USDA-NRCS Final Report: June 2015
Pilot Test Interstate Water Quality Trading Ohio River Basin

2011 Conservation Innovation Grant
Grant Number: NRCS 69-3A75-11-178
Award Number: 69-3A75-11-178
Grant Period: 9/15/2011 to 9/30/2014, extended to 3/31/2015

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Per NRCS requirements, this document serves as the Final Performance Report for this project.

Project Objectives
The project's primary goal was to execute pilot trades of nutrient credits in a regional WQT program. We needed to work through issues related to supply of credits by farmers, including the calculation and verification of credits, regulatory treatment of credits, baseline for credit generation, potential contracting obligations and liabilities, role of different conservation practices in trading, and many other details critical to a full-scale trading program. We planned to complete two cycles of pilot trades to test and improve our trading program rules, unravel the logistics of interstate trading, clarify the appropriate role of the watershed model in the program, make the business case for trading partners, estimate the ancillary environmental benefits from trading (specifically GHG sequestration), and provide a historic test-case of how to structure a market to achieve environmental improvements.

Project Overview:
The Ohio River Basin WQT program is a first-of-its-kind defensible interstate trading program. We chose to work on an interstate basis for several reasons. First, the watershed boundaries cross state lines and to have the largest possible benefit in-stream, it was important to follow the actual functioning of the watershed units. Second, for WQT to be successful, a market needs an adequate number of credit buyers and sellers. The larger the area, the greater the number of potential buyers and sellers, and the more viable the resulting market. Lastly, we felt a regional program would benefit from shared infrastructure, tools, and models, reducing the burden of program costs to local entities. Indeed, to build defensible WQT programs supported by science and modeling, shared resources and robust stakeholder input are critical.

EPRI started researching WQT in 2005 and published a business case for an interstate WQT market in the Ohio River Basin in 2010. In 2009 - 2010, one of the EPRI collaborators, American Farmland Trust (AFT) convened listening sessions with about 150 producers and agricultural professionals from Ohio, Kentucky, Indiana and Illinois to more fully understand the type of trading market structure that might work best for agricultural producers in the ORB. With the 2011 USDA CIG grant in hand, we started to assemble the trading plan, using the Watershed Analysis Risk Management Framework (WARMF) model to identify key interstate watersheds and holding a series of discussions with stakeholders, state agencies, federal agencies, Soil and Water Conservation Districts (SWCDs) in potential target areas and briefings of state commissioners, state conservationists and agricultural leaders at the national level. In August 2012, Indiana, Kentucky and Ohio signed a first-of-its-kind interstate pilot trading plan where the states operate under the same rules so that a water quality credit generated in one state can be applied in another, selling credits generated by an up-stream farmer and within a Hydrological Unit Code 4 (HUC 4) watershed to downstream buyers. The trading plan is

attached. The plan was amended in October 2013 to recognize "stewardship" credits and clarify specific aspects of the program.

To install practices and bring credits to market, the project worked directly with the agriculture agencies and permitting authorities in all three states. EPRI has contracts with the three state agriculture agencies (Ohio Department of Natural Resources, Kentucky Division of Conservation, and Indiana State Department of Agriculture) to provide private financial support raised by EPRI to SWCDs. The 2009-2010 listening sessions with farmers identified the SWCDs as the most trusted market intermediaries. Each state received seed funds ($100,000) to remove 22,000 pounds of total nitrogen and 11,000 pounds of total phosphorus over a five-year period. The state agriculture agencies moved these funds to SWCDs, who then contracted with farmers to install conservation practices according to USDA-NRCS conservation practice standards. Examples of these practices include cover crops and heavy use areas, among others. Both the state agriculture agencies and the SWCDs are reimbursed for their time and effort (estimated for the pilot period at 10% of funds passed to the farmers). However, the project is tracking the real cost of these responsibilities to inform the adaptive management of the project going forward.

Based on input from the agriculture community, during the initial pilot trading phase, farmers were paid up to 75% of their documented costs (up to $10,000) after the practice is installed. The $10,000 cap on each project ensures that our current private funding is distributed across multiple farmers in each state, and reduces the overall impact if one particular project does not generate credits. Some of the SWCDs are identifying potential farmers by looking at unfunded applications for USDA-NRCS programs. There is no risk to the farmer that credits will be sold; they are paid after on-site confirmation of practice installation, regardless of whether or when the credits generated from those practices are, in fact, transacted.

For the initial pilot trades, EPRI owns and aggregates the resulting credits and has the responsibility for transacting, donating, or retiring those credits. From a farmer perspective, the ORB pilot project offers a privately funded cost-share opportunity, using a simple contract, and is implemented via their local SWCD. EPRI is reinvesting money raised from the sale of the pilot credits back into the project operation and research.

The project also took several innovative steps to encourage potential buyers. The project sought out and documented ancillary benefits that project could produce (e.g. carbon sequestration, wildlife habitat, improvements in soil quality, etc.). Since there is no regulatory driver at present in the ORB (i.e. stricter nutrient standards that might compel trading), the permitting authorities agree that point sources who participate in pilot period would get recognition for nutrient reductions that can be applied to future compliance obligations or to partially address supplemental environmental projects (SEPs). During this pre-compliance period, the project is selling compliance-grade credits as "stewardship" credits that can be applied toward sustainability goals, offsetting supply chain impacts or used for SEP obligations in Ohio, Kentucky or Indiana. Duke Energy, Hoosier Energy, and American Electric Power were the first buyers in the program and on March 11, 2014, the companies purchased 9,000 stewardship credits, agreeing to retire the associated nutrient and ecosystem benefits, rather than apply them towards possible future permit requirements.

Installed Projects

In Indiana, 13 separate projects were installed in 5 counties, all 5 year contracts. There was a mix of projects including an agricultural drainage water management project in Wayne County. These projects provided over 30,000 lb N reduction and 9,000 lbs of P. In Ohio, there are 9 separate contracts (5 and 10 year contracts) in 4 counties with a mix of practices and one ag drainage project in Logan County. These projects have resulted in reductions of 20,000 lb. N and 7,000 lbs P. In Kentucky, projects have been installed in 5 counties, 10 contracts (all 10 year) and all are gravel or concrete pads. These projects have resulted in reductions of 39,000 lbs N and 9,000 lbs P and all are beef operations. The overall reductions achieved are over 98,000 lbs N and 28,000 lbs P and include 516 acres of seasonal practices (cover crops, conversion to hay, ag drainage water). We estimate that the 14 SWCDs directly contacted 560 farmers (40/county) and distributed RFPs to many more.

Ohio River Basin Water Quality Trading Project - by the Numbers	
Number of credits (pounds) sold to date:	9,000
Number of farmers funded:	32
Pounds of Total Nitrogen Contracted:	98,314
Pounds of Total Phosphorous Contracted:	28,699
Acres of land under seasonal practices:	516.2
Credits available in April 2015 Auction:	~100,000

Credit Verification, Monitoring, and Reserve Pool

During this project period, we have created a rigorous project flow. Before any credits are issued in the ORB project, all projects must be installed, verified, and certified. This requires the following steps: 1) SWCD completes a practice "Installation" form after on-site inspection, including before and after photos, 2) The state agriculture agency completes a "verification" form based on on-site inspection and confirmation that the practice meets NRCS practice standards, and 3) The state permitting authority completes a "certification" form based on a desk review of all project records, photos, baseline confirmation, and regulatory review. All projects are monitored annually with on-field verification by the state agriculture agency and annual desk-review by the permitting authority. Farmers must meet baseline requirements including compliance with all local, state, and federal law, AND implement practices that are additional to current conditions (based on 3 years of farm practice history). The project will only issue credits after conservation projects have been implemented, verified, and certified. Before credit transactions (and application of a trading ratio), 10% of all credits are moved into a reserve pool, which can be tapped in the event of an unanticipated project gap or failure. Further, to ensure that the pilot project has a broader public benefit EPRI is voluntarily retiring 10% of all credits. Full documentation, including on-site photos, is posted in the public view of the project's on-line credit trading registry and the public can track every pound of reduction to a county level, but not all the way to a specific farmer.

