

USDA Conservation Innovation Grant Project

Customized Training on Water Quality Trading: Final Project Report

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INTRODUCTION

In an effort to advance implementation of market-based environmental trading programs, the Conservation Technology Information Center (CTIC) partnered with the Environmental Trading Network (ETN), the International Certified Crop Advisors, and the Water Environment Federation to develop and deliver customized training on water quality credit trading (WQCT). Funding for the training project was provided through a Conservation Innovation Grant from the United State Department of Agriculture's Natural Resources Conservation Service (NRCS). This training was comprised of several two-day workshops held to increase awareness and understanding of WQCT programs among agricultural producers, municipal wastewater facility operators, and potential aggregator groups.

The purpose of this project was to engage potential trading partners in states where WQCT is developing. The workshops helped initiate communication and collaboration among trading partners and equip them with the appropriate tools and motivation to begin developing or participating in WQCT in Ohio, Indiana, and Maryland. This summary report provides details of the workshop components, participant interactions and feedback, and general workshop results and benefits. (All workshop presentations can be downloaded at www.ctic.org.)

Water Quality Credit Trading

Many market-based environmental trading programs are being developed around the country. WQCT is a market-based approach to improve water quality in a cost-effective, flexible manner. It provides watershed managers and regulators with a voluntary tool that connects regulated point sources with nonpoint sources, such as agricultural producers, to economically achieve water quality improvements. Over the past few years, both the United States Department of Agriculture (USDA) and Environmental Protection Agency (EPA) have confirmed their commitment to WQCT through various grant opportunities for market-based approaches, educational and guidance materials, and partnership agreements between NRCS and EPA.

As part of CTIC's efforts to better educate agricultural producers and wastewater treatment operators to the process and benefits of WQCT, customized trainings were held in Ohio, Maryland, and Indiana. All of these states have current or developing trading opportunities for participants. Ohio has already promulgated statewide water quality trading rules, which were used as a framework for WQCT at the pilot workshop and subsequent workshop in Sherrodsville, Ohio. In Maryland, CTIC collaborated with Maryland's Department of Environment (MDE) and Department of Agriculture (MDA) to deliver a workshop that introduced the state's draft trading rules. In Indiana, no statewide rules currently exist, but the feasibility of WQCT is now being tested in the Wabash River watershed through an EPA Targeted Watershed Grant through CTIC.

Workshop Overview

Initial workshop elements were developed through conference calls between project partners prior to the pilot in August of 2008. The project team determined that a two-day workshop would be effective and encourage the greatest amount of participation. The workshop agenda and presentation topics were developed by ETN with input from CTIC. Workshop location, registration, promotion and coordination was led by CTIC. Speaker and content coordination was provided by ETN. Other project partners contributed through workshop promotion.

The morning of the first day of the workshop consisted mainly of presentations. The presentation topics focused on introducing basic market concepts, WQCT background, and program examples. Presentations were delivered by federal and state regulators, local organizations and individuals engaged in WQCT, and national examples from professionals experienced in WQCT.

The afternoon presentations for each of the workshops consisted of breakout sessions that provided specific information from experts in the field of environmental markets for agriculture, wastewater treatment facilities, and potential aggregators. The topics covered by each breakout session (listed in Attachment A) generally included specific information that each trading partner would need to consider before successfully completing a trade. The breakout sessions provided ample time for discussion between the experts and participants. After these sessions, the entire group reconvened to a panel discussion on trading. The question, “*Are you ready to trade?*” was presented to the group. This question provided a lead-in to day two of the workshop.

Day two started with an introduction to regional water quality issues within the Ohio River Basin (or the Chesapeake Bay Watershed, in the case of the Maryland workshop). Speakers at each of the workshops represented a variety of disciplines, including private consulting groups, industry, non-governmental organizations and universities. The second day of the workshop also allowed for a more “hands on” experience in WQCT by allowing participants to role play as different trading stakeholders than they would normally be in real life. The role playing exercise provided a trading scenario that prompted discussions within each stakeholder group. The key trading questions presented at the pilot workshop were:

- What is your preferred trading market structure?
- What structure would you not use?
- At what price would you consider buying (WWTP) or selling (farmers/aggregators)?
- Who do you want to negotiate your trade?
- What do you see as barriers or critical steps to pursue trading opportunities?

Small groups at each workshop convened for several sessions to answer the questions posed in the trading scenario. Each group had two facilitators to record group answers and keep the discussion on track. After each group answered the questions, facilitators reported the answers to the entire group.

The groups were ultimately asked to decide, “Are you ready to trade?”

PILOT WORKSHOP: TROY, OHIO

The first workshop took place in Troy, Ohio on August 19-20, 2008. This training served as a pilot that was evaluated by the participants in order to inform the three remaining workshops. Presentations were led by trading experts from the U.S. and Canada. The 2-day workshop’s interactive “role playing” exercise that asked participants to become stakeholders in the trading process different from their actual roles was very successful based on participant feedback in workshop evaluations. Information from this workshop was summarized in a preliminary report and used to modify future workshops.

Workshop Participation and Results

The pilot workshop had approximately 50 participants and 15 speakers or project partners in attendance. Participants came from several states across the country and were well distributed among agricultural organizations/producers, municipal/industrial point sources, and potential aggregator groups. The agenda for the pilot workshop is presented in Attachment B and includes the speaker names and affiliations.

During the role playing exercise, participants were asked to answer a series of questions regarding preferences in a WQCT framework (trading exercise materials included as Attachment C). Results from the pilot workshop are as follows:

Farmers:

- The aggregator/broker model is the most preferred market structure for trading due to certain constraints in the farmers’ lives, for example, limited time to “figure out” WQCT and the ability of a farmer to put trust in one person/entity.
- The group preferred to use an aggregator with strong agricultural roots and/or someone they personally knew well.
- Price was an issue for the group. Some preferred only to make a profit, while others assumed that a certain level of environmental ethic or pride of one’s land would compel a farmer to lower the price for a credit. The final answer was a range of between \$2.50 - \$12 per credit.
- Barriers to trading that the group discussed were liability for failed practices, time commitment, too few aggregators or brokers, inhibition to government evaluating property, change of commodity prices, land use trends/development driven prices, desired money up front (before BMP is installed), lack of information/education for farmers, need to keep WQCT simple for busy farmers.

- At first the group decided they were not ready to trade until they were more comfortable with contract terms and had some guarantee to pricing, but by the end of the exercise decided they would rely on a trusted broker/aggregator and were ready to trade.

Aggregators:

- The aggregator structure with a municipal broker was the preferred market structure for trading since the direct trading between NPSs and PSs appeared to have too many barriers and transaction costs for both parties.
- The group did not decide on a specific price per unit of credit, but decided that the market should ultimately determine the price. For an aggregator, the price would have to be high enough to cover costs and be in the best interest of the public/tax payer.
- The group decided a champion role is necessary in each broker position in the trading structure chosen.
- Another need for trading to work is communication and education for parties involved and an entity to organize the initial market transactions, certification, verification, etc.
- Two major issues to trading are 1) having the appropriate drivers in place to encourage trading, and 2) assessing the risk involved in aggregating and selling credits.
- After establishing they would be able to perform an assessment of risk as an aggregator and that water quality standards would serve as a driver, the group decided they were ready to trade.

Wastewater:

- The aggregator/broker was the preferred market structure for trading and the group preferred to have the aggregator or broker contract trades with all farmers so that the WWTP did not have to take on this time-consuming task.
- The price of a credit would depend on supply, but the group agreed they would purchase the lowest cost credits they could get. In the short-term, the WWTP might purchase credits that are slightly higher in cost than it would be to upgrade the plant, but in the long-term, the WWTP would only participate in trading if there was a cost savings.
- The group wanted to see a performance guarantee to minimize liability due to BMP failure.
- Another important issue in trading for this group was the ability for individual WWTPs to organize together, forming a larger organization that would represent the individual plants and coordinate trading for the best price, lowest overhead, etc.
- A major objective of all WWTPs is compliance with NPDES permits, so the group wanted to review certain aspects of the trade in-house and then seek outside council to be certain the trade will meet the WWTPs' needs. Additionally, the WWTPs needed verification that the

credits are being generated and certification that credits will apply toward their permit limits.

- After speaking to the entire group, the WWTP group decided they were ready to trade because the state trading rules and program requirements would assure that credits were verified.

Evaluation and Feedback

After evaluating the initial pilot workshop, two changes were made. First, the group breakout sessions in the afternoon of day one were shortened to just two hours, instead of the three-hour allotment used in the pilot workshop. Only the WWTP group used the majority of the three-hour time period and speaker feedback indicated that shortening this session to two hours would provide ample time. Secondly, the five key trading questions were shortened to just three questions for the subsequent workshop. For the Maryland workshop, the questions were changed as follows:

- At what price would you consider buying (WWTP) or selling (farmers/aggregators) credits?
- Who do you want to negotiate your trade?
- What do you see as barriers or critical steps to pursuing trading opportunities?

Workshop Evaluation Summary

Water Quality Credit Trading Workshop

August 19-20, 2008

Troy-Hayner Cultural Center, Troy, Ohio

1. Please indicate your Registration Type: Business 10 Federal Govt. 1
 State Govt. 8 Nonprofit 4 University 4 Other 10 (please explain)
 - Provincial Government (Ontario, Canada)
 - Ontario Government
 - Interstate Agency
 - Municipal
 - Local Government (2)
 - Watershed Conservancy District
 - Local Government-POTW operator
 - Local Government- Watershed
 - Water Surveyor
 - Contract operator for municipal & industrial wastewater treatment plants
2. How are you involved with Water Quality Trading? (General Interest, Planning, Buyer / Seller, Regulator, Technical / Engineering, etc.)
 - Buyer/Seller potentially
 - Current study underway
 - Planning for future regulations

- Voluntary participant
- General Interest (9)
- Developing Ohio River Basin Wide and State Wide Trading programs
- Broker
- Buyer(4)
- Policy/Legislation
- TMDL Development- associated linkages & possibilities
- Regulator (4)
- Planning (5)
- General Engineering Interest
- Seller (4)
- Research
- Technical (7)
- Watershed coordinator
- CCA
- Engineering (5)
- Potential State aggregator
- Market carbon credits/consider P&N

3. How did you first learn about this conference? Mailing 0 Email 18

Colleague 20 Searching Internet 0 Other 2 (please explain)

- Boss
- Forwarded by EPA regional personnel

4. Did this conference meet your expectations? *(please rate on the scale below)*

Fell Short -----Exceeded

1 0 2 1 3 2 4 27 5 6

5. Were you satisfied with the structure/format of this workshop? Yes 35 No 1

If not, what suggestions do you have for the future?

