are not near waterways.

### **Trading Requires Partnerships**

Additional research, development, and demonstration are necessary to achieve an effective nutrient trading program in New Jersey. The resulting management practices and market mechanisms will be powerful tools in reducing pollution at the lowest possible cost. The research and development process requires a diverse team of professionals skilled in various dimensions of environmental protection, economic analysis, team and consensus building, and stakeholder outreach and engagement.

The Water Resources Program can provide the technical and scientific support for a pollutant trading initiative in New Jersey on a watershed basis. Technical/scientific groups can identify and evaluate trading opportunities throughout the State. Watersheds where trading is feasible will be identified, followed by a more detailed study that will pinpoint a smaller number of watersheds where stakeholder outreach and engagement can begin. Once stakeholders are engaged and broad local interest is

generated, the technical/scientific group can continue to provide information in support of program design, implementation, and evaluation over time.

As trading programs move forward, a strong administrative group is needed to manage the day-to-day activity of the trading program. These activities include the negotiation of trading agree-

ments, assuring that all parties are complying with the trading agreements, as well as serving as a liaison between the U.S. Environmental Protection Agency (USEPA), NJDEP, the point source discharger, the farmer, and the municipality. The main goal of the administrative group will be to assure that a functional trading market is established and is properly functioning over time.

© 2004 by Rutgers Cooperative Extension, New Jersey Agricultural Experiment Station, Rutgers, The State University of New Jersey.  
This material may be copied for educational purposes only by not-for-profit accredited educational institutions.

Desktop publishing by RCE/Resource Center

Published: October 2004

**RUTGERS COOPERATIVE EXTENSION  
N.J. AGRICULTURAL EXPERIMENT STATION  
RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY  
NEW BRUNSWICK**

Distributed in cooperation with U.S. Department of Agriculture in furtherance of the Acts of Congress on May 8 and June 30, 1914. Rutgers Cooperative Extension works in agriculture, family and consumer sciences, and 4-H. Dr. Karyn Malinowski, Director of Extension. Rutgers Cooperative Extension provides information and educational services to all people without regard to race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Rutgers Cooperative Extension is an Equal Opportunity Program Provider and Employer.