Science, Modeling, and Ratios

A fundamental challenge for WQT lies in understanding, quantifying, and managing the uncertainty associated with the implementation of on-the-ground practices and the associated water quality benefits over time and place. This challenge is especially pronounced when trading involves farmers as credit sellers, where there is no specific pipe from which to monitor or measure water quality. Trade ratios are used to ensure that the amount of reduction

resulting from the trades has the same (or better) effect as would be required using a technology option at the point of compliance. The peer-reviewed research done as part of this project on the appropriate quantification of credits in WQT has informed national discussions regarding ratios, uncertainty estimates, model calibration protocols, and credit equation factors.

The ORB project uses a scientifically-based credit equation methodology that accounts for location-specific nutrient attenuation factors, rather than a blanket trading ratio throughout the entire ORB. The methodology uses: 1) the EPA Region 5 spreadsheet model for estimating nutrient reductions at the edge of the field (i.e., Point of Generation Credits); and 2) the Watershed Analysis Risk Management Framework (WARMF) model for estimating nutrient attenuation (reduction) from the edge-of-field to the point of use (i.e., Point of Use Credits). The models account for location-specific nutrient attenuation factors and ensure that the project pays for, and in fact delivers, performance (i.e. nutrient reductions, not simply conservation practices).

Unique to this project, we apply the WARMF model to predict attenuation from the edge of the field to the stream and the resulting in-stream responses to nutrient load reductions between credit sellers and credit buyers, thereby estimating the total nutrient reductions actually achieved at any particular point of compliance. These predictions account for a number of physical factors (e.g., location of buyer and seller, in-stream fate and transport, specific form of pollutant), as well as the uncertainty inherent in the model itself. In this way, the project calculates unique trade ratios for every single transaction, and accounts for the specific watershed characteristics between each buyer and seller. The further apart buyers and sellers are, the greater the uncertainty in the model, the higher the trade ratio and the greater the cost for each pound at the buyer location. Therefore, there is a driver for the market to self-select transactions that are "local," as that will provide the most favorable trade ratio. The seller (the farmer), however, does not absorb the "hit" of a distant buyer – it is the buyer's burden to purchase enough credits to meet their compliance obligation, wherever they happen to be in the watershed. The trading ratio is applied AFTER 10% of credits are moved to a reserve pool and 10% of credits are voluntarily retired by EPRI. While the project is not selling compliance credits at this time (hence, there is no "point of compliance" and no ratio applicable), the research has the scientific basis to support transactions occurring within a HUC 4 watershed.

Credit Registration and Tracking

A credit registry is a tracking system that follows a credit from creation to sale and ultimately to retirement. The on-line credit registry customized for the ORB project (funded by USDA-NRCS 2012 CIG) provides checks and balances to ensure that each credit is created and used precisely as approved under the trading plan. The online registry provides security measures similar to online banking and provides transparency to the market. In one online location, information about each farm project is captured; agriculture agencies "verify" that best management practices have been implemented on the ground; permitting authorities "certify" that a credit is appropriate for regulatory compliance; credit buyers can search for credits available to purchase; and stakeholders can view public information on projects. Further, the registry utilizes EPRI's watershed model to calculate specific trade ratios for each transaction based on the location of particular buyers. The registry assigns a unique serial number for each pound of nutrient reduction, eliminating the risk of double counting. The serial number allows for tracking of the credit through its lifecycle. The registry is a key component of the ORB project and ensures the same process and protocols are applied across multiple states.

Credit Price and Definition

One credit is equal to one pound of total nitrogen (TN) or total phosphorus (TP) that, through voluntary action, is prevented from discharging into the ORB in a given year. The project uses a cost-based price model to incorporate the full cost of implementing the program assuming no government or state subsidy. At a summary level, we've included: 1) the cost of project activity done on the farm, 2) the cost of project administration (including burden to the SWCDs and state agriculture agencies), and 3) the cost of addressing project risk. The first transactions sold a 3-year stewardship credit for $10 each. Each stewardship credit represents a bundle of quantified nitrogen and phosphorus reductions, plus qualitative ancillary ecosystem benefits (pollinators, soil health, greenhouse gas reduction, etc). If the credits were unbundled and sold as individual pounds of nitrogen or phosphorus, each pound of either nitrogen or phosphorus would cost $10 under the pricing system.

Stakeholder Engagement

Because this project is so far-reaching and the largest of its kind, it has been important to identify and engage stakeholders so that concerns are appropriately identified and evaluated. In particular, the early engagement of agriculture was critical to design a system that would work for both buyers and sellers. In addition, EPRI organized and maintains several stakeholder advisory committees to provide feedback on the emerging market including agriculture, environmental groups, power companies, wastewater treatment plants, and federal and state agencies. The project is committed to an adaptive management approach and greatly benefits from the ongoing input from these committees and the public in general. The project maintains a website, holds periodic webinars, posts and sends out a newsletter and makes all documents, research reports, white papers, slide decks and other materials available through its website.

Key Learnings

For WQT markets:

- WQT is a developing market and will benefit from research on best practices, tools, and elevated stakeholder understanding. Our project is advancing this maturation via the ORB pilot effort and the involvement and in-kind support of the collaborating partners in the National Network for WQT. EPRI also helped fund the National Network guidebook: *Building a Water Quality Trading Program: Options and Considerations.*
- With the science, tools, and policies for WQT evolving, it is probably premature to make generalized conclusions about WQT in the absences of specific program elements.
- There are fundamental differences between point-point trading and a program where farmers are the credit generators - these differences will influence appropriate credit ratios, verification, and uncertainty.
- The balance between a farmer's confidentiality and the public interest in verifying that a permit limit is being met continues to be a point of discussion. Further, questions regarding who holds liability for failed conservation projects that generate credits still need to be discussed (credit buyer, credit seller/aggregator, farmer, verifying party, or other).
- Nonpoint source credits that are "real" and comparable to installing a point source technology require careful documentation, modeling, and science at a level that can be costly and require highly skilled training. Sharing of resources via public access and

collaboration may help curb the burden on individual projects, reducing costs to establish rigorous programs in the future.

- The EPRI project remains committed to an adaptive management approach and encourages input from all participants and stakeholders in the pilot project to inform the appropriateness of WQT.
- It remains to be determined whether, after applying necessary rigor and science, 1) the market will support the fully burdened price of credits, and 2) observing stakeholders will be satisfied that trading is an appropriate tool for compliance.
- Ultimately, whether credits are real is fundamental to buyers committed to ensuring that their permits are met, to stakeholders who deserve to have confidence in the system, and to the ecosystem

For Farmers:

- Working via local SWCDs to contact and enroll producers can be appropriate in many cases, and appropriate compensation may be considered (there is some compensation provided to SWCDs during the EPRI pilot project). However, not all states have district staff with the engineering, planning, and design expertise to implement projects, and they will need support to get a significant number of projects installed with producers.
- Baseline discussions (what practices a farmer had to have in place to be eligible to generate credits) revolved around equity issues for early adopters of conservation practices (for all of the stakeholder committees and the state agencies). However, the SWCDs mainly reached out to farmers who had previously applied for cost-share funding and many of these farmers could be characterized as early adopters. So far, participation by early adopters as well as late adopters has not been a problem.
- Collecting farm histories and baseline data is challenging. It helped to talk this through with the SWCDs but may continue to be problematic for management BMPs. Structural BMPs are much easier to document via historic aerial photography, which the states maintain anyway.

For credit buyers:

- The first credit buyers were members of EPRI who were familiar with the project and had great confident in the resulting credits. While the predicted regulatory driver (more stringent nutrient standards for the Ohio River) had not materialize, the power plants were willing to purchase stewardship credits and retire them as part of their corporate sustainability efforts.
- Public Auctions: EPRI scheduled a public auction for Stewardship credits which was outside the time period of this grant (scheduled for May 2015). Therefore, more details on this auction will be shared in another report. Quickly, with only a few bidders, the project postponed the auction. Most corporations make decisions about their budgets a year in advance.

Market sustainability:

- Because the project has not yet held a public auction, the market activities continue to be supported by a mix of private and public investments. We have not yet achieved a fully functional market. A fully functional market will require stronger regulatory drivers, transition from EPRI acting as the only credit seller, and budget allocations from sustainability buyers.

