BIOPHYSICAL AND ECONOMIC ANALYSIS OF GREAT MIAMI RIVER WATERSHED FOR A WATER QUALITY TRADING PROGRAM, OHIO

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Project Costs: **$90,000**

Project Completion: **2005 - Ongoing**

At the request of the Miami Conservancy District, KIESER & ASSOCIATES (K&A) conducted an analysis of biophysical and economic aspects of the Great Miami River basin, Ohio from 2004-2005 to assess non-point source loading conditions in this 3,800 square mile watershed (http://www.envtn.org/docs/Great-Miami_Trading_Analysis.pdf). This analysis served as the cornerstone for the Miami Conservancy District's development of a water quality trading program to achieve significant nutrient load reductions in this tributary of the Ohio River. The Great Miami has over 70% of its land in agricultural uses and is among the top three nitrogen contributors to the Ohio River. Driven by the pending nutrient standards for the state's surface waters, this 10-year pilot trading program focuses on point source/nonpoint source trading for nutrients (total phosphorus and total nitrogen) between permitted wastewater dischargers and agriculture.

To determine potential viability of trading in this watershed, the K&A analysis focused on:

- Conducting a nonpoint source modeling analysis using SWAT to assess agriculture loading and potential credit supply
- Assessing and comparing the costs of point source load reductions via traditional in-plant facility upgrades to the costs of comparable load reductions by agricultural
- Analyzing cost savings and load reductions achievable through trading

Results indicated that phosphorus credit demand and most of the nitrogen credit demand by point sources can be met by nonpoint sources through the implementation of the no-till management practices on 50% of the row crops in the watershed. Treatment plant upgrades to biological nutrient removal technologies for all point sources are estimated at $422.5 million. Costs for implementation of no-till practices to meet point source watershed demand are $37.8 million providing a $384.7 million savings compared to treatment plant upgrades. The analysis concluded that water quality trading in the Great Miami River watershed has the potential to provide significant cost savings over traditional command and control approaches. Kieser & Associates also defined ancillary trading program benefits including significant sediment loading reductions, reduced peak flows during spring runoff, and increased groundwater recharge resulting in increased summertime baseflow.

The Miami Conservancy District secured final regulatory approval for this point source/nonpoint trading program in 2005. K&A has subsequently assessed annual program performance, BMP efficiencies and costs. K&A ultimately developed an electronic registry for tracking non-point source nutrient reduction projects that now accounts for nearly 300 projects with farmers and contracted annual nutrient loading reductions of over 400 tons. K&A most recently has tapped into their 8-year history with this model program to help identify economic policy interests for water management in Europe under the EU Water Framework Directive. This trading program is currently the largest active program of its type in the world.