AN EVALUATION OF WATER QUALITY TRADING FOR GEORGIA WATERSHEDS

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Abstract

Water quality trading is a policy tool that could improve the cost effectiveness of achieving environmental goals, but it is not currently used in the state of Georgia. This research seeks to evaluate the applicability of water quality trading in Georgia watersheds. This report provides an update on the status of current research on water quality trading conducted through a collaboration of the Georgia Water Policy and Planning Center, the Georgia State University Andrew Young School of Public Policy, and the University of Georgia Warnell School of Forest Resources.

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I. INTRODUCTION

In 2003, the EPA issued a national water quality trading policy to support the development and implementation of market-based approaches to water quality management (USEPA, 2003). The EPA advocates water quality trading as a cost-effective means to preserve and improve water quality. The agency hopes to build on the success of air quality trading programs which have been effective in efficiently controlling the emissions of compounds responsible for the formation of acid rain. To date there are over forty water quality trading programs established in the U.S. and an additional thirty programs currently in development, but at this time, water quality trading has not yet been established in Georgia.

The purpose of this paper is to review the status of on-going research concerning water quality trading that is being conducted through collaboration among Georgia State University, the Georgia Water Policy and Planning Center, and the University of Georgia. This research is intended to assist Georgia policy makers in evaluating the applicability of water quality trading in Georgia watersheds.

II. BACKGROUND AND RELATED WORK

Water quality trading is a policy that allows pollutant sources to trade pollution control obligations in order to lower the joint costs of compliance. Trading takes advantage of differences in pollution reduction costs among pollution sources. The costs of pollution reduction are not uniform. Different pollution sources have different pollution reduction costs as a result of factors such as treatment plant size, level of reduction required, and available treatment technology. When trading is an option, a discharger can choose between reducing its pollutant load and purchasing pollutant reduction credits from another source that has exceeded its own pollution reduction obligation. Trading allows pollution sources to achieve environmental goals more cost-effectively. Furthermore, trading can be designed to achieve environmental improvement by requiring a trade premium (i.e., the trading ratio is greater than 1:1).

The success of water quality trading hinges on a broad range of economic, environmental, social, and political factors. Implementation is complex, and the potential benefits can only be realized when trading is implemented under appropriate conditions. Despite its complexity, trading can offer a tool for enhancing the cost effectiveness of water quality expenditures. With over 50% of the state's rivers and streams only partially supporting or not supporting water quality standards, the costs of restoring water quality in Georgia's waters will be high. Any policy tool that can improve the cost effectiveness of water quality expenditures deserves serious consideration.

The key issues surrounding the potential application of water quality trading in Georgia are the adequacy of financial and regulatory incentives, the availability of potential traders, and the acceptance of trading policies by affected stakeholders. Another key issue for water quality trading, in general, is the lack of trading activity to date in existing water quality trading programs. Identifying barriers to trading activity and evaluating whether the paucity of trades elsewhere indicates failure of the policy are important questions that this research aims to address.

Nationally, water quality trading is a subject of great interest to policymakers, and research efforts on the topic are underway in watersheds around the U.S. In Georgia, over the past few years, the Andrew Young School of Policy Studies (AYSPS) at Georgia State University and the Georgia Water Planning & Policy Center (GWPPC) have issued several policy papers that have examined the potential use of water quality trading in Georgia (Morrison, 2002; Cummings et al., 2003; Rowles, 2004; Jiang et al., 2004). Research on water quality trading at AYSPS and the GWPPC is continuing in collaboration with the Warnell School of Forestry at the University of Georgia. This research recently assessed the potential for the use of trading in the Upper Chattahoochee River basin and made initial estimates of the marginal costs of point source pollution treatment, and it is currently evaluating the possible use of trading for watersheds across Georgia. This research project aims to lay the policy research foundation for trading in Georgia. Elsewhere in the state, another project at the University of Georgia is studying the potential use of water quality trading in the Lake Allatoona watershed in northern Georgia.

III. RESEARCH DESIGN AND METHODS

To evaluate the applicability of water quality trading in Georgia, we are conducting several research and outreach activities. First, we are completing an evaluation of all major Georgia watersheds relative to their suitability for water quality trading. We are using criteria identified in our study conducted last year of the opportunity for water quality trading in the Upper Chattahoochee watershed (Rowles, 2004). These criteria include: environmental suitability, regulatory incentive, participant availability, economic incentive, and stakeholder response.