Concluding Remarks

Our commitment to an adaptive management approach and defensible science and transparency has been fundamental to the project. We are revisiting some of the details related to the pilot trades in the ORB as they are informed by project implementation. The next phase will include transitioning the program so that another organization can sell the credits other than EPRI, which will allow the credits to be applied towards permit compliance obligations (rather than retired for the public benefit). We also are gaining important information on where failures can occur in the system, necessary safety factors, and whether a 10% reserve pool is sufficient in the long run. Risks from large-scale storms or natural disasters that eliminate farm conservation projects that generated credits still need to be addressed. It is critical to recognize that not all trading programs are equal, that flexibility is likely appropriate depending on program location, and that decisions regarding credit definition, verification, and quantification are currently defined largely at the individual project level. We have taken a particularly conservative approach in evaluating program decisions to ensure that credits are "real" and decisions are reviewed, discussed, and approved by the states involved. From an economic perspective, it is still to be determined if, after applying all necessary rigor and science, the market will support the fully burdened price of credits. Ultimately, it is that issue - whether credits are real - that is fundamental to buyers committed to ensuring that their permits are met, to other stakeholders who deserve to have confidence in the system, and for the ecosystem.

The following Sections of the FINAL REPORT include:

- Performance on Objectives and Deliverables, Page 8
- The Project Advisory Committees & Summary of Key Issues, Page 9
- Summary Report on Agricultural Outreach Activities by American Farmland Trust, Page 11
- List of Reports, Newsletters, and Materials Published During the Grant Period, Page 15
- 2011 CIG Progress Reports Submitted During Grant Period
- Public Newsletter Updates
- Auction Invitation

PERFORMANCE ON OBJECTIVES AND DELIVERABLES: EPRI 2011 CIG

OBJECTIVES DELIVERABLES	PREDICTED	ACHIEVED	ADDITIONAL DETAILS
Test key components	Test key technical, regulatory and economic	100%	Technical and regulatory components have been tested and either improved or resolved. Preliminary economic analysis (cost of credits) completed and full analysis underway.
Establish supply of credits	Assess load reductions and costs	100%	Cost/credit analysis completed to determine amount of funds to move to States and limits on cost-share to farmers
Directly interact with farmers	Interact with 150+ farmers	100%	14 SWCDs contacted up to 30 farmers each = 420;
Achieve reductions of TN	Up to 45,000 lb annual TN	100%	Overall reduction of 90,000 lb TN
Achieve reductions of TP	Up to 15,000 lb annual TP	100%	Overall reduction of 28,000 lb TP
Assess calculation methods	Apply NTT to 50% of trades	Not applicable	The use of NTT was dependent on USDA calibration which did not occur during the project period
Trading framework	Test interstate trading plan	100%	Tested plan with 2 rounds of pilot trades and modified through amendment
Execute pilot trades	Trades with up to 50 farmers	100%	Executed 30 projects (12 in Indiana, 8 in Ohio, 10 in Kentucky)
Calculate GHG impact	GHG credits	Estimates only	Calculated GHG credits using DNDC model;
Stacked credits	Identify opportunities for GHG/nutrient credits	100%	Project estimated GHG reductions from BMPs. There is opportunity, but additional work is needed to bring carbon credits forward.
Credit generation	Develop Templates	100%	Templates publicly available through Internet site
Verification	Develop Protocols	100%	Protocols publicly available through Internet site
Registry	Establish Registry to track credits	100%	Oh-Line Registry fully functioning with both private and public components and each credit identified and tracked with unique serial number
Credit Calculation	Convert from field to buyer	100%	Edge of field paired with WARMF in registry to generate unique trade ratios at point of purchase
Interstate trades	Up to 3 trades	100%	Duke, AEP and Hoosier Energy purchased 9,000 interstate credits
Contracts	Up to 50 contracts	100%	Contracts in place with 35 farmers

The Project Advisory Committees

Agricultural Stakeholders: American Farmland Trust established an informal advisory committee in 2010. In September 2011, we expanded the informal group and started convening regular meetings hosted by AFT and the Ohio Farm Bureau. Agriculture advisory committee members have included representatives from: Kentucky Farm Bureau Federation; Indiana State Department of Agriculture; Kentucky Division of Conservation; USDA, ARS; USDA NRCS; Illinois State Conservationist; National Pork Producers; West Virginia Conservation Agency; Ohio Department of Natural Resources; Kentucky Corn Growers Association/Kentucky Small Grain Growers Association; Mosaic; Ohio Environmental Council; Indiana Farm Bureau, Inc.; North Carolina Department of Agriculture and Consumer Services; and Land Stewards, LLC.

Key issues:

- Agricultural baseline: agreed with proposed project baseline but were concerned about pricing early adopters out the market, rewarded farmers who had not yet adopted practices and the possibility of back-sliding (taking out practices and coming back 3 years later to re-install practices to generate credits). Kentucky was concerned that the Kentucky Agricultural Water Quality Act set a higher baseline for its producers.
- Dealing with early adopters: Since this was the primary concern in the baseline discussions, we dealt with this as a separate issue. During the pilot trading phase, several early adopters have participated so this has not been a problem.
- What best management practices to pre-approve and how to incorporate "cutting edge" practices like precision agriculture and agricultural drainage management.
- Baseline verification: How best to verify that farmers are eligible to generate credits.
- Balancing farmers' concerns about privacy with the public's right to know: particularly concerned about releasing "before" and "after" pictures; agreed with identification of projects down to a HUC10 level (40,000 to 250,000 acres or 62-390 square miles).

Environmental Stakeholders: This group began discussions to support a targeted comment period in the months preceding signing of the trading plan by the states. The group met approximately twice a month by conference call between April and July 2012, and continues to meet on a regular basis. Advisory committee participants have included: the Ohio Environmental Council, The Nature Conservancy, Sierra Club, Environmental Law and Policy Center, Minnesota Center for Environmental Advocacy, Kentucky Waterways Alliance, and Environmental Defense.

Key issues:

- Balancing farmers' concerns about privacy with the public's right to know (the Clean Water Act allows citizens to hold permit holders (point sources) accountable: the project needs to make as much information as possible accessible to the public)
- The use of modeling versus edge-of-field and in-stream monitoring to confirm the effectiveness of conservation practices (in-stream monitoring continues to be the "gold standard" but is expensive and water quality improvements resulting from the implementation of practices on 30 farms in 3 states will not be detectible)
- Setting the baseline at a high enough threshold (the committee discussed with the baseline but were concerned about whether early adopters could compete with late adopters and whether the incentives would be attractive enough)

- Whether the NRCS practice standards rigorous enough to assure quality control
- Whether ORB WQT stewardship credits can be used to partially address supplemental environmental projects (SEPs)

Wastewater Treatment Facilities

EPRI is collaborating with the Ohio River Valley Water Sanitation Commission (ORSANCO) to help ensure that the implementation of this effort is appropriate and effective for wastewater treatment permitted dischargers. The project team is also working with the National Association of Clean Water Agencies (NACWA) to ensure the project is appropriate for the wastewater treatment plant community.

Key issues:

- Credits must be verifiable and credible with the appropriate documentation
- The State Agencies must sign the trading plan and be comfortable with the credits and the regional and federal EPA need to support the plan.
- Prefer 25 year credit length

Electric Power Utilities

EPRI published its business case for water quality trading in October 2010. Active participants in EPRI's Focus Group on water quality trading have included: Tennessee Valley Authority, American Electric Power, Hoosier Energy, Exelon, and Duke Energy.

Key issues:

- Credits must be verifiable and credible with the appropriate documentation
- Ancillary benefits should be tracked and information on them made available
- Since there is no regulatory driver at present (i.e. stricter nutrient standards that might compel trading), point sources asked for some incentives for pre-compliance trades (point sources who participate in pilot period get recognition for nutrient reductions that can be applied to future compliance obligations or to partially address supplemental environmental projects (SEPs))

PROJECT REPORTS, NEWSLETTERS AND OTHER PROJECT MATERIALS Published During the Grant Period.

Full reports can be found at www.epri.com using the report number as the search term. Direct links are also cross posted at http://wqt.epri.com under the Reference Shelf.

