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CONSERVATION INNOVATION GRANTS
Final Report

Grantee Name: Pennsylvania Environmental Council (PEC)	
Project Title: Conestoga River Reverse Auction Project	
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Period Covered by Report: September 28, 2004 to September 28, 2007	
Project End Date: September 28, 2007	

Introduction

In 1996, the Conestoga watershed, located in the lower Susquehanna Basin in southcentral PA, was listed as a phosphorous impaired waterbody. Agriculture is the dominant land use and is the largest source of phosphorus loads in the watershed. Market-based tools, such as reverse auctions, provide an innovative and effective means of targeting funding and improving water quality in watersheds like the Conestoga. These tools can assist conservation agencies and organizations in allocating limited resources to get the most cost-effective environmental benefits from agricultural conservation practices.

The Conestoga River Reverse Auction Project (Project), led by the Pennsylvania Environmental Council (PEC), conducted a reverse auction using an online GIS-based nutrient trading tool called *NutrientNet*, developed by the World Resources Institute (WRI) to award funds to farmers implementing the most cost-effective Best Management Practices (BMPs) within the Conestoga watershed. The replicable methodology and tool can help conservation agencies and organizations better allocate conservation dollars to maximize pollution (nutrients and sediment) reductions with limited funds.

A trial reverse auction was conducted in June 2005, and administrative modifications were made to streamline the reverse auction mechanism. The second reverse auction was conducted between October 2005 and February 2006.

The Project was launched On September 28, 2004 and was concluded on September 28, 2007. PEC in partnership with WRI, the Lancaster County Conservation District, Natsource, LLC, The Conservation Fund and the PA Department of Environmental Protection held 2 auctions resulting in the award of $481,016 to 16 BMPs on 13 farms that will result in annual reductions of 91,322 lbs. of phosphorous and to local surface waters in the Conestoga River Watershed in Lancaster County, Pennsylvania. The lifespan of the BMPs implemented range from 10 to 20 years.

Reverse auctions, like standard auctions, are competitive bidding systems. In a reverse auction sellers compete to supply buyers with a specified good or service, enabling buyers to locate the most competitive sellers. Unlike standard auctions in which multiple buyers compete to *buy* goods from a single seller, in reverse auctions, multiple sellers compete to *sell* goods to a single buyer. The effect is that in a reverse auction sellers bid prices *down* while in a standard auction buyers bid prices *up*. In markets with multiple sellers and a single buyer, reverse auctions can help to efficiently allocate a limited budget.

The reverse auction format and the *NutrientNet* tool are easily transferable to other programs that allocate funds for BMPs to address nonpoint source water pollution challenges. State environmental agencies and county conservation districts can customize these tools for their respective watersheds and use them to rank BMPs according to their improvement in local or downstream water quality.

Project Activities & Results

Reverse Auction I Project Design:

Members of the Investment Committee and project partners, WRI and Natsource, began project design activities in October 2004. Initial design parameters included the selection of eligible agricultural best management practices, auction process, including the sequence of bid solicitation, bid preparation, auction implementation and bid awards for Reverse Auction I, which was scheduled for the spring of 2005.

The project team held individual meetings in fall 2004 with plain sect farmers, Lancaster County Conservation District personnel, local NRCS representatives and other key stakeholders to discuss project design parameters.

The Lancaster County Conservation District hosted a kickoff meeting of approximately 20 individuals including key stakeholders, agricultural producers and the project team on January 25, 2005. The meeting provided an introduction to *NutrientNet* and the proposed reverse auction design.

The project team finalized the design for the first auction in March 2005 and scheduled Reverse Auction I for June 6 through June 24, 2005.

The project team and Investment Committee recommended using Environmental Quality Incentive Program standard cost-share rates and contracting procedures for the first auction. PEC enlisted the LCCD to assist with marketing and implementation of the reverse auctions. The project team held training sessions with LCCD management and technicians in the winter and spring of 2005 about the reverse auction process and use of *NutrientNet*.

The following BMPs were deemed eligible for Reverse Auction I:

1) Stream bank fencing
2) Cover cropping
3) Conservation tillage/no till
4) Contour strips
5) Terracing and waterways
6) Riparian buffers/filter strips
7) Manure management systems

Formation of Conestoga River Reverse Auction Investment Committee:

In April 2005, PEC assembled the Conestoga River Reverse Auction Committee to oversee the implementation of the Reverse Auction Project.