- Room too small
- More time spent on basic concept (too much info too fast)
- Breakout session was too long. Had an hour before the 4pm break
- Too much cheerleading for reverse auction & regional scale option
- The hard copy slides weren't in order or were missing. Would have liked to hear from the Ag & Aggregator Speakers to get a complete understanding
- More Ag groups involved
- Would like to see a hands on workshop
- Dominated discussion in break outs a bit too much

6. What would you like to see addressed at a future training workshop?

- The demand side where is the demand
- Selling opportunities
- Have farmers/producers present who have "trading" BMPs on their land

- Starting with one specific hands on project and have lectures and workshops throughout
- Location was ok, but confusion about parking locations, also the seating arrangement left ½ looking over their shoulders.
- Environmental group perspective on WQ trading
- More state watershed specific with stakeholders needed to initiate WQ trading on a Huc8 Scale
- I really liked the group discussion. Because we got to look at different slides. I never knew aggregators were so on the scene.
- How can an engineering firm help
- Specific examples of a farmer trade to a WWT or power plant
- Establishing baseline
- Latest rule making pertaining to NTP and modules
- Simulated trading scenario with computer program that tracks trades
- Field tour- BMPs implemented
- Monitoring verification methods, analysis of BMP performance

7. Please rate the following:

a. Overall Speaker Quality	<input type="checkbox"/> Excellent 14	<input type="checkbox"/> Very Good 22	<input type="checkbox"/> Good 1	<input type="checkbox"/> Fair 0	<input type="checkbox"/> Poor 0
b. Use of time	<input type="checkbox"/> Excellent 11	<input type="checkbox"/> Very Good 22	<input type="checkbox"/> Good 4	<input type="checkbox"/> Fair 0	<input type="checkbox"/> Poor 0
c. Meeting Facility	<input type="checkbox"/> Excellent 7	<input type="checkbox"/> Very Good 12	<input type="checkbox"/> Good 10	<input type="checkbox"/> Fair 7	<input type="checkbox"/> Poor 1
d. Hotel Accommodations	<input type="checkbox"/> Excellent 5	<input type="checkbox"/> Very Good 11	<input type="checkbox"/> Good 12	<input type="checkbox"/> Fair 1	<input type="checkbox"/> Poor 0
e. Food	<input type="checkbox"/> Excellent 6	<input type="checkbox"/> Very Good 15	<input type="checkbox"/> Good 15	<input type="checkbox"/> Fair 1	<input type="checkbox"/> Poor 0
f. Registration Process	<input type="checkbox"/> Excellent 13	<input type="checkbox"/> Very Good 21	<input type="checkbox"/> Good 3	<input type="checkbox"/> Fair 0	<input type="checkbox"/> Poor 0
g. Value of Workshop (\$)	<input type="checkbox"/> Excellent 19	<input type="checkbox"/> Very Good 17	<input type="checkbox"/> Good 1	<input type="checkbox"/> Fair 0	<input type="checkbox"/> Poor 0

8. Did the conference provide sufficient information on...?

a. Fundamentals of trading	<input type="checkbox"/> Exceedingly 7	<input type="checkbox"/> Fully 24	<input type="checkbox"/> Partially 5	<input type="checkbox"/> Barely 1	<input type="checkbox"/> Not at all 0
b. Trading program examples	<input type="checkbox"/> Exceedingly 6	<input type="checkbox"/> Fully 23	<input type="checkbox"/> Partially 7	<input type="checkbox"/> Barely 1	<input type="checkbox"/> Not at all 0
c. Case study details/materials	<input type="checkbox"/> Exceedingly 6	<input type="checkbox"/> Fully 22	<input type="checkbox"/> Partially 6	<input type="checkbox"/> Barely 1	<input type="checkbox"/> Not at all 0
d. Developing WQT programs	<input type="checkbox"/> Exceedingly 5	<input type="checkbox"/> Fully 16	<input type="checkbox"/> Partially 15	<input type="checkbox"/> Barely 0	<input type="checkbox"/> Not at all 0
e. Different roles in WQT	<input type="checkbox"/> Exceedingly 8	<input type="checkbox"/> Fully 19	<input type="checkbox"/> Partially 10	<input type="checkbox"/> Barely 0	<input type="checkbox"/> Not at all 0

9. Additional Comments:

- State examples were great
- Good conference
- Interesting workshop
- Hand out more materials- or “freebies”. I know they are cheesy but, but they work
- Keep evaluation form short
- Keep work shop to one day
- Too long of evaluation form
- Need coffee ready when people arrive
- A lot of info to absorb in two days
- A lot of repeated info in the presentations
- Better coffee! (I’m reaching for things to improve on.) Strength of the workshop is having players from all sectors present
- I don’t think detailed speaker evaluations are necessary or useful

- Too many unexplained acronyms
- Would have liked a full scenario acted by three people to understand the transitions between parties
- I would have really liked to hear & understand how the aggregator works. The room where most of the conf. was held was a bit difficult. People walking around the room was loud & made it hard to hear the speakers
- A chance for participants to attend all the different breakout sessions
- Many ways to structure could not cover all in detail
- Examples & case studies were good
- The partially part from 8 could be addressed with a more Huc8 focused meeting

(optional) **NAME/ORGANIZATION:**

- Charlie Schafer/Agri Drain
- Dean Yashan/Montana DEQ
- George Mathieus/MT.DEQ
- Doug Wird/Allied Enviromental Group
- Tom Schommer/City of Dayton
- Steve Grossman/OWDA
- Sergio Castillo/Texas A&M University
- Muskingum Watershed Conservancy District
- Todd Teegardim/Montana DEQ
- Dan Towery
- John/Norton Engineering
- VWNA
- Ontario Ministry of Agriculture & food
- David McCartney/DSM
- Schogan/Ohio Farmers Union
- Tammy Clements/City of Dayton

Retention Survey: April 28, 2009

Retention surveys were conducted for the pilot workshop and two of the subsequent workshops. The surveys were meant to evaluate the potential impact of the workshops and measure the practicability of lessons learned.

Water Quality Credit Trading, Troy

Did participation in the Troy, OH Water Quality Credit Trading workshop (Aug. 19-20, 2008) improve your understanding and knowledge of water quality credit trading benefits, processes, and technical issues?

Answer Options	Response Percent	Response Count
Not at all	0.0%	0
Somewhat	47.6%	10
Very much so	52.4%	11

<i>answered question</i>	21
<i>skipped question</i>	0

Did you share the information you gained from the workshop with others?		
Answer Options	Response Percent	Response Count
Yes	85.7%	18
No	14.3%	3
<i>answered question</i>		21
<i>skipped question</i>		0

Have you taken steps to develop a water quality credit trading program or participate in water quality credit trading?		
Answer Options	Response Percent	Response Count
Yes	42.9%	9
No	57.1%	12
<i>answered question</i>		21
<i>skipped question</i>		0

WORKSHOP 1: WYE MILLS, MARYLAND

The second workshop took place in Wye Mills, Maryland, on March 4-5, 2009. This training served as a platform for vetting draft water quality guidance for the MDE and MDA. The draft guidance was evaluated by the participants. Trading experts from the around the country and several State of Maryland representatives presented to the group.

Workshop Participation and Results

The workshop had approximately 50 participants and 13 speakers in attendance. Participants came from several states across the country, although the majority was from Maryland. The participants were well distributed among agricultural organizations/producers, municipal/industrial point sources, and potential aggregator groups. The agenda for the pilot workshop is presented in Attachment D and includes the speaker names and affiliations.

During the role playing exercise, participants were asked to answer the series of questions regarding their preferences for a WQCT program (materials for this exercise included as Attachment E). Results from the workshop are below:

Farmers:

- The pricing of a credit varied within the group, but at first many agreed they would only accept a price just below the cost of the WWTP upgrade costs. Later in discussion, the group started to explore the idea of taking a lower price than just below upgrade costs.
- Farmers preferred individual deals with individual WWTPs and wanted a minimum contract value to participate. The group discussed the possibility of forming a cooperative that would provide a resource to farmers needing to negotiate contracts and come to a consensus on the overall, average price of a credit.
- Farmers wanted the government to calculate credits for each BMP (in order to standardize a credit); they also expected that government would verify the credit.
- Farmers did not want to front the costs for the BMPs and preferred a “reopener” clause in the contracts in order to allow for escalating credit pricing over long-term contracts (10-20 years per draft trading guidance document).
- Farmers wanted the trading policy to better define the aggregator’s role and thought government should play a role in certifying aggregators.
- Farmers felt they were ready to trade at the end of the exercise.

Aggregators:

- In terms of credit pricing, aggregators stated they would do their “homework” on supply and demand in the watershed, utilize cost-share dollars to get as many farmers to baseline as possible, and determine cost per credits on multiple variables; no price range was determined.
- Aggregators preferred large-scale trading volumes, but thought the exercise limited the geographic extent of the watershed in which they could trade.
- They preferred an RFP type process from WWTPs/buyers in order to help define the demand, and help with pricing.
- Possible early incentives might help farmer participation, including paying for the BMP implementation up front.
- Aggregators wanted private buyers to be able to post needed or available credits to the online marketplace to help the aggregator’s role.
- The group determined that government needed to: 1) grandfather existing contracts as policy changes; 2) promote new BMPs by approving Tier II and Tier III BMPs; and, 3) to certify the credit verifiers. The group did not come to a consensus on whether the government should certify aggregators.

- After discussing issues with the larger group, the aggregator group decided they would be ready to trade.

Wastewater:

- In terms of price, the WWTP group was not fixed on a specific price point they would go to, rather they would be willing to pay as much as it takes up to a certain point were growth is deemed “unaffordable.” They were intentional about not sharing a price point with farmers.
- The preference was to trade at scale, but in some cases, to work with local farmers/BMPs. Farmer participation is important and may be a challenge to get steady, reliable supply of credits in first 5-10 years of market start-up.
- WWTPs preferred a competitive bidding structure with an RFP type process, but thought government should set a credit pricing floor to encourage initial participation by farmers.
- WWTPs liked the idea of early buy-in or trading incentives, as well as early incentives for farmers to help grow/stabilize the market. They realized a “reopener” clause may be necessary to negotiate trades with farmers when entering into long-term contracts (10-20 years per guidance).
- Generally, the group wanted more detail about what the proposed trading program from the Department of Environment and Department of Agriculture, yet in the end the group said they were ready to trade.

Evaluation and Feedback

Unlike the other workshops conducted for this project, this workshop provided a platform for the MDE and MDA to introduce draft water quality trading guidance for the state. Several speakers from MDE and MDA were added to the agenda to introduce these, forecast further trading opportunities in Maryland, and provide general feedback to workshop participants. In addition, information from the draft WQCT guidance was incorporated into the role playing exercise on day 2 of the workshop.