Attenuation Coefficients for Water Quality Trading

Arturo A. Keller, Xiaoli Chen, Jessica Fox, Matt Fulda, Rebecca Dorsey, Briana Seapy, Julia Glenday, and Erin Bray. ***Environ. Sci. Technol.*, 2014**, *48* (12), pp 6788–6794

Water quality trading has been proposed as a cost-effective approach for reducing nutrient loads through credit generation from agricultural or point source reductions sold to buyers facing costly options. We present a systematic approach to determine attenuation coefficients and their uncertainty. Using a process-based model, we determine attenuation with safety margins at many watersheds for total nitrogen (TN) and total phosphorus (TP) loads as they transport from point of load reduction to the credit buyer. TN and TP in-stream attenuation generally increases with decreasing mean river flow; smaller rivers in the modeled region of the Ohio River Basin had TN attenuation factors per km, including safety margins, of 0.19–1.6%, medium rivers of 0.14–1.2%, large rivers of 0.13–1.1%, and very large rivers of 0.04–0.42%. Attenuation in ditches transporting nutrients from farms to receiving rivers is 0.4%/km for TN, while for TP attenuation in ditches can be up to 2%/km. A 95 percentile safety margin of 30–40% for TN and 6–10% for TP, applied to the attenuation per km factors, was determined from the in-stream sensitivity of load reductions to watershed model parameters. For perspective, over 50 km a 1% per km factor would result in 50% attenuation = 2:1 trading ratio.

Development of Water Quality Trading Standards. EPRI, Palo Alto, CA: 2014. 3002003619.

This report presents a summary of the developments in the U.S. towards creating standards for WQT. The research team reviewed publically available reports, project documents, articles, and online resources regarding federal agency and practitioner activities related to standards development. For the purposes of this report, we consider "standards" to be methodologies for ensuring the implementation, monitoring and verification of credits, which might include "best practices," "principles," and "technical guidelines," and could be either agency or independently developed. While the 2003 EPA policy on WQT provides certain federally issued guidance, the need for more explicit details to direct the formation of programs has created several ad hoc efforts aimed at clarifying criteria for defensible programs. This report provides background on developments in WQT standards, and reviews examples of standards development in other environmental markets.

***Case Studies of Water Quality Trading Being Used for Compliance with National Pollutant Discharge Elimination System Permit Limits.* EPRI, Palo Alto, CA: 2013. 3002001454**.

While there is a great deal of published work describing and analyzing WQT and explaining how to engage in it, research is lacking regarding permits that use WQT to meet compliance obligations. This report aims to provide transparency on National Pollutant Discharge Elimination System (NPDES) permits that incorporate WQT through a series of 18 case studies. The research does not attempt to provide comprehensive coverage of every NPDES permit that uses water quality trading. Rather, case studies of 18 NPDES permits are provided as a sample of permits known to allow water quality trading to meet compliance obligations. The case studies focus on the language within the permit itself, supplemented with external information that provides a context for WQT in the permit.

Implementation of the Watershed Analysis Risk Management Framework (WARMF) Watershed Model for Nutrient Trading in the Ohio River Basin: Analysis of Scioto, Muskingum, and Allegheny Watersheds. **EPRI, Palo Alto, CA: 2012. 1025820**

As part of the ORB WQT Program, the Scioto, Muskingum, and Allegheny watersheds were analyzed, using the Watershed Analysis Risk Management Framework (WARMF) model, to determine their capacity for nutrient trading. For consistency across the Ohio River Basin, the watershed models were implemented using the hydrological unit code (HUC)10 delineation available from the United States Geological Survey. We used data from the Ohio Environmental Protection Agency, Pennsylvania Department of Environmental Protection, and United States Environmental Protection Agency for point sources and water quality monitoring to set up the model. Agricultural nutrient loading factors were based on the most recent USDA crop survey.

Barriers and Solutions for Farmer Participation in the Ohio River Basin Water Quality Trading Program. **EPRI, Palo Alto, CA: 2011. 1023642.**

As part of a multiyear collaborative effort, American Farmland Trust (AFT) convened six listening sessions with approximately 150 agricultural producers (farmers) in the Ohio River Basin (ORB) to determine their readiness to sell nutrient credits in a regional WQT market. In a WQT market, municipal wastewater treatment plants, industrial manufacturing plants, and electric power companies can purchase nutrient credits to meet their regulatory requirements. They pay farmers to implement best management practices that reduce the loss of nutrients (such as nitrogen and phosphorus) and soil sediments from farms and generate nutrient offset credits. Participants in the agricultural listening sessions identified potential barriers to their participation as credit sellers in a regional WQT program and proposed solutions to overcome those barriers.

Use of Models to Reduce Uncertainty and Improve Ecological Effectiveness of Water Quality Trading Programs: Evaluation of the Nutrient Trading Tool and the Watershed Analysis Risk Management Framework. **EPRI, Palo Alto, CA: 2011. 1023610.**

Through a USDA-NRCS Conservation Innovation Grant, collaborators working on the development of the interstate Ohio River Basin Water Quality Trading Program conducted a robust analysis to evaluate possible approaches for using water quality models for crediting nutrient load reductions from agricultural best management practices (BMPs). A credit estimation method that ensures reliable and repeatable results is a critical element in a successful WQT program and is something that is not always scientifically informed. This effort considers one approach for creating a scientifically informed approach that uses a combination of field-scale and watershed-scale models for crediting agricultural conservation practices. The Nutrient Trading Tool (NTT) and the Watershed Analysis Risk Management Framework (WARMF) were selected to evaluate the non-point source load reductions at the field scale and watershed scale, respectively. The project assessed both NTT (field-scale) and WARMF (watershed-scale) models to determine the strengths and weaknesses for use in WQT. NTT was also tested by a select group of Ohio agricultural Technical Service Providers, Certified Crop Advisors, and SWCDs for applicability, user-friendliness, information content, and reliability. The project showed that both NTT and WARMF have demonstrable uses for supporting essential elements of credit calculations and policy development in WQT programs. While WARMF has been tested and applied in many locations across the United States, NTT has yet to receive a similar level of scrutiny and application. Vetting by local experts and knowledgeable program participants of both the data and assumptions used by modelers is highly recommended, especially for NTT, which relies on field-specific information. In addition, recommended NTT model improvements will enhance the accuracy and performance of the tool, the results of which will increase trust and use by program participants. WQT programs can adjust for introduced errors and uncertainties by using a combination of eligibility conditions and an explicit trade ratio. These decisions can be informed by sensitivity analysis of the calibrated models, incorporation of model "goodness of fit" results, and best professional judgment. Output of these tools can be combined to provide an appropriate level of user-friendliness and pragmatic use of best available science for crediting, policy decisions, and program administration. The project also considered characteristics of a future on-line trading registry.

***U.S. National Opinion Survey on Stacking Environmental Credits: Definition, Status, and Predictions of Wetland, Species, Carbon and Water Quality Credit Stacking.* EPRI, Palo Alto, CA: 2011. 1024803**
This report summarizes and analyzes the responses of a national survey entitled "Evaluation of Credit Stacking" that was developed jointly by EPRI, the World Resources Institute, Stetson University College of Law and the University of Kentucky. The purpose of the survey was to collect opinions about credit stacking from practitioners currently involved in environmental credit markets. The survey was conducted in the first quarter of 2010 and was sent to approximately 1,500 individuals residing primarily in the United States. After verification and removal of duplicate inputs, responses were received from 309 individuals. Respondents were asked to identify themselves as credit sellers, researchers, policy-makers, credit buyers or credit exchangers. Ninety-four percent of respondents identified themselves as either credit sellers, researchers or policy-makers, and the responses from these groups were analyzed in depth.

***Ohio River Basin Trading Project Agricultural Stakeholder Listening Workshops: Sardinia, Ohio, October 14, 2010.* EPRI, Palo Alto, CA: 2011. 1023133.**
On October 14, 2010, AFT held a listening workshop in Sardinia, Ohio, to provide information to and collect feedback from farmers and agricultural representatives on the Ohio River Basin Trading Project. The session began with a basic primer on water quality trading given by Jim Klang of Kieser & Associates. The presentation was followed by facilitated discussions. Participants were prompted with a variety of questions developed from earlier listening workshops held in other regions of the Ohio River Basin and addressed issues that producers will likely face in future water quality trading markets.

PROJECT NEWSLETTERS:

Summer 2011: Provides project overview, funding update (including announcement of 2011 CIG award), project activities, project briefing on Capitol Hill, recent and upcoming project publications and the new version of the project website.