Member	**Organization**
Don Robinson	Former Administrator Lancaster County Cons. District
Don McNutt	Lancaster County Conservation District
Suzy Friedman	Environmental Defense
Andrew McElwaine	Pennsylvania Environmental Council
Andy Zemba	PA Department of Environmental Protection
Brad Michael	Natural Resource Conservation Service
Matt Ehrhart	Chesapeake Bay Foundation
Todd McNew	The Conservation Fund
Bill Achor	Wenger's Feed Mill, Inc.

The primary responsibilities of the Committee were to oversee the design of the reverse auctions and approve the winning bids resulting from those auctions.

Producer Outreach and Marketing Program:

The project team posted an advertisement in the April 2005 issue of the agricultural periodical Lancaster Farming (www.lancasterfarming.com). The advertisement included details about the auction schedule, geographic coverage, eligible BMPs, and contact information at the LCCD.

In conjunction with the advertising effort, PEC enlisted LCCD technicians to inform eligible agricultural producers about Reverse Auction I as part of their normal rounds in meeting with producers. During the spring of 2005, LCCD technicians solicited 36 individual producers in the Conestoga Watershed to participate in Reverse Auction I.

PEC also posted an advertisement in Lancaster Farming in January 2006 in order to solicit interest by eligible producers for Reverse Auction II, which was open from October 10, 2005 to February 24, 2006.

Reverse Auction I – June 6 to June 24, 2005:

8 bids were received from 7 qualified producers in the Conestoga Watershed between June 6 and June 24, 2005. The Investment Committee met on June 25 to review and approve the winning bids. A summary of the winning bids are presented in tabular form in Attachment A, Conestoga Reverse Auction I Results Summary. A complete report of Auction I results is included in Appendix B. One of the projects was not completed according to specifications and therefore payment was not issued, nor are the reductions and expenditures reflected in the final data presented in the narrative of this report.

Table 1 – Summary of Reverse Auction I Results – 5 Completed Projects at 4 Farms

Annual Reductions (lbs. of P)	Total Reductions (lbs. of P)	Range of P Bid Prices Received ($/lb P)	Total Project Cost	PEC Cost-share Amount	Average Cost Per Pound of Reductions ($/lb P)
256	3,800	$8.87 - $103.06	$86,658	$37,707	$9.92

Reverse Auction II:

Following the completion of Reverse Auction I in June 2005, the project team developed revisions to the auction process and design of *NutrientNet*. A summary of the proposed changes is presented below:

1. Modifications to NutrientNet Tool for Auction II:
   - Additional BMPs (separate terraces and waterways as BMPs, waterways for pastures, rotational grazing, precision dairy feeding, manure solids separator, etc.)
   - Modifications to Data Entry Pages
   - Calculation Changes

2. Schedule for Auction II:
   Auction Opening Date: October 10, 2005
   Auction Closing Date: February 24, 2006
   Approve Winning Bids: March 2006

3. Coordination of Reverse Auction II and the EQIP Process

5. Modifications to Auction Rules:
   - Variable pricing for BMPs (above and below EQIP standard prices)
   - Variable cost-share rates

The Investment Committee approved the proposed changes on September 19, 2005. The most significant change for the Auction Process was to allow for fully variable pricing of BMPs by eligible producers in order to more closely represent unregulated commodity markets. In this circumstance the producers were effectively allowed to set the price of the commodity, one pound of phosphorous reductions, at their discretion.

The Reverse Auction II was held from October 11, 2005 through February 24, 2006. During this period Lancaster County Conservation District (LCCD) technicians met with over 40 individual producers in the Conestoga Watershed and solicited a total of 23 bids from 22 individual producers. The 23 bids amounted to $666,106.26 in total cost and would result in 90,519 pounds of phosphorous loading reductions over the expected lifespan of the practices at an average cost of $7.36/lbs of phosphorous, based on the results of the NutrientNet estimation tool.

A summary of the Auction II results is presented in tabular form in Appendix C and detailed report of the Reverse Auction II Results is included as Appendix D.

At the March 3, 2006 meeting of the Conestoga River Reverse Auction Investment Committee, with a budget of $450,000.00, the Committee decided to award the 13 most cost effective practices at a total cost of $446,990.02, which would yield 88,327 pounds of phosphorous reductions over the expected lifespan of the practices at an average cost of $5.06/lb of P. Two of the winning projects were withdrawn by the participating producers following the auction. The payment and nutrient reductions associated with the 2 withdrawn projects are not included in the data presented below in Table 2 or in the Introduction of this report.