Workshop Evaluation Summary
Water Quality Credit Trading Workshop
March 4-5, 2009
Wye Mills, MD

1. Please indicate your Registration Type:

Business	5
Federal	2
State	2
Nonprofit	4

- | | |
|------------|--------------------------|
| University | 1 |
| Other | 7 (all local government) |
2. How are you involved with Water Quality Trading?
- | | |
|---------------------------------------|----|
| Potential aggregator | 1 |
| Buyer | 2 |
| Engineering | 3 |
| Consultant | 1 |
| Potential regulator | 1 |
| Facilitator/educator | 2 |
| General interest | 11 |
| Planning | 6 |
| Policy development | 1 |
| Evaluation | 1 |
| Technical | 4 |
| Role of SCD | 1 |
| Seller | 3 |
| Outreach to farmers to encourage BMPs | 1 |
3. How did you first learn about this conference?
- | | |
|-----------------|----|
| Email | 14 |
| Colleague | 8 |
| Website posting | 1 |
4. Did this conference meet your expectations? (1=fell short, 5=exceeded)
- | | | |
|---|------------|----|
| 1 | Fell short | 0 |
| 2 | | 0 |
| 3 | | 1 |
| 4 | | 16 |
| 5 | Exceeded | 4 |
5. Were you satisfied with the structure/format of this workshop?
- | | |
|-----|----|
| Yes | 18 |
| No | 1 |

Suggestions for the future:

- Cold room!
- Get a grant to provide a national conference!
- Very good interaction and discussion
- Maybe try not to jam so much into day 1? Could have done some presentation Day 2? In the end, it worked, so maybe your experience is that it needs to be this way.
- Propose a short background session and then allow forum/question & answer session
- The open discussions were filled with great questions/comments. This time was more beneficial than the extensive presentations.
- Really enjoyed the format.
- Role play great idea. Found it difficult to fully or effectively participate due to lack of knowledge (treatment plant).

6. What would you like to see addressed at a future training workshop?

- Start from the beginning and spend more time on the background of the trading concept of split the workshop into 2 levels; introduction and practical
- Work through a couple examples of calculations worksheets.
- N/A—good mix of info/participation
- Try to use real watershed farmers and WWTP to look at real numbers.
- Full examples of actual trades.
- The MD policies should have been clearly defined before we discussed so much arbitrary items.
- Maybe some examples from other eco-system services markets regarding aggregation, developing markets, trading/banking mechanisms
- Maybe a case study in a specific watershed
- Details of case studies, examples
- More specific prices, discussion of BMPs, resources for individual watersheds (to find specific nutrient loads, etc.)
- More focus on strategy to get the various players into the trading market. More info on how future regulations will push players into the market and create demand.

7. Please rate the following:

a. Overall speaker quality:

Excellent	6
Very Good	15
Good	0
Fair	0
Poor	0

b. Use of time:

Excellent	4
Very Good	11
Good	5
Fair	1
Poor	0

c. Meeting facility:

Excellent	3
Very Good	12
Good	5
Fair	1 (Cold!)
Poor	0

d. Hotel accommodations:

Excellent	0
Very Good	7
Good	1
Fair	0
Poor	0

e. Food:

Excellent	4
Very Good	8
Good	9
Fair	0
Poor	0

f. Registration process:

Excellent	5
Very Good	9
Good	5
Fair	0
Poor	0

Provide more location detail/map. Building Name, Room #
Letter of confirm. Helpful/receipt needed.

g. Value of workshop (\$)

Excellent	7
Very Good	13
Good	1
Fair	0
Poor	0

8. Did the conference provide sufficient information on:

a. Fundamentals of trading:

Exceedingly	4
Fully	12
Partially	5
Barely	0
Not at all	0

b. Trading program examples:

Exceedingly	0
Fully	13
Partially	8
Barely	0
Not at all	0

c. Case study details/materials:

Exceedingly	0
Fully	12
Partially	8
Barely	1
Not at all	0

d. Developing WQT programs:

Exceedingly	1
Fully	13
Partially	7
Barely	0
Not at all	0

e. Different roles in WQT:

Exceedingly	2
Fully	16

Partially	3
Barely	0
Not at all	0

Additional Comments:

- Thanks very much! Good job to organizers. Hope to get speakers to come to my jurisdiction as we develop process.
- Use microphone.
- The disparity between TMDLs and Trib Strategy goals created good discussion—could have continued and learned more.
- Very good and very professionally done. Nice to see some real facilitation.
- Very good information on the MD trading program.
- Would like more info on baseline assessment for farmers at the watershed level.

Retention Survey: July 16, 2009

Did participation in the Wye Mills, MD Water Quality Credit Trading workshop (March 4-5, 2009) improve your understanding and knowledge of water quality credit trading benefits, processes, and technical issues?		
Answer Options	Response Percent	Response Count
Not at all	0.0%	0
Somewhat	54.5%	6
Very much so	45.5%	5
<i>answered question</i>		11
<i>skipped question</i>		0

Did you share the information you gained from the workshop with others?		
Answer Options	Response Percent	Response Count
Yes	81.8%	9
No	18.2%	2
<i>answered question</i>		11
<i>skipped question</i>		0

Have you taken steps to develop a water quality credit trading program or participate in water quality credit trading?		
Answer Options	Response Percent	Response Count
Yes	45.5%	5
No	54.5%	6
<i>answered question</i>		11
<i>skipped question</i>		0

WORKSHOP 2: SHERRODSVILLE, OHIO

This workshop took place in Sherrodsville, Ohio, at Atwood Lake Lodge on July 8-9, 2009. This workshop served as a general training on WQCT in a different part of the State of Ohio from the pilot workshop. The location was selected to draw participants from both the Ohio River Basin area in the southeast portion of the state and participants working in the Lake Erie Watershed to the north. Presentations were led by trading experts involved in WQCT in Ohio and from around the country in order to highlight interstate and national trading projects.

Workshop Participation and Results

The workshop had approximately 24 participants and 12 speakers in attendance. Participants came from several states within the region and attracted participants from West Virginia, Texas, Pennsylvania, and California, in addition to participants from Ohio. The participants were well distributed among agricultural organizations/producers, municipal/industrial point sources, and potential aggregator groups. Soil and Water Conservation Districts from Ohio were well represented at this workshop. The agenda for the workshop is presented in Attachment F and includes speaker names and affiliations.

During the role playing exercise, participants were asked the series of questions regarding their preferences for a WQCT program (these exercise materials are included as Attachment G). Results from the workshop are as follows:

Farmers:

- Farmers had several concerns before determining whether they would participate in trading. They felt they needed to consult someone they trust and wanted to have a guarantee that trading policy and conditions would not change during their trading contracts.
- Farmers also wanted assurance that they would not be regulated for participating in trading and preferred to get technical assistance in order to start participating in trading (ultimately paid for as part of their trading agreement).
- Farmers wanted to know what risk they would be assuming, how their credits would be verified, and they needed flexibility in program participation.
- They preferred a system that would allow for both trading through an aggregator and direct trading by each individual farmer.
- Farmers did not want to participate in a trading program that was not already developed, although with the right early incentives, they would consider early trading with incentives.

- In terms of payment for credit generation, farmers wanted upfront payments for BMPs and annual installments over the life of the contract.
- After discussing the early issues farmers had with the entire group, they decided they were ready to trade with the right technical assistance.

Aggregators:

- In terms of credit pricing, aggregators stated they would work to find the cheapest credits first, which would drive down the price per credit. They wanted to meet with the buyers (WWTPs) to determine if they had requirements/concerns that would affect pricing (e.g., preference for local credits to emphasize local community benefit to trading program).
- Aggregators thought credit price would be influenced by their “business” costs or transaction costs, overhead, etc. In the end, they predicted a credit would cost between \$6-9.99 to generate and sell on the market.
- Aggregators were generally interested in longer-term credits and trading in higher volumes of credits, which would bring prices down.
- Aggregators argued that the trading program needed a third party to manage risk for both buyers and sellers and this aggregator would assume most of the liability for the transaction. Potential aggregators included SWCDs, agribusinesses, consultants, etc.
- Aggregators thought some sort of centralized clearinghouse might be appropriate in the watershed described in the exercise, although they concluded that a clearinghouse might have to develop secondary to the initial market development.
- The major barriers to trading for the aggregator group included: convincing buyers/sellers of aggregators’ value; evaluating and understanding all of the risks; discovering price through assessment of demand and supply; gauging the future potential of market; developing contract language; determining credit contract length; and, externalities in addition to credit price.
- Aggregators were ready to trade early on with the concept that they were providing a valuable and necessary service in a trading market.

Wastewater:

- In terms of pricing, the WWTP group determined they would pay between \$6-10 per credit.
- Considerations the WWTP group had before participating in trading included: being involved in the WQCT planning process, need for an insurance pool of credits, desire for the aggregator group to assume risk and assure credits will be there for life of contract; and, would prefer government covers a portion of the planning costs with federal/state funding.
- The WWTP group wanted a good monitoring plan, good verification of credits, and a trading program plan that was both politically and scientifically acceptable.

- WWTPs may need a market feasibility study to determine if trading will work for them in the long-term and participating in a pilot project may be of interest to the group.
- In terms of a market or trading structure, the group determined that they do not care what structure they use to trade, they want the lowest priced credit. They also wanted to evaluate risk in trading over time and will need to build public support for the trading plan/program before moving forward.
- The group was ready to trade if the price was not higher than traditional WWTP upgrade costs.

Evaluation and Feedback

The format and agenda for this workshop was very similar to the first pilot workshop, except that the role playing exercise used the three shorter key trading questions from Maryland. The role playing exercise was adapted from the Maryland workshop to include Ohio trading rule information and was specific to the Muskingum River watershed setting. Additionally, the role playing exercise was modified by consolidating the small group breakouts into two instead of three sessions in the afternoon on day two.

Workshop Evaluation Summary

Water Quality Credit Trading Workshop

July 8-9, 2009

Sherrodsville, OH

1. Please indicate your Registration Type: Business Federal Govt.
 State Govt. Nonprofit University Other (please explain)

Business=3 ; Fed Govt.=2; State Govt=5; Nonprofit=3; University=4

2. How are you involved with Water Quality Trading? (General Interest, Planning, Buyer / Seller, Regulator, Technical / Engineering, etc.)