Summer 2013: Provides project overview (including signing of the interstate trading agreement), announcement of a 2012 CIG award (to build the on-line registry), a review of watershed modeling and credit calculation and a column by AFT on farmer involvement in the trading project.

Spring 2014: Provides project highlights (including a description of stewardship credits), the trading plan amendments, the project's YouTube video on WQT and the ORB project, EPRI's technical report on the use of WQT for compliance with permit limits, EPRI's research on credit stacking and what's next.

Spring 2015: Announces the project's award of the U.S. Water Prize, the water stewardship credit auction (later postponed until Fall 2015), the first credit sales, congressional testimony, the first peer-reviewed article assessing appropriate trade ratios for WQT from project collaborators and several new EPRI technical reports related to WQT nationally.

Other Documents Available On-Line

Project templates: Included in the RFP is the pilot project application, farm history affidavit, project farm inventory and evaluation form, farm history documentation for baseline eligibility, sample for SWCD-producer contracts, sample producer announcement for funding and checklist for qualification criteria and application submittal. The RFP was customized for each state and was revised for Year 2 of the pilot trades.

Credit documentation flow: The workflow includes the SWCD installation report, the credit verification report (State Agriculture Agency), the credit certification report (State Permitting Authority), Credit Release letter (EPRI), Credit suspension, reinstatement, cancellation notice and credit calculation report.

Project Presentations

- Project YouTube video
- Public webcast: Advancing the Science for Estimating Trade Ratios in WQT
- Congressional testimony: The Role of Trading in Achieving Water Quality Objectives
- Public webcast: The Legal Status of Environmental Credit Stacking
- Agriculture Leader Briefing: The ORB WQT Trading Project (April 2012)
- Project webcast: Modeling Trading in the Ohio River Basin: Theoretical and Practical Considerations
- Stacking Environmental Opportunities and Risks in Environmental Credit Markets
- Washington, DC Briefing - Summary - Presentation
- Water and Ecosystems Area Council
- Public webcast: Water Quality trading in the Ohio River Basin
- Public webcast: Ohio River Basin Trading Program for Wastewater Treatment Plants
- Public webcast: Public Status Update

Water Quality Trading in the News: links to 30 media article on the project

Agreement and Letters:

- Signed, Multi-State Pilot Trading Plan
- The National Association of Regulatory Utility Commissioners Resolution Recognizing EPRI's Water Quality Trading Project
- USDA-NRCS State Conservationist of Indiana Expresses Support
- USEPA Provides Clarification on Incentives for Early Participation of Point Sources During Pilot Period
- USDA Expresses Support for EPRI Water Quality Trading Project
- EPA Region 4 Expresses Support for Project
- SWCDs Support Project (4 support letters)
- ORSANCO Resolution 2-11

Public Auction of Credits:

The project also developed the following materials to support a public auction.

- Water Auction Invite Final
- Pricing Summary

American Farmland Trust

American Farmland Trust:
Summary Report on Agricultural Outreach Activities
EPRI 2011 CIG
June 2015

BACKGROUND

The EPRI 2011 Conservation Innovation Grant: Pilot Test Interstate WQT in the Ohio River Basin covers October 2011 through October 2014 with no-cost extension to March 2015.

During the first phase of American Farmland Trust's involvement with the Ohio River Basin WQT project (2009-2010), AFT convened listening sessions with about 150 producers and agricultural professionals from Ohio, Kentucky, Indiana and Illinois to help the project collaborators more fully understand the type of trading market structure that might work best for agricultural producers in the ORB. Between July and October 2010, AFT recruited nine high-level agricultural stakeholders to advise AFT on the project. They included Robert Boggs, Director, Ohio Department of Agriculture, Jane Hardisty, Indiana State Conservationist, John Hardin, Past President of National Pork Producers, Don Villwock, President, Indiana Farm Bureau, Bill Gradle, Illinois State Conservationist and Dominic Bassani, environmental consultant, Biontech Corporation. In October 2010, the project decided to focus on three states for pilot trades: Ohio, Indiana and Kentucky. The project revised its scope and we focused our remaining resources on engaging agriculture in these three states. In September of 2011, AFT discontinued our informal group of advisors and formed a 15-member ORB WQT Agricultural Stakeholder Advisory Committee to advise the whole project team, with Hardin, Villwock and Gradle continuing to serve.

For the 2011 CIG, the project collaborators proposed to test key technical, regulatory and economic components of an interstate WQT program by completing pilot interstate trades between farmers and industrial point sources. At the time of submission, the collaborators estimated that direct interactions with more than 150 farmers would lead to a series of pilot trades from new conservation practices on up to 20,000 acres yielding reductions of up to 45,000 lbs of total nitrogen and 15,000 lbs of total phosphorus entering the Ohio River. Tasks included establishing the supply of credits (with AFT as lead), developing trading protocols/procedures and educating stakeholders involved with supply, applying credit estimation tools, coupling tools and linkage of estimator tools with available watershed monitoring, tracking all credits generated, executing pilot trades, using adaptive management to improve the trading framework, tracking ancillary benefits and documenting project activities.

TIMELINE OF AGRICULTURE OUTREACH

2011

- October - December: Trading plan starts to come together. In December, the agencies comment on the first discussion draft. The Agricultural Stakeholder Committee begins to provide feedback:

- Appropriate BMPs to generate credits
- Agricultural Baselines

2012

- January: Project identifies the pilot trade areas and narrows down scenarios for pilot trades to test interstate trading, identifies the interstate watersheds where the WARMF model has been calibrated and considers land uses and locations of potential buyers.
- January - August: Discuss and finalize Trading Plan/Implementation process
    - Trading plan: 8 draft revisions: Drafts on Dec. 12, April 16, May 23, June 22, June 26, July 2, July 10 with final on August 6
    - Credit Generation/Transaction: 8 draft revisions: Drafts on March 11, April 24, April 27, May 2, May 3, May 17, May 22, June 4
    - To facilitate state agency signing, both Indiana and Kentucky asked to see the draft EPRI-State Agency contract and SWCD-producer contracts as soon as possible. Most of the questions from Indiana focused on the monitoring and verification process and the role of the State Agency. Both Kentucky and Indiana were concerned about their ability to run the Region 5 spreadsheet so AFT agreed to do that for them.
- January - June: Convene Ag Stakeholder Advisory Committee Discussions: Outreach Strategies, Dealing with early adopters, Draft trading plan and ag crediting protocol, Discussion of June 5 draft of trading plan and ag crediting protocol
- January - February: Interstate discussions and webinars on incentives for pre-compliance trading, the WARMF model, proposed interstate trading process, agricultural baselines and demonstration of credit trading registry. These activities included an ORB State agency call on setting agricultural baselines and Ohio SWCD Annual Meeting. This face-to-face meeting with the SWCDs in the pilot trade counties helped resolve several lingering issues for the SWCDs and smoothed the way for productive collaborations
- February – July: Conference calls with state ag agencies help clarify contracting process and crediting steps and in-person site visits with the SWCDs in the pilot trade counties help crystallize details needed to draft the Agricultural Crediting Protocol guide.
    - April: EPRI-AFT host webinar for ag leaders in Washington, DC and USDA NRCS State Conservationists
    - June: Briefing/Discussion with State Commissioners. AFT meets with the Historic Hoosier Hills RC&D in Versailles, IN and the Switzerland County SWCD in Vevay, IN to discuss the trading plan.
- **August: Trading Plan signed**. At a ceremony in Cincinnati, OH, representatives from IN, KY and OH sign the plan that will serve as the basis for these states to implement pilot trades beginning in 2012 through 2015.
- September - December: Begin to implement trading plan.
    - September - November: EPRI finalizes contracts with states.
    - September: Meet with IN SWCDs in Aurora, IN to review trading plan and inform revisions to application packet and development of frequent questions/answers
    - October: AFT meets with OH SWCD staff in Lisbon, OH to review trading plan and inform revisions to application packet and development of frequent questions/answers
    - November: EPRI team meets in Columbus, OH
    - December: AFT develops guidelines for application package, using the trading plan for guidance and incorporating information from the agricultural crediting protocol.