Winning practices include manure storage systems for poultry, swine and cattle manure, streambank stabilization and fencing, terraces, and waterways.

Table 2 – Summary of Reverse Auction II Final Results – 11 Projects at 11 Farms

Total Reductions (lbs. of P)	Range of P Bid Prices Received ($/lb P)	PEC Payments to Producers	Average Cost Per Pound of Reductions ($/lb P)
87,522	$2.36 - $157.49	$443,309	$5.07

The World Resources Institute recently conducted a study comparing results of the Conestoga Reverse Auction II with more traditional practice-based funding allocations from the EQIP program. The results of the Conestoga reverse auction provide evidence that performance-based allocation strategies which incorporate competitive bidding can provide significant improvements in program cost-effectiveness over traditional practice-based funding strategies, maximizing environmental outcomes per public dollar spent. In fact, the Conestoga reverse auction resulted in six times more phosphorus reduced per

average dollar spent than comparable EQIP allocations within the same period and in the same watershed.[1]

Producer Contract Execution and Practice Installation/Implementation:

Following the approval of the winning projects for both Reverse Auctions I and II LCCD Technicians initiated drafting agreements with individual farmers for installation of the proposed BMPs. The project team drafted the following customized contractual templates based on standard EQIP cost-share program agreements:

A) BMP Conservation Application and Contract & Appendix A
B) Practice Approval and Payment Application

The contract documents list PEC as the entity issuing payment for the practices and the farmer as the contractor/applicant.

Farmers signed the Conservation Application and Contracts following the auction. Upon completion of the installation of the practices the farmers submitted a Practice Approval and Payment Application to PEC. A LCCD Technician approved each of the installed BMPs and signed the Practice Approval and Payment Application accordingly.

Installation and approval of all of the Reverse Auction I and II projects continued through the entire term of the project.

Engineering Certification of Constructed Manure Management BMPs

PEC enlisted the services of 2 engineering firms to provide professional engineering certification of a total of 7 manure storage systems constructed through the 2 reverse auctions. The 7 constructed facilities included the following:

- 5 roofed poultry manure stacking pads
- 2 circular dairy cattle manure storage tanks

Funding Received and Expended

Final financial status report included in Attachment E.

[1] For more information, see WRI's Environmental Markets Policy Note No. 5- Paying for Environmental Performance: Comparing Traditional Conservation Funding Allocations with Reverse Auctions. *Forthcoming, Spring 2008.*

Potential for Transferability of Results

The Conestoga Reverse Auction project is readily transferable to other watersheds and Conservation Districts seeking to maximize the environmental benefits of their conservation funding.

Reverse Auctions can serve as a ranking tool used in combination with conventional NRCS EQIP cost-share programs, or as a stand alone tool for ranking conservation projects on the basis of their environmental benefit. The Conestoga Reverse Auction ranked practices based on phosphorus reductions to improve local water quality, however reverse auctions can be used to rank a variety of other water quality benefits from agricultural practices, including reductions in nitrogen and sediment loss, or decreases in stream temperature for improvements in fish habitat.

With the assistance from the World Resources Institute, the online *NutrientNet* tool can easily be customized for individual watersheds. Currently WRI is developing *NutientNet* for use in water quality trading programs in the Potomac watershed of West Virginia, and the Kalamazoo watershed in Michigan.

PEC and WRI are also developing Nutrient Net as an online credit calculation tool and marketplace for the PA Department of Environmental Protection's (PA DEP's) Nutrient Trading Program. This program is targeted at reducing nitrogen, phosphorous and sediment loadings to the Chesapeake Bay. *NutrientNet* will assist users with calculating, buying and selling credits, and will provide an easy-to-use framework for PA DEP to approve credits and trades. Pennsylvania's *NutrientNet* tool can be found at: http://pa.nutrientnet.org. Details about the PA nutrient trading program can be found at: http://www.dep.state.pa.us/river/Nutrient%20Trading.htm.