General Interest=12; Planning=4; Buyer/Seller=2; Regulator= 1; Tech/Eng=2; Research=1

3. How did you first learn about this conference? Mailing Email Colleague Searching Internet Other (please explain)

Mailing= 0; E-mail=10; Colleague=2; Searching internet=2; Other=1 (Professor)

4. Did this conference meet your expectations? *(please rate on the scale below)*

Fell Short -----Exceeded

1 2 3 4 5

1: 0 2: 0 3: 1 4: 9 5: 6

5. Were you satisfied with the structure/format of this workshop? Yes No YES=15 NO=1

If not, what suggestions do you have for the future:

- I think a simple introduction explaining the concept of what WQT Points were should have been done. I needed to have more explanation before hearing rules & regulations from EPA. It took me quite a while to figure out what WQT was. I needed this intro to grasp everything else.
- Maybe make the speaker times shorter, due to retention luls.

6. What would you like to see addressed at a future training workshop?

- Implementation of trading from the ground up. Basically how to get trading going in our area.
- At my level of knowledge this was very informative
- Importance of a pilot program in different areas
- New and emerging other areas where trading is possible. Discuss also a short presentation on ps to ps trading.
- Maybe start off the workshop with some of the basic information or the concept and how it works.
- Explain how specific BMPs work (e.g. cost of BMP to implement and yield of reduction)
- Since I am most interested in how to set up a WQT system, more info on steps to take in establishing such a program with a programmer would be great, but I got a good basis of info.
- I could not understand how initial permits are distributed among the polluters, explanation about some economic issues
- More examples of successful programs
- Panel of actual participants of trading
- The examples of the process were helpful

7. Please rate the following:

h. Overall Speaker Quality	8 Excellent	9 Very Good	0 Good	0 Fair	0 Poor
i. Use of time	5 Excellent	10 Very Good	1 Good	1 Fair	0 Poor
j. Meeting Facility	8 Excellent	7 Very Good	2 Good	1 Fair	0 Poor
k. Hotel Accommodations	2 Excellent	7 Very Good	5 Good	0 Fair	0 Poor
l. Food	0 Excellent	7 Very Good	8 Good	1 Fair	0 Poor
m. Registration Process	8 Excellent	6 Very Good	3 Good	0 Fair	0 Poor
n. Value of Workshop (\$)	10 Excellent	7 Very Good	0 Good	0 Fair	0 Poor

8. Did the conference provide sufficient information on...?

- a. Fundamentals of trading 6 Exceedingly 6 Fully 5 Partially 0 Barely 0 Not at all
- b. Trading program examples 7 Exceedingly 10 Fully 0 Partially 0 Barely 0 Not at all
- f. Case study details/materials 10 Exceedingly 6 Fully 1 Partially 0 Barely 0 Not at all
- g. Developing WQT programs 2 Exceedingly 13 Fully 1 Partially 1 Barely 0 Not at all

h. Different roles in WQT all

3 Exceedingly 10 Fully 4 Partially 0 Barely 0 Not at

9. Additional Comments:

- Excellent workshop
- Learned much more than expected
- Overall informative workshop
- Sparked many ideas for WQT in TX
- Liked the format
- Enjoyed workshop - got excited as this is a definite possibility for my area

Retention Survey: September 21, 2009

Did participation in the Sherrodsville, OH Water Quality Credit Trading workshop (July 10-11, 2009) improve your understanding and knowledge of water quality credit trading benefits, processes, and technical issues?		
Answer Options	Response Percent	Response Count
Not at all	0.0%	0
Somewhat	20.0%	2
Very much so	80.0%	8
<i>answered question</i>		10
<i>skipped question</i>		0

Did you share the information you gained from the workshop with others?		
Answer Options	Response Percent	Response Count
Yes	88.9%	8
No	11.1%	1
<i>answered question</i>		9
<i>skipped question</i>		1

Have you taken steps to develop a water quality credit trading program or participate in water quality credit trading?		
Answer Options	Response Percent	Response Count
Yes	30.0%	3
No	70.0%	7
<i>answered question</i>		10
<i>skipped question</i>		0

WORKSHOP 3: INDIANAPOLIS, INDIANA

The final workshop took place in Indianapolis, Indiana, on August 26-27, 2009. This workshop served as a general training on WQCT in Indiana and surrounding states due to the developing potential for trading opportunities in the area. Participants from this workshop were asked to complete an evaluation form from the workshop in order to provide feedback to presenters and project partners. Presentations were led by trading experts involved in WQCT around the country in order to highlight interstate and national trading projects and opportunities.

Workshop Participation and Results

This workshop had approximately 20 participants and 10 speakers in attendance. Approximately half of the participants were from Indiana, with the other half coming from different states around the country. The participants were not as well distributed among different groups, with the majority representing government, private consulting/agribusiness firms, and NGOs. A few representatives were present from municipalities and one farmer from Ohio attended the workshop. The agenda for the workshop is presented in Attachment H and includes speaker names and affiliations.

During the role playing exercise, participants were asked to answer a series of questions regarding preferences in a WQCT framework (trading exercise materials included as Attachment I). Results from the workshop are as follows:

Farmers:

- Farmers had several concerns/questions they needed addressed before they would participate in a trading program, including: who takes on the liability for the credits; will the program be flexible for farmers; can farmers still participate in cost-share/farm bill programs; and, can credits be generated from older BMPs.
- Farmers wanted to know more about price discovery of a credit or pound of reduction. Other concerns over cost were whether the buyer would cover time/costs to negotiate trade, are WWTPs buying the credits or the practice, etc.
- Farmers felt they needed to gain a better understanding of what their credit or pound of generation potential was (perhaps using the local SWCD for technical assistance).
- At first farmers decided they would represent themselves in trading and not rely on an aggregator. They agreed a clearinghouse might work best with individual farmers negotiating trades. In the end, some of them would consider using an aggregator.
- Contract length was an important issue for farmers, wanting to be paid over several years, but uncertain if 10+ year contract would work for them.
- In the end, the farmer group decided they were ready to trade.

Aggregators:

- Aggregators put a range of prices on the combined credit from \$6.00-9.99 (just below what it would cost to purchase from the existing WWTP with credits).
- The aggregators decided they would cater to the WWTPs by meeting with them to determine their needs/concerns. The credit supply seemed more than ample in the watershed, so supply should be easy to secure.
- Aggregators were generally interested in longer-term credits and trading in higher volumes of credits, which would bring prices down.
- Aggregators argued that the trading program needed a third party to manage risk for both buyers and sellers and this aggregator would assume most of the liability for the transaction. Potential aggregators included SWCDs, agribusinesses, consultants, etc.
- The group decided that they preferred the government to require certification for aggregators, and that high standards could be expected, which would benefit trading.
- In the end, the aggregator group was ready to trade.

Wastewater:

- The WWTP group recognized the need to have a diverse portfolio of BMPs for credit assurance. They were also concerned about liability and who would assume this if BMPs failed or did not deliver credits.
- The group considered a buyers coalition or association to eliminate competition and stabilize the price of a credit.
- The WWTP group wanted trading rules to be established, and preferred that the WWTPs were involved in this process, but not the lead.
- The group had several barriers to trading that they identified, including: needing assurance; wanting control over where the credits come from; limited liability on their behalf; a buffer between buyer and seller; and, punitive damages in contract terms.
- For pricing, they wanted a low credit price, but also required assurance and insurance that credits would be delivered.
- The WWTP group was ready to trade if the price of a credit was lower than upgrade costs and proper insurance of credits was in place.

Evaluation and Feedback

The final WQCT workshop held in Indianapolis, Indiana, was similar to the Sherrodsville workshop, but focused more specifically on the Ohio River Basin and future potential for WQCT. Speakers with

experience in program development were included on the agenda because Indiana has not developed statewide WQCT rules.

This evaluation was emailed to participants after the workshop. It was shortened from the earlier evaluation form formats to increase the response rate. Unfortunately, the response rate was rather low.

Please indicate your registration type:		
Answer Options	Response Percent	Response Count
Business	50.0%	2
Federal Government	0.0%	0
State Government	25.0%	1
Nonprofit	25.0%	1
University	0.0%	0
Other	0.0%	0
Other (please specify)		0
<i>answered question</i>		4
<i>skipped question</i>		0

Answer Options	Response Percent	Response Count
Mailing	0.0%	0
Email	50.0%	2
Colleague	50.0%	2
Searching internet	0.0%	0
Other	0.0%	0
Other (please specify)		0
<i>answered question</i>		4
<i>skipped question</i>		0

Were you satisfied with the structure/format of this workshop?		
Answer Options	Response Percent	Response Count
Yes	100.0%	4
No	0.0%	0
If not, how could we improve?		1
<i>answered question</i>		4
<i>skipped question</i>		0

Please rate the following:						
Answer Options	Excellent	Very Good	Good	Fair	Poor	Response Count

Overall Speaker Quality	1	2	1	0	0	4
Use of Time	1	2	1	0	0	4
Meeting Facility	2	2	0	0	0	4
Hotel Accommodations	1	0	0	0	0	1
Food	1	2	0	0	0	3
Registration Process	1	2	1	0	0	4
Value of Workshop	2	0	2	0	0	4
<i>answered question</i>						4
<i>skipped question</i>						0

Did the conference provide sufficient information on...?						
Answer Options	Exceedingly	Fully	Partially	Barely	Not at all	Response Count
Fundamentals of trading	1	3	0	0	0	4
Trading program examples	1	2	1	0	0	4
Case study/details/materials	1	3	0	0	0	4
Developing trading programs	1	0	3	0	0	4
Different roles in trading	1	2	1	0	0	4
<i>answered question</i>						4
<i>skipped question</i>						0

Retention Survey: not performed due to project end date.

CONCLUSIONS

The WQCT trainings developed and delivered as part of this project directly educated over 160 individuals in the agricultural and water quality sectors. Many others in these sectors were educated indirectly by the workshop participants, as many noted in their evaluations that they shared information about the trainings with colleagues. In particular, Soil and Water Conservation District and Certified Crop Advisors that attended the workshop are now able to share information they learned at these workshops. With the knowledge they gained, District personnel and CCAs can help farmers and others understand trading, which results in further education of potential trading stakeholders. In addition, staff members from different government departments (agriculture and environment) that participated in workshops as speakers were able to learn from other individuals involved in WQCT around the country and solicit feedback from potential stakeholders. A long-term result of the project training should be increased participation in WQCT programs in Ohio, Maryland and Indiana due to the general education, awareness, and capacity-building these workshops promoted.

Workshop Benefits and Transferability of Results

The benefits of these workshops were two-fold -- educating individual participants on WQCT and

increasing awareness and interest in local and regional WQCT programs. The workshops were designed to provide several benefits to participants. Each workshop included a group of speakers who have relevant, expert information on WQCT as well as local program examples and national examples to showcase different trading program elements and requirements (see Attachment J for speaker biographies). Workshop participants were encouraged to interact with expert speakers and ask questions to gain knowledge from this resource. Further, the workshops created a forum for participants to interact with other potential trading stakeholders. The interactive sessions, on day two especially, provided this much-needed capacity building and interaction between nonpoint sources, point sources, and potential aggregators. The role playing trading exercise brought together diverse, interdisciplinary groups that engaged in a collaborative process to answer key questions about trading (see individual workshop summaries).