First draft submitted to EPRI for review December 18, 2012. Plan is to distribute general application package early in January and have SWCDs submit applications to State Agencies by February 14, 2013.

2013

- January: Release generic Draft Application Package (January 11) with webinars to discuss the package the following week. SWCDs concerned about timelines and need more information about how the pilot program would work. For IN and KY, water quality trading isa new concept. OH SWCDs has fewer concerns since they are more familiar with WQT. The project decides to work with each state separately and custom-tailor both the application package and the timelines to accommodate their needs. IN and KY SWCDs are contacted individually by AFT.
    - Webinars with SWCDs and agencies to collect feedback on the ORB WQT application packet.
    - Additional revisions to Ohio Application packet;
- February: In person meetings and agreement from Ohio on a process.
    - AFT and EPRI submit a summary of the ORB WQT project to Solutions from the Land that is published as part of *Solutions from the Land: Developing a new Vision for United States Agriculture, Forestry and Conservation.*
    - In-person meetings with KY SWCD and NRCS staff in Maysville, KY and Burlington, KY
    - OH is first state to agree to a process and moves forward with projects. 4 page application signed by farmer and SWCD staff, baseline eligibility confirmations signed by farmer and SWCD, project farm inventory and evaluation form (KY) signed by SWCD. Remote sensing serves as primary evidence of farm practice history along with checklists, farm records when available. OH submits 4 applications by March 21, 2013. Ultimately, only 2 proceed.
    - Conference call with IN SWCDs
- March - April: More in-person meetings and summaries SWCDs can use
    - In-person meetings with SWCDs in KY and IN to review application package, answer questions about how the program will work. Meetings are followed up by weekly conference calls.
    - Summaries of pre-approved BMPs and data sheet forms for EPA Region 5 spreadsheet model to calculate nutrient credits.
    - Document availability of remote sensing data for ORB WQT counties. Proposed baseline verifications, preferred and alternative (remote sensing, potential paper records) for farm history are vetted with Ag Stakeholder Committee March 15.
    - Update to SWCDs on progress with application packages.
    - IN and KY application packets released with a rolling deadline for application between April 16 and July 1, 2013. IN applications start coming in during May. AFT completes all credit calculations. EPRI and AFT review and approve project applications. By August, project has approved 10 projects in IN.
    - Example scenarios for credit generation and reduction costs for selected practices shared with SWCDs.
    - Summary of Ohio DNR cover crops load reduction spreadheet.
- May - June:

  - KY application packet revised and released with rolling deadline between April 16 and September 1. KY SWCDs lag behind and ask for deadline extension but are hopeful they will have some applications by October.
- July:
  - Redraft agriculture web pages for EPRI website, including sections on how the trading plan incorporates concerns from producers and on pre-approved BMPs.
  - EPRI Team meets in Cincinnati, OH
  - Complete and submit a review of the agricultural regulations in Kentucky, Ohio and Indiana ahead of the proposed amendment to the trading plan.
- August: Draft proposed amendment to trading plan. AFT recommends including two additional nutrient load reduction spreadsheets developed by ODNR for milkhouse waste and cover crops and provides documentation. The first spreadsheet is the Milking Center Wastewater load reduction spreadsheet which estimates load reductions for improved milk house waste handling and controls. The second spreadsheet is the Agricultural Cover Crops & Reduced Nitrogen Applications load reduction spreadsheet which estimates load reductions based on a cover crops ability to scavenge and sequester residual nitrogen in the soil.
- September:
  - AFT, EPRI and Agency staff review verification documents for on-line registry.
  - EPRI begins putting together a video for the ORB project and AFT drafts key points to cover from the ag sector.
  - EPRI-AFT-Ag Agency discussion on verification process and documents
- October:
  - EPRI and State Agencies discuss WQT amendment and agree to sign. AFT hand delivers amendment for signature by State agricultural agencies.
  - ORB Team meets in Washington, DC

2014

- January - March:
  - Prepare for proposed March Press Event announcing sale of credits
  - Run credit calculations and check all applications for accuracy. Some projects are exceedingly complex, involving multiple fields in different HUCs and put the On-Line Registry and calculations to the test. AFT loads project documentation into the On-Line Registry for the SWCDs.
  - AFT discussion with Prasino Group (work with Dairy Management, Inc. and National Milk Producers Federation) about their plans to pursue nutrient recovery technology for dairies and what would be needed to have a new technology approved to produce credits in the ORB WQT.
  - **Press Event in Cincinnati, OH held March 11. First sale of credits.**
  - AFT compiles lessons learned from Year One of Trades, identifies gaps and recommends next steps
  - Project moves forward with second round of pilot trades. AFT decides which BMPs to stress and how to move credits to market in time for a Fall sale. AFT meets with KY State and district staff.
  - Redraft and release Project Application Package for Year 2 of the pilot trades, asking for applications by April 18 if possible and fully implemented by July 31 if possible. OH now has five projects approved with one complete and the rest starting. KY has

four applications submitted. IN has completed 11 projects with three still needing verification.

- April:
  - Recommend adding critical area planting (NRCS practice code 342) for KY. The EPA Region 5 calculator can handle this practice.
  - Meet with the Great Miami Joint Board in OH.
  - More project proposals come in from KY.
  - AFT submits written statement for the Record to the U.S. House of Representatives Committee on Transportation and Infrastructure, Subcommittee on Water Resources and the Environment "*The role of trading in helping watersheds achieve water quality objectives with the help of agriculture*."
  - EPRI finalizes Kentucky protocol for evaluating practices to ensure they meet ORB WQT baseline requirements and comply with the Agriculture Water Quality Act.
  - AFT revises Request for Proposals for Ohio SWCDs. The counties approved for pilot trades in Ohio now include Columbiana, Jefferson, Mahoning, Holmes and Morgan counties.
- May - June:
  - ORB Team meets in Washington, DC
  - One new project in Holmes County Ohio is completed and SWCD install report submitted to AFT.
  - AFT attends a field day in KY at one of the ORB project participants' farm.
  - 11 projects now approved for KY. OH has 2 new projects approved in Columbiana County and they should be completed this summer. Two project applications are pending from Holmes County (cover crops) and one has been proposed from Coshocton County.
- July: EPRI-AFT in person meetings with agencies and SWCDs in OH, IN and KY. Visit to landowner for proposed ag drainage management project in Ohio.
- August:
  - Scope out project in Logan County (Great Miami) and another project in Wayne County as demonstration projects for agricultural drainage BMPs
  - One new cover crop project in Holmes County, Ohio is approved.
- July – December:
  - 11 approved projects are installed in Kentucky. In Ohio, 3 projects approved in 2014 are installed and 2 projects approved in 2013 are installed. All SWCD install reports for projects in Ohio and Kentucky are submitted to AFT for review. All second year verifications are completed for 11 Indiana projects and verifications are submitted to AFT for review.
  - Conference call with National Federation of Milk Producers, Prasino Group to discuss Diary Resource Recovery project (aerobic digesters and nutrient recovery technology), the dairy industry's USDA NIFA-SBIR proposal (with City of Chicago wastewater reclamation district) and possibility of including nutrient-recovery ready dairies into the ORB in April 2016 (developing protocol, collecting measurements - no existing NRCS practice standard).
  - Brian Brandt from AFT and Pete Conkle from Columbiana SWCD give ORB project update and information about completed projects in Ohio, respectively, at A Community of Ecosystem Services (ACES) conference in Washington DC.

- Two drainage water management project applications (one each in Ohio and Indiana) are submitted and approvals granted. Projects are completed in cooperation with Ecosystem Services Exchange and landowners. Projects will include on-going monitoring of structures to collect data for nutrient reduction calculations. Projects are installed in January 2015.

2015

- February:
  - Brian Brandt from AFT and Pete Conkle from Columbiana SWCD give ORB project update and information about completed projects in Ohio, respectively, at NACD annual meeting in New Orleans, LA.
  - Ag Stakeholder conference call to update the group and discuss next steps
  - Invitation to US Water Prize event sent to Ag Stakeholder committee
- January - May:
  - AFT completes documentation process for the second round of completed projects.
  - Includes credit calculations, finalizing credit calculation report, reviewing and auditing all documentation for accuracy, entering projects into registry.
- April
  - Attend U.S. Water Alliance Water Prize event in Washington, DC along with other ORB team members.
- May
  - Notice sent out to Ag Stakeholder committee informing them of the postponement of the credit auction to be held in New York.
  - Second year verification completed and reviewed for one Ohio project.
- June
  - Jessica Fox and Brian Brandt speak at the Hoosier Chapter of SWCS summer meeting in Richmond, Indiana.