Conclusion

With the generous support of the NRCS Conservation Innovation Grant, PEC and project partners designed an implemented two reverse auctions in the Conestoga River Watershed in Lancaster County, PA. The two projects combined reduced a total of 91,322 pounds of phosphorus over the lifespan of the projects. When compared to traditional EQIP allocations, reverse auctions proved to be more efficient at allocating conservation funding to get the greatest environmental benefit at the least cost. The project successfully demonstrated that reverse auctions can be an effective tool for ranking conservation projects based on their cost-effectiveness in reducing nutrient (phosphorous and nitrogen) runoff.

EQIP Eligibility of Participating Agricultural Producers:

A listing of EQIP-eligible producers involved in the project, identified by name and social security number or taxpayer identification number;

Auction I Participants:

Mr. Paul D. Funk, social security #

Mr. Donald E. Shank, social security

Mr. Virgil Sensenig, social security #

Mr. Leon Eby, social security #

Mr. Abe Barley (Star Rock Farms, LLC)), tax identification #

Mr. Thomas Frey, proposed project withdrawn following auction

Auction II Participants:

Mr. Kenneth Bleacher (Bleacher Farms, LLC) tax identification

Mr. Henry Barley, social security #

Mr. Vince Metzler, farm was sold following auction and the project was not installed.

Mr. John Glenn Zimmerman, social security.

Mr. Walter Hurst, social security #

Mr. Abe Barley (Star Rock Farms, LLC), tax identification

Mr. George Mann, social security #

Mr. Leon Eby- social security #

Mr. Loren Zimmerman, social security

Mr. Donald E. Shank, social security #

Mr. Paul D. Funk, social security

Mr. Karl Martin, social security

Mr. Scott Funk, social security

a. The dollar amount of any direct or indirect payment made to each individual producer or entity for any structural, vegetative, or management practices. Both biennial and cumulative payment amounts must be submitted.

- $1,485 paid on October 28, 2005 to Mr. Paul D. Funk for installation of a 720' gradient terrace.
- $2,063 paid on June 21, 2006 to Mr. Donald Shank for the installation of a 0.5-acre grassed waterway.

- $619 paid on June 21, 2006 to Mr. Donald Shank for the installation of a 0.15-acre grassed waterway.
- $9,464 paid on June 21, 2006 to Mr. Donald Shank for the installation of pipe outlet terraces and riprap rock splash pads.
- $3,700 paid on June 29, 2006 to Mr. Scott Funk for a grassed waterway.
- $3,185 paid on July 6, 2006 to Mr. Walter Hurst for an underground outlet in a heavy use area for cattle.
- $1,500 paid on July 6, 2006 to Mr. Loren Zimmerman for a 500' stream bank stabilization project and a stream crossing.
- $36,772 paid on July 13, 2006 to Mr. John Glenn Zimmerman for the installation of circular concrete manure storage facility.
- $84,000 paid on October 3, 2006 to Mr. Kenneth Bleacher for the installation of a roofed poultry manure stacking pad for 160,000 chickens/cycle and phosphorous-based nutrient management plan.
- $59,000 paid on November 1, 2006 to Mr. Henry Barley for a roofed poultry manure stacking pad for 100,000 chickens/cycle and phosphorous-based nutrient management plan.
- $31,384 paid on December 15, 2006 to Mr. Leon Eby for the installation of a cow and hog manure storage system and heavy use area protection.
- $104,140 paid on January 17, 2007 to Mr. Leon Eby for the installation of roofed poultry manure stacking pad and mortality composter for 64,000 chickens/cycle.
- $106,000 paid on February 16, 2007 to Mr. George Mann for the installation of a roofed poultry manure stacking pad for 50,000 chickens/cycle and a phosphorous-based nutrient management plan.
- $4,500 paid to Mr. Paul Funk on June 5, 2007 for a gradient terrace and the repair of tile drainage system.
- $2,153 paid on June 25, 2007 to Mr. Virgil Sensenig for the installation of a roof runoff structure, underdround outlet and water and sediment control basin.
- $31,051 paid on June 26, 2007 to Mr. Karl Martin the installation of a roofed poultry manure stacking pad for 87,000 chickens/cycle

b. A self-certification statement indicating that each individual or entity receiving a direct or indirect payment for any structural, vegetative, or management practice through this grant is in compliance with the adjusted gross income (AGI) and highly-erodible lands and wetlands conservation (HEL/WC) compliance provisions of the Farm Bill:

- PEC certifies that all Conservation Application and Contracts include said compliance provisions.