In addition to educating individuals and providing a platform for interaction between stakeholder groups, the workshops benefit regional WQCT programs by promoting trading through increased interest of engaged participants. Now that workshop participants understand how trading works and have explored other stakeholder concerns and priorities, they can educate others about WQCT and increase interest in developing viable trading programs within their local watersheds. Thirty-five of the forty-one participants, or approximately 85% of the participants who responded to the follow-up survey, noted they had shared information with co-workers and colleagues.

Future Training Needs

The workshop's basic format has been fine-tuned to provide a quality training experience for those seeking a basic understanding of water quality trading, and could be transferred to any area in the U.S.

Many of the participants in the four workshops conducted through this grant expressed interest in having a similar workshop in their area. In general, the workshop would be useful in the Mississippi River Basin, outside of the Ohio River Basin (which was already covered as part of this grant project). In particular, stakeholders in Illinois would like to have the same WQCT workshop conducted in their state. Workshops in these locations would provide educational information and capacity-building for stakeholders developing market-based programs through the latest round of EPA Targeted Watershed Grants.

In addition to workshop opportunities, participants may require future training on the specifics of WQCT program development. The format for such training will not likely be a workshop, but rather require working meetings with involved stakeholders to determine specific programmatic components.

ATTACHMENT A

Workshop Breakout Session Topics

Breakout Session Topics by Group

The afternoon sessions for all workshops focused on three breakout groups: wastewater, agriculture, and potential aggregators. These sessions provided information from experts in the field of environmental markets and provided ample time for questions and answers for the participants. General topics covered by the breakout presenters are listed:

Wastewater:

- Principles of regulatory requirements
- Permit requirements
- Estimation of credits/generated and potential demand
- Discussion on where trading works
- Types of trading to consider/examples
- Important trading issues for WW community
- Trade design
- Potential trading partners
- Minimizing uncertainty and associated costs
- Trading and NPDES permits
- Managing Risk
- Trading contracts/examples

Agriculture:

- Basic trading guidance (CTIC manual)
- Point source to nonpoint source trading
- Requirements for market success
- Water quality and nutrient sources
- WQT legislation
- Method of capping discharges
- South Nation Conservation procedures/examples
- Trading and price certainty
- Generating P credits by BMPs
- Agricultural concerns

Aggregators:

- Global and local WQT examples
- Input paradox for farmers
- Added incentives/stacking: AFT's BMP challenge & WQCT
- Enhanced nutrient BMP challenge
- Red Barn Trading company history (as credit aggregator)
- Pennsylvania nutrient trading program
- The role of the aggregator
- Types of credit generating practices

ATTACHMENT B

Pilot Workshop Agenda

Water Quality Credit Trading Workshop
August 19-20, 2008
Troy, Ohio

Day 1

8:00 am	Registration	Karen Scanlon, CTIC
8:30-9:30 am	WQCT Overview	Tom Davenport, EPA Region 5
	Workshop Overview	Mark Kieser, ETN
9:30-10:15 am	WQCT Rules Specific to Ohio	Gary Stuhlfauth, OEPA Division of Surface Water
10:15-10:35 am	BREAK	
10:35-11:15 am	Benefits & Obstacles in WQCT	Dusty Hall, MCD
11:15-12:00 pm	WQCT Program Examples	Mark Kieser, ETN
12:00-1:00 pm	LUNCH	
1:00-4:00 pm	Breakout Sessions	
	Agricultural Producers	Sarah Hippensteel, MCD Dennis O'Grady, South Nation Cons. Auth.
	Wastewater Community	Cy Jones, World Resources Institute Jim Klang, Kieser & Associates, LLC
	Aggregators and CCAs	Briand Brandt, American Farmland Trust Peter Hughes, Red Barn Trading Company
4:00-4:15 pm	BREAK	
4:15-4:50 pm	Q&A Panel with Presenters	All Presenters
4:50-5:00 pm	Overview and Wrap up	Mark Kieser, ETN

Water Quality Credit Trading Workshop
August 19-20, 2008
Troy, Ohio

Day 2

8:30-8:45 am	Welcome & Review Day 1	Mark Kieser, ETN
8:45-9:30 am	Introduction to Ohio River	Mark Kieser, ETN
	Water Quality Issues	Tim Lohner, American Electric Power
9:40-10:25 am	Exercise for Ohio River	Mark Kieser, ETN
10:25-10:45 am	BREAK	
10:45-11:45 am	Small Group Report	Facilitated Discussion
11:45-1:00 pm	LUNCH	
1:00-2:00 pm	Issues for Trading - Answers	Facilitated Discussion
2:00-2:20 pm	BREAK	
2:20-2:50 pm	Small Group Discussion	Facilitated Discussion
	“Are you Ready to Trade?”	
2:50-3:30 pm	Groups Report - Q&A Session	All Presenters
3:30-4:00 pm	Workshop Wrap Up	Mark Kieser, ETN Karen Scanlon, CTIC

ATTACHMENT C

Troy Trading Exercise

Ohio Water Quality Trading Exercise

- **WQT Driver:** Instream nutrient standards set by states will result in new permit limits on point sources. State of Ohio standards will be set first along with main stem of the Ohio River. This will affect POTWs in Ohio and power plants on the Ohio River.
- **Pollutants:** Total Nitrogen and Total Phosphorus.
- **New NPDES permit limits WILL BE IN PLACE** in two years (5 mg/l TN; 1 mg/l TP) which will require expensive capital upgrades to Biological Nutrient Removal (BNR). (No loading reductions are required from other sources.) Municipal WWTPs will need to reduce TN and TP. Power companies will need to reduce TN.
- **Loads:**
 - 50 PSs: 40% of TN/TP
 - NPSs: Ag 40% of TN/TP loads; Urban 10% of TN/TP
 - Other (natural background, wetlands, forests): 10% TN/TP
- Water quality data are sufficient to have characterized current conditions.
- **Cost data:**
 - WWTP BNR/other upgrade costs \$12-100/lb TP/TN
 - Agricultural BMP costs \$2.50/lb TP/TN
 - Urban BMP costs \$800/lb TP/TN
 - Administrative trading program costs (varies by program type)
- Stakeholder Groups: there is a loosely organized, ad hoc watershed group that is underfunded and staffed by volunteers. Municipal wastewater treatment plants in the watershed do not routinely communicate. Agricultural participation varies from county to county depending on funding levels at the local soil and water conservation districts.
- Water quality trading rules are in place that allow for PS/PS trading at 1.1:1 to and PS/NPS trading at 2:1.
- Trading program rules allow for establishment of flexible, local trading plans to accommodate stakeholder interests and compliance needs.
- Credits used by PSs must be obtained from upstream sources.

Ohio River Group Questions:

1. What is your preferred trading market structure?
2. What structure would you not use?
3. At what price would you consider buying (WWTPs) or selling (farmers and aggregators)?
4. Who do you want to negotiate your trade?
5. What do you see as barriers or critical steps to pursue trading opportunities?

ATTACHMENT D

Maryland Workshop Agenda

Water Quality Credit Trading Workshop
March 4-5, 2009
Chesapeake College Higher Education Center
Wye Mills, MD

Day 1

8:00-8:30 am	Registration	Christa Martin-Jones, CTIC
8:30-9:10 am	Overview of WQCT	First Last Name, USEPA, Region ?
	WQCT - National Perspective	Mark Kieser, Environmental Trading Network
9:10-10:10 am	Benefits & Obstacles in WQCT	George Kelly, Environmental Banc & Exchange Cy Jones, World Resources Institute
10:10-10:20 am	BREAK	
10:20-11:15 am	WQCT Program in MD - Point Source and Nonpoint Source	Steve Luckman, MD Dept of Environment John Rhoderick, MD Dept of Agriculture
11:15-12:00 pm	NutrientNet - MD's Web Based Trading Tool	Mindy Selman, WRI
12:00 - 1:00 pm	LUNCH	
1:00-2:30 pm	Breakout Sessions:	
	Agricultural Producers	Bob Ensor, Howard Co. Conservation District Gerald Talbert, MD Association of CDs
	Wastewater Community	Jim Klang, Kieser & Associates, LLC Cy Jones, WRI Steve Luckman, MDE
	Credit Aggregators	Brian Brandt, American Farmland Trust George Kelly, EBX
2:30-3:00 pm	BREAK	
3:00-4:15 pm	Q&A with Speaker Panel	All Presenters
4:15-4:45 pm	Overview & Wrap up: Are you Ready to Trade?	Mark Kieser, ETN
4:45-5:00 pm	Day 2 Preview	Mark Kieser, ETN
5:30-6:30 pm	Social Hour	Sponsor: American Farmland Trust

Water Quality Credit Trading Workshop
March 4-5, 2009
Chesapeake College Higher Education Center
Wye Mills, MD

Day 2

8:30-8:45 am	Welcome & Review of Day 1	Mark Kieser, ETN
8:45-9:30 am	Introduction to MD Water Quality Issues	Cy Jones, WRI
9:30-10:00 am	Trading Exercise - Introduction Small Group Discussion Questions	Mark Kieser, ETN
10:00-10:15 am	BREAK	
10:15-11:15 am	Small Group Breakout: Trading Exercise	Facilitated Discussion
11:15-12:00 pm	Small Groups Report Answers from Exercise Questions	Facilitated Discussion
12:00-1:00 pm	LUNCH	
1:00-1:45 pm	Small Groups Reconvene	Facilitated Discussion
1:45-2:30 pm	Small Groups Report Out on Ready to Trade & Barriers	Facilitated Discussion
2:30-2:45 pm	BREAK	
2:45-3:15 pm	Small Groups Reconvene to Finalize Answer on Ready to Trade	Facilitated Discussion
3:15-3:50 pm	Groups Report Out - Are You Ready to Trade?	Facilitated Discussion
3:50-4:00 pm	Workshop Wrap Up	Mark Kieser, ETN Christa Martin-Jones, CTIC

ATTACHMENT E

Maryland Trading Exercise

Maryland Water Quality Trading Exercise

- Scenario: PS-NPS trading for 8 new/expanding WWTPs
- WQT Driver: Loading caps on new discharges are creating demand as these caps require offset for all new and expanding discharges
- Pollutants being capped: TN and TP
- New/expanding sources: Not being permitted unless they can meet the load reduction cap with offsets (potentially caps growth)
- Compliance options: NPS credit offsets for new loads using Tier 1 BMPs
- Water quality data: Sufficient to have characterized current conditions. No local TMDLs, only tributary strategy.
- Costs data:
 - WWTP costs, why does it matter/offset required?
 - Agricultural BMP cost, \$4/lb TP/TN
 - Urban BMP cost, \$8,000-12,000/lb TP/TN
 - Administrative trading program costs included in costs/lb
- Stakeholder groups:
 - Watershed organizations, but are volunteers
 - Limited historical interaction amongst farmers/developers/WWTPs
 - SWCDs with technical staff, but not trained on trading tools
 - Ag participation with SWCDs varies from county to county
 - Private CCAs/third parties are in MD with WQT assistance capabilities
- Agricultural baseline: Farmers interested in participating are 25% below trading baseline per tributary strategy, but interested in possible participation.
- Water quality trading guidance: Guidance is in place that allows for PS/NPS trading at 1.05:1 for Tier 1 BMPs.
- Credits: Those used by PSs are obtained from immediately upstream sources.
- No credit discounting: Distance ratio yield 100% delivery of NPS loads (for simplicity).