TRACKING AND APPROVING PROJECTS

To facilitate discussions about projects and track our progress, AFT developed and maintains complex excel spreadsheets for each state and uploads all application materials to a secure FTP site maintained by EPRI. AFT expanded the spreadsheets as we identified more variables we would need to track. Current spreadsheets include columns on:

- Approval (yes or no)
- Project Name (unique code beginning with state i.d.)
- Farmer ID
- County
- BMP
- Practice type (structural or management)
- AFT Region 5 review
- Ag Agency review
- Estimated total project cost
- Farmer cost share
- EPRI cost share
- EPRI cost share %
- District payment share
- Total committed to producers and districts

- TN credits (5 years)
- TP credits (5 years)
- TN + TP
- Cost per pound EPRI share/TN
- Cost per pound EPRI share/TN+TP
- Cost per pound total cost/TN + TP
- Baseline documented
- Farm history Affidavit
- Contract submitted
- SWCD verification
- Completed project photos
- Receipts submitted
- Final project cost
- Final reimbursement amount
- Region 5 screen shots
- Notes (animals, distance to water, HEL, etc.)
- Questions
- Items needed for complete application
- Media event
- Ancillary benefits

The spreadsheets also track:

Total amount proposed to date, total available in original agency contract and amount remaining (for total project costs proposed, total of farmer requested funds and total State agency commitment)
Credits still needed

Once projects are approved by EPRI, AFT transfers the appropriate documents to the On-Line Registry, making sure that producer confidentiality is maintained.

AGRICULTURAL STAKEHOLDER COMMITTEE DISCUSSSIONS

In August 2011, AFT recruited and confirmed 15 ORB WQT Agricultural Stakeholder Advisory Committee members. In recruiting them, we listed their responsibilities as: *"the Agricultural Stakeholder Committee will provide initial and ongoing advice in helping secure the active participation of agriculture in developing and implementing a regional water quality trading market in the Ohio River Basin. The Committee will provide input and guidance to collaborators for the following essential objectives: 1) securing the support of high level agricultural stakeholders in the region; 2) understanding the needs, concerns and constraints faced by agricultural credit sellers to help us design a market and tools that work for them; 3) designing and testing tools that help producers participate in the market; 4) widely informing the agricultural producers in the basin about this opportunity; and 5) anticipating other needs in designing and implementing a market in which agriculture will play a key participatory role."* As of June 20, 2012, the committee had 16 members based in six states in the ORB and included a State Conservationist, a president of a State Farm Bureau, crop consultants, staff from the State Departments of Natural Resources, Departments of Agriculture and commodity groups, farmers, Soil and Water Conservation District (SWCD) Board members and a USDA Agricultural Research Service scientist.

The members included:
L. Joe Cain, Director of National Affairs and Political Education, Kentucky Farm Bureau Federation
Jerod Chew, Director, Indiana State Dept. of Agriculture, Division of Soil Conservation (replaced by *Sarah Simpson*, Director, Agricultural Policy, Indiana State Dept. of Agriculture on June 15, 2012)
Stephen A. Coleman, Director, Kentucky Division of Conservation
Norman A. Faucey, Supervisory Soil Scientist and Research Leader, USDA, ARS, MWA, Soil Drainage Research Unit
William J. Gradle, Illinois State Conservationist, USDA NRCS (retired December 2011; replaced by Ivan Dozier, new Illinois State Conservationist)
John Hardin, Hardin Farms, Past President of National Pork Producers
Carolyn A. Hefner, Operations Division Director, WV Conservation Agency
Kevin R. Jeffries, Co- Owner and Operator, Grand Meadow Farms, LLC
John Kessler, Assistant Chief, Ohio DNR Division of Soil and Water Resources (joined by *Fred P. Hammon*, SWCD Program Manager, Ohio DNR Division of Soil and Water Resources in June 2012)
Laura M. Knoth, Executive Director, Kentucky Corn Growers Association/Kentucky Small Grain Growers Association
Joe Logan, Director of Ag Programs, Ohio Environmental Council
David Rowlett, Production Supervisor / Farmer, Kentucky Utilities Co. / Farm Owner
Don Villwock, President, Indiana Farm Bureau, Inc.
David B. Williams, Deputy Director, North Carolina Department of Agriculture and Consumer Services – Division of Soil and Water Conservation
Mark L. Wilson, President, Land Stewards, LLC

Patrick van der Voorn, Senior Environmental Council, The Mosaic Company, was added in late 2012. In late 2013, two more members were recruited: *Ryan Bennett*, Director, Governmental Relations, National Milk Producers Federation and *Jeff Sands*, Director of Public Policy, Agricultural Retailers Association.

The committee started holding regular meetings in October 2011 to provide valuable insights and input as the draft Interstate water quality trading plan, crediting protocols and other support materials came together. AFT (Ann Sorensen) and Ohio Farm Bureau (Larry Antosch) hosted the calls and AFT maintained a password protected website with background materials, meeting notes and a calendar and provides staff support for the committee. Early discussion topics included BMPs to generate credits, baseline considerations, crediting tools, outreach strategies to the agricultural community and how to honor early adopters of conservation practices. These early discussions helped inform the draft of a trading plan that was emerging from discussions with the state permitting authorities. The committee then provided feedback during several reviews of the draft trading plan and draft agricultural crediting protocols as the collaborators worked to improve them.

As of May 2014, the Committee members included:
Ryan Bennett, Director, Government Relations, National Milk Producers Federation
L. Joe Cain, Director of National Affairs & Political Education, Kentucky Farm Bureau Federation
Ivan Dozier, Illinois State Conservationist

Norman R. Fausey, Supervisory Soil Scientist and Research Leader, USDA, ARS, MWA, Soil Drainage Research Unit
Chad Amos, Division of Soil and Water Resources, Ohio Department of Natural Resources
John Hardin, Owner, Hardin Farms, Indiana
Jane Hardisty, Indiana State Conservationist
Kevin R. Jeffries, Co- Owner and Operator, Grand Meadow Farms, LLC. Kentucky
Laura M. Knoth, Executive Director, Kentucky Corn Growers Association/Kentucky Small Grain Growers Association
Anthony Nott, Assistant State Conservationist, USDA, NRCS, Kentucky
Kimberly Richardson, Acting Director, Kentucky Division of Conservation
David Rowlett, Production Supervisor / Farmer, Kentucky Utilities Co. / Farm Owner
Jeff Sands, Director of Public Policy, Agricultural Retailers Association
Patrick van der Voorn, Senior Environmental Council, The Mosaic Company
Don Villwock, President, Indiana Farm Bureau, Inc.
Tara Wesseler-Henry, District Support Specialist, Indiana State Department of Agriculture
Mark L. Wilson, President, Land Stewards, LLC, Ohio
*Karen Woodrich***,** State Conservationist, USDA, NRCS, Kentucky

POINTS OF DISCUSSION/CONCERN FOR THE PROJECT

Pre-Approved Best Management Practices

Based on the information from early listening sessions, input from the agricultural stakeholder advisory committee and the SWCD staff and the availability of potential crediting protocols, the pre-approved BMPS included: (1) cover crops, (2) nutrient management, (3) vegetative filter strips, (4) grass waterways, (5) livestock exclusion, (6) heavy use protection areas, and/or (7) conservation tillage. Other BMPs could be considered on a case-by-case basis.