Second, we are analyzing the legal framework for water quality trading in Georgia. The success of a water quality trading project requires that the administering agency has clear legal authority to create, implement, and enforce the program. We are conducting a review of the legal foundation that would be needed to support water quality trading in Georgia by examining existing Georgia policy and by analyzing water quality trading policies adopted in other states that could provide policy models for Georgia.

The third component of the project is to develop a simulation model for water quality trading in a Georgia watershed. The STAND model (Sediment-Transport-Associated Nutrient Dynamics) developed at the University of Georgia will be used bring together the results of our recent work to develop cost curves for phosphorus reduction by municipal wastewater treatment plants in a sophisticated water quality model that will be able to demonstrate the effects of water quality trading under various scenarios.

Fourth, we will conduct a monitoring study to support the development of trading ratios applicable for point to nonpoint source trades. Continuous sampling methods will be used to estimate pollutant loads from potential sellers of nonpoint source pollutant credits. Monitoring results will support modeling efforts described above and provide a basis for the development of trading procedures, including trading ratios.

Fifth, we will engage stakeholders in discussion about the development of water quality trading in Georgia, primarily through a workshop planned for the spring of 2005. A new water quality trading program would affect stakeholders across the state. Successful adoption of water quality trading in Georgia will require that stakeholders are involved in the discussion of how trading should be implemented in the state. We will continue and expand our efforts to meet with stakeholders from community organizations, private interests, and all levels of government to provide information and facilitate discussion on the issue. The workshop will be designed to provide an educational simulation of the use of market mechanisms in water quality policy.

IV. CONCLUSIONS AND DISCUSSION

The research for this project is not complete, but some preliminary conclusions can be made at this time. First, the primary barrier to trading activity in water quality trading programs elsewhere is the lack of adequate financial incentives for trading. At the outset, initiatives that aim to allow trading between point and nonpoint sources are presented as desirable because of the expected low relative cost of treating nonpoint source pollution loads. In fact, the cost differential between point and nonpoint source pollutant reductions often does not turn out to be as great as expected. Factors that contribute to the difference between expected costs and actual costs are overestimates of point source pollution control costs, underestimates of nonpoint pollution control costs and transaction costs, decreasing costs of point source pollution control technologies, and external subsidies for point source pollution control measures. Any new point-nonpoint trading initiative must ensure that cost estimates are accurate, or trading activity may not develop as envisioned. This research is developing estimates for point source nutrient control costs that will be relevant to evaluating economic incentives in advance of trading implementation.

Financial incentives are closely tied to regulatory requirements. Where regulation of point sources pollution is strict, control costs will be high, and trading is more likely to occur than in the absence of strict regulation. Point source regulation varies across the state, depending on local watershed conditions. The implementation of nutrient standards in Georgia, in response to a national effort by the U.S. Environmental Protection Agency to encourage the adoption of its nutrient criteria, would increase opportunities for point-nonpoint source trading in the state.

Although trading activity has been slow in most trading initiatives to date, trading is still expected to provide communities with opportunities for future growth, especially where environmental policies require no net increase of a pollutant load. Water quality regulation has traditionally focused on point source controls, while nonpoint source controls have been primarily voluntary, and the cost differential between point and nonpoint sources will become more supportive of trading as regulation increases the relative marginal cost of point source controls. Point source control costs follow a general pattern of increasing marginal costs as pollutant removal efficiency approaches 100%.

Although point-nonpoint source trading of nutrients is one of the predominant models for water quality trading, it is not the only model, and other models may be appropriate for use in Georgia. Trading between point sources may be attractive, especially between large and small point sources, with the large point sources generally having lower control costs as a result of returns to scale. Trading between nonpoint sources has been initiated in Colorado in a watershed where no net increase of phosphorus loading is permitted. All new nonpoint sources are required to offset their phosphorus loads with nonpoint source controls at existing nonpoint sites as well as implementing controls in their own development of the new site. Opportunities to apply trading principles also may arise as local communities develop stormwater control programs to comply with EPA stormwater regulations.

This research aims to address the key issues relating to the potential for implementation of water quality trading in Georgia. Research to date indicates that water quality trading could be a cost-effective tool for water quality protection in Georgia. However, the complexity of implementation requires careful advance study and planning. Further research will provide for informed decision making about the future of water quality trading in Georgia.

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