Breakout Group Questions:

1. At what price would you consider buying (WWTP) or selling (farmers and aggregators)?
2. Who do you want to negotiate your trade?
3. What do you see as barriers or critical steps to pursue trading opportunities?

Are you ready to trade?

ATTACHMENT F

Sherrodsville, OH Workshop Agenda

Water Quality Credit Trading Workshop

July 8-9, 2009

Atwood Lake Resort & Conference Center

Sherrodsville, OH

Day 1

8:00 am	Registration	Christa Martin-Jones, CTIC
8:25-8:30 am	Welcome	Christa Martin-Jones, CTIC
8:30-9:00 am	Water Quality Credit Trading Introduction	Thomas Davenport, USEPA, Region 5
9:00-9:30 am	Overview & Objectives National Perspective	Mark Kieser, Environmental Trading Network (ETN)
9:30-10:15 am	Ohio WQCT Rules	Gary Stuhlfauth, OEPA Div. of Surface Water
10:15-10:30 am	BREAK	
10:30-11:15 am	Ohio WQCT Program Example	Dusty Hall, Miami Conservancy District (MCD)
11:15-12:00 pm	Benefits & Obstacles in WQCT	George Kelly, Environmental Banc & Exchange
12:00 - 1:00 pm	LUNCH	
1:00-1:30 pm	Credit Demand & Potential Buyers	Tim Lohner, American Electric Power
1:30-3:30 pm	Breakout Sessions: Agricultural Producers Wastewater Community Potential Aggregators	Sarah Hippensteel, MCD Mark Kieser, ETN Jim Klang, K&A Gary Stuhlfauth, OEPA Brian Brandt, American Farmland Trust George Kelly, EBX
3:30-3:50 pm	BREAK	
3:50-4:30 pm	Q&A with Speaker Panel	All Presenters
4:30-5:00 pm	Overview & Wrap up: Are you Ready to Trade?	Mark Kieser, ETN
5:30-6:30 pm	Social Hour	

Water Quality Credit Trading Workshop
July 8-9, 2009
Atwood Lake Resort & Conference Center
Sherrodsville, OH

Day 2

8:30-9:00 am	Review of Day 1 and Forecast Day 2	Mark Kieser, ETN
9:00-9:45 am	Sugar Creek WQCT Example	Richard Moore, OSU
9:45-10:15 am	Greene Co. WQCT Example	Kristen Risch, Malcolm Pirnie, Inc.
10:15-10:45 am	Introduction to New WQCT Opportunities	Mark Kieser, ETN
10:45-11:00 am	BREAK	
11:00-11:15 am	Trading Exercise - Introduction Small Group Discussion Questions	Mark Kieser, ETN
11:15-12:00 pm	Small Group Breakout: Trading Exercise	Facilitated Discussion
12:00-1:00 pm	LUNCH	
1:00-1:45 pm	Small Groups Report Answers from Exercise Questions	All Presenters
1:45-2:45 pm	Small Groups Reconvene to Answer: Are you Ready to Trade?	Facilitated Discussion
2:45-3:00 pm	BREAK	
3:00-3:30 pm	Small Groups Report Out	All Presenters
3:30-4:00 pm	Open Discussion on "What Information do you Need to Trade?"	All Presenters
4:00-4:15 pm	Workshop Wrap Up	Mark Kieser, ETN Christa Martin-Jones, CTIC

ATTACHMENT G

Sherrodsville Trading Exercise

CTIC – Ohio WQT Workshop – July 8-9, 2009

Role-playing Trading Exercise: Assumptions

- **Setting:** Muskingum Watershed (tributary to the Ohio River)
- **Scenario:** Eight WWTPs must consider expensive upgrades to Biological Nutrient Removal Technology (BNR) at a cost of \$20 per combined pound of TP and TN.
- **WQT Driver:** New water quality standards for TP and TN require WWTP upgrades.
- **Pollutants being capped:** Total Nitrogen and Total Phosphorus
- **Compliance options:**
 - Upgrade to BNR
 - Purchase trading credits from:
 1. *NPS agricultural credits (unlimited supply and location at \$3/combined pound)*
 2. *PS credits from a 9th WWTP upstream of all others that already upgraded to BNR (with a limited number of credits at \$10/combined pound).*
- **Water quality data:** Sufficient to have characterized current water quality conditions. No local TMDLs apply, therefore NO non-point source baseline requirements exist.
- **Stakeholder Groups:**
 - There is a history of cooperation in the watershed.
 - There is a Conservancy District in place.
 - Soil Conservation Districts (SCDs) with available technical staff.
 - Ag participation with SCDs varies from county to county.
 - Private CCAs, other third parties are available to offer assistance capabilities.
- **Water Quality Trading Rules:** State-wide rules in place that allows for:
 - PS/NPS trading at 2:1
 - PS/PS trading at 1:1
 - There is NO watershed trading plan yet in place (as required by rules).
- **Credits:** Those used by WWTPs are obtained from upstream sources.
- **No Credit Discounting:** Distance ratios yield 100% delivery of NPS loads (*for simplicity*).

THREE KEY QUESTIONS:

1. At what price would you consider buying (WWTPs) or selling (farmers and aggregators)?

2. Who do you want to negotiate your trade?

Options...

Direct contracts: buyers to sellers

Brokers: third parties that bring trading partners together

Aggregators: third parties that collect trading credits and sell in bulk to buyers

Central Credit Clearinghouse: Manages all trades but allows for aggregators

3. What do you see as barriers or critical steps to pursue trading opportunities?

ATTACHMENT H

Indianapolis Workshop Agenda

Water Quality Credit Trading Workshop
August 26-27, 2009
Crowne Plaza Hotel & Conference Center
Indianapolis, IN

Day 1

8:00-8:25 am	Registration	Christa Martin-Jones, CTIC
8:25-8:30 am	Welcome	Christa Martin-Jones, CTIC
8:30-9:00 am	Introduction to WQCT	Bill Franz, USEPA, Region 5
9:00-9:30 am	Overview & Objectives	Mark Kieser, Environmental Trading Network
9:30-10:15 am	Nutrient Standards & WQCT	Peter Tennant, Ohio River Valley Water Sanitation Commission
10:15-10:30 am	BREAK	
10:30-11:15 am	WQCT Program Examples	Dusty Hall, Miami Conservancy District (MCD)
11:15-12:00 pm	National Perspective on WQCT	Mark Kieser, ETN
12:00 - 1:00 pm	LUNCH	
1:00-1:45 pm	WQCT in Sauk River, MN	Carrie Raber, Stearns Co. SWCD Jim Klang, Kieser & Associates, LLC
1:45-3:45 pm	Breakout Sessions:	
	Agricultural Producers	Sarah Hippensteel, MCD Mark Kieser, ETN
	Wastewater Community	Jim Klang, K&A
	Potential Aggregators	Dusty Hall, MCD Carrie Raber, Stearns Co. SWCD Jamie McCarthy, Kieser & Associates, LLC
3:45-4:00 pm	BREAK	
4:00-4:45 pm	Q&A with Speaker Panel	All Presenters
4:45-5:00 pm	Overview & Wrap up: Are you Ready to Trade?	Mark Kieser, ETN
5:30-6:30 pm	Social Hour	

Water Quality Credit Trading Workshop
August 26-27, 2009
Crowne Plaza Hotel & Conference Center
Indianapolis, IN

Day 2

8:30-9:00 am	Review of Day 1 and Forecast Day 2	Mark Kieser, ETN
9:00-9:45 am	Benefits & Obstacles in WQCT	George Kelly, Environmental Banc & Exchange
9:45-10:30 am	New Opportunities in WQCT in the Ohio River Basin	Mark Kieser, ETN
10:30-10:50 am	BREAK	
10:50-11:15 am	Trading Exercise - Introduction Small Group Discussion Questions	Mark Kieser, ETN
11:15-12:00 pm	Small Group Breakout: Trading Exercise	Facilitated Discussion
12:00-1:00 pm	LUNCH	
1:00-1:45 pm	Small Groups Report Answers from Exercise Questions	All Presenters
1:45-2:45 pm	Small Groups Reconvene to Answer: Are you Ready to Trade?	Facilitated Discussion
2:45-3:00 pm	BREAK	
3:00-3:30 pm	Small Groups Report Out	All Presenters
3:30-4:00 pm	Open Discussion on "What Information do you Need to Trade?"	All Presenters
4:00-4:15 pm	Workshop Wrap Up	Mark Kieser, ETN Christa Martin-Jones, CTIC

ATTACHMENT I

Indianapolis Trading Exercise

CTIC – Ohio WQT Workshop – August 26-27, 2009

Role-playing Trading Exercise: Assumptions

- **Setting:** Wabash River Watershed (tributary to the Ohio River)
- **Scenario:** Eight WWTPs must consider expensive upgrades to Biological Nutrient Removal Technology (BNR) at a cost of \$20 per combined pound of TP and TN.
WQT Driver: New water quality standards for TP and TN require WWTP upgrades.
- **Pollutants being capped:** Total Nitrogen and Total Phosphorus
- **Compliance options:**
 - Upgrade to BNR
 - Purchase trading credits from:
 1. *NPS agricultural credits (unlimited supply and location at \$3/combined pound)*
 2. *PS credits from a 9th WWTP upstream of all others that already upgraded to BNR (with a limited number of credits at \$10/combined pound).*
- **Water quality data:** Sufficient to have characterized current water quality conditions. No local TMDLs apply, therefore NO non-point source baseline requirements exist.
- **Stakeholder Groups:**
 - There is a history of localized cooperation in the watershed.
 - There is NO Watershed Management District.
 - Soil Conservation Districts (SCDs) with available technical staff.
 - Ag participation with SCDs varies from county to county.
 - Private CCAs, other third parties are available to offer assistance capabilities.
- **Water Quality Trading Rules:** Proposed Wabash River trading based on regional trading rules that allow for:
 - PS/NPS trading at 2:1
 - PS/PS trading at 1:1

Credits: Those used by WWTPs are obtained from upstream sources.
- **No Credit Discounting:** Distance ratios yield 100% delivery of NPS loads (*for simplicity*).

THREE KEY QUESTIONS:

1. At what price would you consider buying (WWTPs) or selling (farmers and aggregators)?

2. Who do you want to negotiate your trade?

Options...

Direct contracts: buyers to sellers

Brokers: third parties that bring trading partners together

Aggregators: third parties that collect trading credits and sell in bulk to buyers

Central Credit Clearinghouse: Manages all trades but allows for aggregators

3. What do you see as barriers or critical steps to pursue trading opportunities?

ATTACHMENT J

Workshop Speaker Biographies

Speaker Biographies

Brian Brandt, American Farmland Trust

Mr. Brandt is Director of American Farmland Trust's Agricultural Conservation Innovation Center (ACIC), which works to develop market-based incentives to promote adoption of conservation practices by farmers. Mr. Brandt has played an integral role in a multi-disciplinary effort to develop innovative risk management tools to increase the adoption of best management practices. Specifically, he spearheaded the development of the BMP Challenge guarantee program. He is also coordinating the development of a water quality trading program in the Sauk River Watershed in Minnesota.

Mr. Brandt brings to ACIC an intimate knowledge of production agriculture having been raised on a hog and cash grain farm in west central Ohio and is still actively involved managing the family farm.

Thomas Davenport, U.S. Environmental Protection Agency, Region 5

Mr. Thomas Davenport currently serves as EPA Region 5 Agricultural Advisor and National Nonpoint Source (NPS) Expert. Mr. Davenport provides technical and program assistance to the watershed, urban storm water, lakes, TMDL and NPS programs nationally. He administers the Section 319 national monitoring program, which is a pioneering effort to monitor the effectiveness of best management practices over a 6 to 10 year time frame.

William Franz, U.S. Environmental Protection Agency, Region 5

Mr. Franz is a career EPA employee having begun working at EPA in June 1972 after graduating from the University of Illinois Chicago with a Bachelor of Science degree in Environmental Engineering. He also has a Master of Science degree in Public Health from the University of Illinois School of Public Health. Mr. Franz has worked in the NEPA Review Program for the first 25 years of his career and was the Chief of the Program in Region 5 for ten of those years.

For the past 12 years, Mr. Franz has served as the Region's lead on water quality and environmental restoration issues related to the Upper Mississippi River. In his current capacity he is involved with the states on matters related to Section 303(d) and 305(b), working with the States as the EPA representative to the Upper Mississippi River Basin Association, (UMRBA), and the Water Quality Task Force of the UMRBA, as well as working with the Corps of Engineers on their environmental restoration program on the Upper Mississippi River, coordinating Regional efforts related to hypoxia in the Gulf of Mexico, and the biomonitoring/early warning network on the Upper Mississippi River.

Robert Ensor, Howard Soil Conservation District

Mr. Ensor is District Manager of the Howard County Soil Conservation District. Prior to this role, he served as Administrator of the Conservation Grants Program with the Maryland Department of

Agriculture. He has held various positions within USDA's Natural Resources Conservation Service (NRCS), including Acting Director for Operations Management and Oversight Division of NRCS in Washington, D.C.; State Conservationist in Des Moines, Iowa; and, Assistant State Conservationist in Temple, Texas. He has also had various leadership positions with NRCS in Maryland, Pennsylvania, West Virginia, and Rhode Island.

Mr. Ensor earned a Bachelor of Science degree in agronomy from the University of Maryland in College Park, MD. He is a Certified Professional Agronomist and Certified Professional Soil Erosion and Sediment Control Specialist. Mr. Ensor is a member of the Soil and Water Conservation Society, National Association of Conservation Districts, and the American Society of Agronomy.

Douglas *Dusty* Hall, Miami Conservancy District

Dusty joined The Miami Conservancy District in 2002 and is currently the Manager of Program Development. Prior to joining the Conservancy, Dusty served for 15 years as a manager and executive with the City of Dayton and for 10 years as a research scientist with the University of Dayton Research Institute.

Dusty is experienced in developing programs to enhance water resources ranging from source water protection to storm water management. He is currently working with market-based approaches to improving surface water quality. In 1999, Dusty was named as one of seven National Drinking Water Heroes by the U.S. EPA.

He holds a Master of Science from the University of Dayton, Bachelor of Science from Wright State University, and he is a graduate of the Senior Executive Institute at the University of Virginia.

Sarah Hippensteel, Miami Conservancy District

Sarah is the Program Development Specialist for the Miami Conservancy District where her main focus is developing new programs. She coordinates and interacts with community members, federal, state, and local agencies, businesses, and agricultural producers throughout the Great Miami River Watershed – a fifteen county region in Southwest Ohio. Using effective partnerships she has successfully raised nearly \$8 million dollars to use on water quality improvements in the watershed in just 3 years.

Sarah is currently earning a Doctorate in Leadership and Change from Antioch University. She has a Master of Arts degree from Antioch University Seattle in Environment and Community and a Bachelor of Science degree from The Ohio State University in Watershed Resource Policy and Planning.

Prior to working for the Miami Conservancy District her experience includes government, private industry, and nonprofit organizations. She served as the Executive Director of the Little Miami River Partnership, an Environmental Information Specialist for YSI, Inc., the Hoosier Riverwatch Coordinator for the Indiana Department of Natural Resources and an Environmental Manager for the Indiana Department of Environmental Management.

Cy Jones, World Resources Institute

Mr. Jones works in the World Resources Institute's People and Ecosystems Program where he leads the Water Quality Team and its trading initiatives in the Chesapeake Bay and Mississippi River watersheds. The goals of these initiatives are to advance market-based efforts to reduce nutrient pollution impacting the Chesapeake Bay and the Gulf of Mexico and to promote the development of frameworks for interstate nutrient trading. Mr. Jones is also leading a WRI effort to promote the use of market-based methods for water pollution control in China.

Prior to joining WRI, Mr. Jones had a 24 year career with the Washington Suburban Sanitary Commission in Laurel, Maryland, where he managed the regional and regulatory affairs of the water and sewer agency. After retiring from WSSC, he joined the engineering firm of CH2M HILL where he worked to develop nutrient trading programs in Virginia, Maryland, and North Carolina. He has a Bachelor of Arts degree in Zoology and a Masters of Science degree in Environmental Engineering from the University of Iowa.

George Kelly, Environmental Banc & Exchange, LLC

Mr. Kelly is the founder and Director of Environmental Banc and Exchange (EBX), where he has permitted and sold over \$70m of environmental credits in the United States relating to wetlands, streams, endangered species and water quality. He has worked with numerous resource agencies, landowners, investors and private and public credit buyers in the implementation of mitigation projects. He has been a leader in promoting new policies at the federal and state levels relating to market-based solutions to achieve environmental objectives, including working on the recently promulgated federal wetland mitigation rules enacted in June 2008.

Mr. Kelly serves on the Board and was recently elected as the Vice President of the National Mitigation Banking Association. Additionally, he was appointed to serve on the EPA Chesapeake Bay Program Nutrient Trading Task Force, the Advisory Committee to the Water Quality Fund for the Chesapeake Bay, the Maryland Non-Point Source Task Force, and the Maryland Climate Commission (Mitigation Work Group). He also served as Chair of the Section of Environmental Law for the Maryland State Bar Association and was asked to represent the business and legal communities in the drafting of the precedent-setting brown fields environmental legislation.

Prior to founding EBX in 1997, Mr. Kelly served as partner and member of the Environmental Law Group at the firm, Ober, Kaler, Grimes and Shriver. Mr. Kelly is a cum laude JD and MSL (Environmental Law) graduate of the Vermont Law School.

Mark Kieser, Environmental Trading Network

Since 2001, Mr. Kieser has served as Acting Chair of the Environmental Trading Network (ETN), a non-profit clearinghouse for water quality trading program information. He is also Senior Scientist and principal of the Kalamazoo, Michigan-based firm of Kieser & Associates, LLC. He has been active in

water quality trading program and policy development since 1995. Mr. Kieser led one of five EPA supported water quality trading projects in the U.S. in the mid 1990s that largely shaped EPA's 2003 final trading policy. He also served on the state of Michigan Water Quality Trading Workgroup that developed the framework for Michigan's water quality trading rules; the first such rules in the U.S. He now leads a variety of market-based incentive programs focused on: watershed, state-wide and regional trading program development; agricultural credit banking schemes; urban storm water; electronic water quality trading registries and infrastructure; water quantity market structures for water offsets; restoration of natural flow regimes in Great Lakes tributaries; and, development of ecosystem service markets. These market-based trading efforts are being conducted in PA, OH, MI, MN, WV, NV, CA, ID, MD, VA, KY, IN, NY and WI.

Mr. Kieser is the technical co-lead with the Electric Power Research Institute (EPRI) to develop the first multi-state regional trading program in the U.S. for the Ohio River Basin (ORB). This program will be based on pending nitrogen and phosphorus water quality standards that will signal expensive and drastic reductions in wastewater discharge permits triggering robust point source/non-point trading opportunities.

Mr. Kieser is co-author of a 2005 McGraw-Hill text on water quality trading. He actively serves on national advisory committees for the Chesapeake Fund (a voluntary nitrogen market), and the Ecosystem Marketplace (the recognized, on-line source of ecosystem service market information). He is a frequently invited speaker to U.S. conferences and symposia; he actively leads regional workshops on water quality trading; and, is internationally recognized for his trading expertise with invitations to assist trading program development in Canada, Japan, Sweden and East Africa.

Mr. Kieser holds a Bachelor of Science degree in Biological Sciences from Wittenberg University in Springfield, Ohio and a Master of Science degree from Michigan Technological University in Biological Sciences.

James Klang, PE, Kieser & Associates, LLC

Mr. Jim Klang is a Senior Project Engineer at Kieser & Associates, LLC. He is a registered Professional Engineer in MN. His expertise is in watershed management and market-based incentives including water quality trading. Before joining K&A in 2006, Mr. Klang was the Principal Engineer for TMDL activities and water quality trading at the Minnesota Pollutant Control Agency (PCA). During his 20-year tenure at PCA, he worked on a variety of water resource issues including watershed assessment, soil erosion and nutrient load estimation, trading policy and program development, non-point source BMPs, lake and river assessments, waste load allocations, TMDL development and NPDES permitting.

Mr. Klang was the technical lead for the 2006 Minnesota River Summer Low Flow DO TMDL and co-authored the Low Dissolved Oxygen TMDL Protocol at PCA. Mr. Klang also led the PCA in water quality trading on: 1) the Rahr Malting Company and Southern Minnesota Sugar Beet Cooperative NPDES trading permits; and, 2) the Minnesota River Basin General Phosphorus Watershed Permit. This

watershed permit resulted in the current and robust point source/point source trading for phosphorus in the Minnesota River. Mr. Klang has been serving on Minnesota's Water Quality Trading Rules advisory committee for the past two years. He is the leading expert on water quality trading in Minnesota.

For K&A., Mr. Klang now manages several ecosystem service market development projects in the Upper Mississippi River Basin under USDA and private foundation funding. He is also directing K&A technical efforts for stormwater trading in the Western U.S. for Lake Tahoe, as well as for non-point source quantification protocols for agricultural BMP crediting in Michigan, Minnesota, Pennsylvania and Ohio. He recently authored a white paper on agricultural perspectives on trading participation in the Midwest, and one of the first technical reports in the U.S. that provided definitive approaches for scientifically establishing trading ratios and discounting factors for Minnesota's pending trading rules. Mr. Klang holds a Bachelor of Science degree in Civil Engineering from Colorado State University.

Timothy Lohner, PhD, American Electric Power

Dr. Lohner is a principal environmental specialist in the Environmental Services Division of American Electric Power (AEP), one of the largest electric utilities in the country, based in Columbus, Ohio. He received his Ph.D. and M.S. degrees in environmental toxicology from The Ohio State University in 1987 and 1983 and his B.S. degree in biology from the University of Cincinnati in 1981 with College Honors, *Magna cum Laude*. He manages studies to evaluate the potential environmental health impacts of power generating facilities and participates in the development of environmental regulations. Prior to joining AEP, Dr. Lohner was employed by Virginia Power, the Ohio Environmental Protection Agency, and the Cincinnati Gas & Electric Company. He is co-author of the book, "Sound Science, Junk Policy, Environmental Health Science and the Decision-Making Process," and has published numerous articles on aquatic toxicology, risk assessment, and environmental policy.

Steve Luckman, Maryland Department of Environment

Mr. Luckman has a Bachelor of Arts degree from Johns Hopkins University in Chemistry and a Masters of Arts degree in Environmental Engineering. He has been with the Maryland Department of the Environment NPDES Discharge Permits Division for 29 years, including 20 years as Division Chief, where he helped develop the Phase I- Point Source to Point Source Trading guidelines. Mr. Luckman serves as MDE's representative on the workgroup that has drafted the Phase II- Non-Point Trading Guidelines. In a previous life, he was in charge of the Drinking Water Quality laboratories for Baltimore City.

Jamie McCarthy, Kieser & Associates, LLC

Ms. McCarthy is a Project Scientist at Kieser & Associates, LLC. Her background is in watershed management and aquatic ecology. At K&A, she is involved in several watershed planning projects and water quality trading programs in Michigan and Pennsylvania. These have focused on the feasibility and development of water quality trading programs, watershed management planning, and water quality monitoring. Ms. McCarthy received a Bachelor of Science degree in Biology from Calvin College and a Master of Science degree in Natural Resources from the University of Michigan.

Richard Moore, PhD, The Ohio State University

Dr. Moore is Professor and Director of the Environmental Science Graduate Program at The Ohio State University. The program consists of 85 faculty and 65 graduate students from across the university. He is also President-elect of the Culture and Agriculture Subgroup of the American Anthropological Association. He is an anthropologist and rural sociologist and leads the Sugar Creek Watershed Interdisciplinary Research Team at OSU which has grants from USDA, NSF, and EPA to conduct water quality research on headwaters and participatory methods of local community involvement. The project received recognition from the Kellogg Foundation in 2007 and Carnegie Foundation in 2009 for outreach and community engagement.

He is the lead author of the Alpine Water Quality Trading Plan which is on-budget, ahead of schedule, and with a waiting list of farmers wanting to participate. The local county SWCD recognized Moore with the 2008 Friend of Conservation Award. Dr. Moore is the lead investigator in the USEPA Targeted Watershed Program grant on trading feasibility in the Upper Scioto Watershed near Columbus, Ohio and is also working with the French and Chinese on water quality projects.

Dennis O'Grady, South Nation Conservation Authority

Dennis O'Grady has managed watersheds for Conservation Authorities across Ontario for 28 years. For the past 21 years, he has been the General Manager of South Nation Conservation, a 4,000 sq. km. watershed covering 15 municipalities. The 50 staff members at South Nation deliver a wide variety of programs in groundwater protection, forestry, fisheries, water quality, flood and erosion control and land use planning.

The South Nation River Watershed's trading program for phosphorus started 10 years ago and it has completed over 200 verifiable trades. South Nation recently completed a contract for the Province of Ontario detailing how to implement a phosphorus trading program in the Province.

Mr. O'Grady has a Masters Degree in Public Administration from Queen's University in Kingston, Ontario, and an undergraduate degree in Geography from the University of Western Ontario in London, Ontario.

Carrie Raber, Stearns County Soil & Water Conservation District

Ms. Carrie Raber is the Urban Conservationist for the Stearns County Soil & Water Conservation District in Central Minnesota. She helps communities address natural resource concerns and assists with the implementation of their Source Water Protection Plans. In addition, Carrie serves on the aggregator committee for the Sauk River Ecosystem Services Project which is currently being developed as a new alternative to address impaired waters. Carrie obtained a Bachelor of Science degree in Environmental Geology and Technologies from the University of North Dakota.

John Rhoderick, Resource Conservation Operations, MD Department of Agriculture

Mr. Rhoderick serves as the Administrator for Operations for the Office of Resource Conservation, which provides financial and technical assistance, as well as staffing support to the state's 24 soil conservation districts in their promotion of soil conservation and water quality programs. He also serves on a number of inter-agency committees that are working on Maryland's tributary strategies.

Mr. Rhoderick has managed portions of the Maryland Agriculture Cost-Share Program (MACS) during his 14 years at the Maryland Department of the Environment before the transfer of that program to the Maryland Department of Agriculture. At the Department of Environment, Mr. Rhoderick administered programs that dealt with non-point source pollution abatement and served as Maryland's Biological Nutrient Removal Program Coordinator.

Roger Richardson, Secretary of Maryland Department of Agriculture

Secretary Richardson is a life-long farmer from Worcester County. His family farms 3,500 acres of grain on the Lower Eastern Shore and operates a trucking company. He has a long history of leadership positions in agriculture. Before accepting the job of Agriculture Secretary, he served in a variety of positions as director of the Maryland Center for Agro-Ecology and the American Corn Growers Association, chairman of the Maryland Department of Agriculture's Board of Review, President of the Snow Hill Grain Co-Op, second term on the Worcester County Farmland Preservation Committee, and former president of the Worcester County Farm Bureau.

Secretary Richardson has also served on the Maryland Farm Service Agency, Maryland Agriculture Stabilization Committee, the Worcester County Soil Conservation District, and the Agricultural Stewardship Commission in 2006. Other community service includes 10 years on the Worcester County Board of Education in the 1980's and 90's including terms as vice-president and president; the Dividing Creek Public Drainage Association; and past-president of the Snow Hill Lions Club.

Kristen Risch, Malcolm Pirnie, Inc.

Ms. Risch is an environmental scientist with extensive experience in environmental permitting and water resource restoration. Her experience includes ecological assessments, watershed management, wetland delineation, stream restoration/mitigation, stormwater management, remediation, groundwater investigations, and grant writing.

Ms. Risch has served as Project Manager responsible for dozens of ecological restoration efforts throughout the country. Most recently, her work has included the oversight of several watershed restoration endeavors in the Little Miami River watershed. Ms. Risch is currently managing the planning, design, and construction of over 6 miles of stream and 5 acres of wetland restoration within the watershed. To achieve this, Ms. Risch has secured nearly \$5 million in grant funding for these projects.

Mindy Selman, World Resources Institute

Ms. Selman is Senior Associate with the World Resources Institute in their People and Ecosystems Program. She has worked with trading various programs throughout the country through the

development and implementation of WRI's online nutrient tracking tool, NutrientNet. She has published papers on various trading topics, including improving cost-share programs to increase efficiency, potential cost savings using a reverse auction system, and assessing the state of knowledge of eutrophication and hypoxia in coastal areas.

Gary Stuhlfauth, Ohio Environmental Protection Agency, Division of Water

Mr. Stuhlfauth is with Ohio EPA's Division of Surface Water. He has worked in the NPDES permit program for the past 19 years, primarily writing discharge permits for major municipal wastewater plants. In addition to permit-related work, he was responsible for writing Ohio EPA's rules for water quality trading. Other areas that Mr. Stuhlfauth is involved in include participating on various total maximum daily load teams, addressing sewer overflows and implementing Ohio's mercury variance rule.

Gerald Talbert, Maryland Association of Conservation Districts

Mr. Talbert has been working in the agricultural conservation field for over 30 years. He has held positions in the conservation community at the county, state and national levels. For the last 12 years, he has served as an independent consultant, managing various conservation projects for several national, state and local conservation organizations. He has been involved in several projects to raise awareness about market-driven approaches to conservation, through carbon and water quality trading, as new voluntary incentive tools for agriculture to put more conservation on the land. Mr. Talbert has a Bachelor of Science degree from Drexel University and a Masters of Science in Business from Johns Hopkins University.

Peter Tennant, Ohio River Valley Water Sanitation Commission

Mr. Peter Tennant is Deputy Executive Director of the Ohio River Valley Water Sanitation Commission (ORSANCO), an interstate agency which oversees water quality management of the Ohio River and its tributaries. Mr. Tennant has developed and managed programs in the areas of Water Quality Monitoring, Assessment, and Standards for the Ohio River for over 30 years. For the past twelve years, he has represented ORSANCO and its member states in deliberations regarding hypoxia in the Gulf of Mexico, and currently acts as convener for the Ohio River Sub Basin Committee which was formed to address the effects of nutrient loadings from the Ohio on the Gulf.

Mr. Tennant is a member of the National Water Quality Monitoring Council representing river basin commissions, and serves as a co-chair of the Monitoring, Standards and Assessment Task Force of the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA). He received a BS in Civil Engineering from Northeastern University in 1972. He is a registered professional engineer in the state of Ohio and a Board Certified Environmental Engineer by the American Academy of Environmental Engineers.

Attachment K

Funding Received and Expended

	Salaries	Contractual	Travel	Supplies	Other	Total	Overhead	Requested
Budget	34409.00	83500.00	6544.00	8160.00	0.00	132613.00	19892.00	152505.00
Total Spent	29238.16	91708.37	3339.49	8178.70	0.00	132464.72	19869.72	152334.44
Balance	5170.84	-8208.37	3204.51	-18.70	0.00	148.28	22.28	170.56