Management practices: The only management practices chosen by farmers were cover crops and hay conversion. We added agricultural drainage water management early in 2015. The SWCDs chose to pay on a seasonal basis over the 5-year contract period so producers had an incentive to continue the practice and maintenance on the practice. Baseline documentation, as expected, was challenging for most seasonal practices

Cover Crops: Failure rate discussions with SWCDs estimated that cover crops in IN are successful about 90% of the time, are partially established 5% of the time and fail completely 5% of the time. For HUAP projects, farmers nearly always maintain the pads so the only risk is if the farmer doesn't follow the correct protocol and takes manure out too early. The margin of error on crediting was estimated at less than 10%. Speaking directly to an IN farmer proposing to use cover crops, we learned the following:

- Markets change constantly and this affects the cost-benefit ratio for installing cover crops
- Farmers with large acreage may need to make equipment adjustments. There will also be uncertainty in the pricing and availability of seed and/or aerial applications.
- Technical assistance may be critical

Hay conversion: With help from the SWCDs, we identified two options to document baseline conditions:

1. (Preferred) - The FSA 578 Report of Acreage form. This form is used to report what crops are planted on every farm that a farmer is farming in his operation. There should be a separate 578 form for each year 2009 through 2012.
2. The Summary of Coverage form provided by each crop insurance company to farmers that purchase crop insurance coverage on their farms. If a farmer does not purchase crop insurance this form would not be available. This form is provided to farmers from their crop insurance company after they report the crops and acreage for every individual farm that is covered. There will be a separate summary of coverage form for each year 2009 through 2012.

Ultimately, we had to decline one of the hay conversion projects because of we couldn't document the baseline. The FSA form showed he put the practice in the year before but the seeding failed and he did not reseed. There was no documentation of the failure, just the FSA form that showed he tried to put in hay.

Structural Practices: Structural practices included heavy use pads and milk house waste treatments. The project decided to use 10- year contracts for structural practices. SWCDs chose to pay upfront for the structural practices (up to $10,000) as soon as installed. Although the leverage was significant (farmers choosing to cover up to 60% of the costs), there may be issues with maintenance over the 10-year period since annual installment payments are not being used. Baseline documentation was easily achieved through remote sensing.

New practices:
Agriculture Drainage: Two drainage water management project applications (one each in Ohio and Indiana) were submitted and approvals granted. The projects were completed in cooperation with Ecosystem Services Exchange and landowners. Projects will include on-going monitoring of structures to collect data for nutrient reduction calculations. The projects were installed in January 2015.
Precision Agriculture: The ORB WQT Ag Stakeholder Committee felt that the use of Precision Ag should qualify as a BMP but no standards or crediting protocols were available. Led by AFT, several of the ORB WQT stakeholders applied for a USDA CIG grant in 2012 and are in the process of completing draft standards for two precision agriculture elements (the use of variable rate technology with zone mapping to control fertilizer application and the use GPS guidance systems to prevent overlapping applications of fertilizer) and recommendations on the use of the EPA Region 5 spreadsheet to quantify credits.

LESSONS LEARNED FROM THE PILOT TRADES

- Regular communication/check-in with partners continues to be important.
- Having a person on the ground with an agronomy/farming background greatly increased our credibility, particularly with the farmers and conservation districts.
- Speaking directly to a few farmers about their involvement and plans helped both EPRI and AFT better understand their perspective.
- Having the in-house ability to run the Region 5 spreadsheet was critical for the project because few SWCDs had this capability and we quickly learned that it was important to enter localized data to reduce errors in calculation.
- Needed to organize engagement of conservation districts. The individual districts would not have participated without it.

- Having the in-house ability to upload all of the application/verification materials for the SWCDs was fortuitous. It would have been difficult for the SWCDs to manage this process in a timely fashion.
- Working with SWCDs to customize RFPs to farmers helped educate the SWCD staff and secure their buy-in.
- Providing SWCDs with customized announcements to reduce their workload and standardize our messaging worked well.
- SWCD staff are familiar with conservation practice implementation but less familiar with the projected impacts of the BMPs on N and P and how attenuation affects the ultimate amount of credits generated.
- The SWCD staff mainly relied on farmers who had applied for EQIP funding and did not seek out late adopters. This gave us some experience with the earlier adopters but points out the limitations of the SWCD staff in terms of their ability to recruit farmers in the field.
- Some SWCD's simply do not have the staffing, especially the technical expertise, to complete a project in-house and rely on other state ag staff or NRCS expertise.
- Collecting farm histories and baseline data was challenging. It helped to talk this through with the SWCDs but will may continue to be problematic for management BMPs. Structural BMPs are much easier to document.
- Documenting the true cost of the credits and reflecting those costs is a critical step to understand issues that must be addressed to get to a fully functional market at scale.
- Developing the trading system with sufficient rigor and science basis so the credits were compliance grade was critical to the project. But packaging the pilot trade credits as stewardship credits was important to create a market while waiting for nutrient drivers.
- Scrubbing the applications so they could be released to the public was a lot of work and we should look for ways to streamline this part of the process.
- The input from the Ag Stakeholder committee was critical in the development of the trading plan and in securing productive participation and support from farm groups. The involvement of the Ohio Farm Bureau Federation brought critical credibility, especially early in the process, and the facilitation skills of Brian Brandt helped keep this committee engaged. Also maintaining a password protected website for the committee, helped members who were not able to join the calls and new members catch up.
- The Ag Stakeholder outreach also built trust among stakeholders and created ancillary benefits and opportunities like the work on a credit estimator for precision agriculture (separate AFT CIG).
- Water quality trading markets like the ORB are generating more interest and involvement among farm groups than carbon markets because they are now active in offering credits not just potential.

EXISTING GAPS TO BE ADDRESSED GOING FORWARD

- Existing BMPs not used. Some of the pre-approved BMPs were not used in Year One (e.g., nutrient management, filter strips). We still need some experience with these practices. We need to understand moving forward what nutrient management practice we will be using and the quantification methodology as Region 5 does not generate reduction estimates for a nutrient management practice.
- Adding new BMPs. There are other BMPs that may be effective and we may want to get some experience with them (e.g., digesters, managed drainage, etc.). We will need to figure

out a procedure to analyze these BMPs for a reduction estimate and provisionally accept them.

- How aggregation will work. Engaging the private sector (e.g. certified crop advisors) as aggregators could greatly expand any future market by bringing in more farmers.
- Timing of implementing practices and getting paid. In a fully functional market, farmers may be required to implement practices and post the resulting credits for sale - without being subsidized to do so. We should try to test this (particularly since at least one of our participating farmers is willing to install more practices to do just that). Additionally, is there a mechanism available that a farmer could implement a practice now and reserve the right to sell those credits in the next several years as the market develops?

USDA-NRCS Progress Report. April 2012
Pilot Test Interstate Water Quality Trading Ohio River Basin

2011 Conservation Innovation Grant
Grant Number: NRCS 69-3A75-11-178
Award Number: 69-3A75-11-178
Grant Period: 9/15/2011 to 9/30/2014

Jessica Fox, EPRI Project Manager, jfox@epri.com, 650-855-2138

This project is on budget and is progressing according to the original contract commitments, as follow:

Project Objective

The project's primary goal is to execute pilot trades of nutrient credits in a regional WQT program. To achieve this goal, we will work through issues related to supply of credits by farmers, including the calculation and verification of credits, regulatory treatment of credits, baseline for credit generation, potential contracting obligations and liabilities, roll of different conservation practices in trading, and many other details critical to a full-scale trading program. The project collaborators will bring actual credits to market for the reduction of nitrogen and phosphorus. At the end of the project period we expect to have tested a set of trading program rules, unraveled the logistics of interstate trading, clarified the appropriate role of the watershed model in the program, summarized the business case for trading partners, estimated the ancillary environmental benefits from trading (specifically GHG sequestration), and provided a historic test-case of how to structure a market to achieve environmental improvements.

General Project Updates

We have made substantial progress on this effort since January. We now have a full Trading Plan, which has been through comment with the states (Ohio, Indiana, Kentucky). The states are preparing to sign the plan in June or July. West Virginia and Pennsylvania have also expressed interest in signing and EPRI is in the process of engaging them. When this plan is signed, it will be the first interstate WQT plan in the world. We are engaging Environmental Groups via a targeted comment period in April and May, prior to the plan signature. We are also receiving comments on the trading plan by USDA, USEPA, EPA Region 4, EPA Region 3, EPA Region 5, WWTP steering committee, Agricultural Steering Committee, Power Plants, Farmers, and local Soil and Water Conservation Districts.

Specifically, since September 2011 we have:

- 5 interstate conference calls to discuss remaining program questions (demo of watershed model, agricultural baselines, incentives for pre-compliance trading, and interstate trading)
    1. Watershed model (Watershed Analysis Risk Management Framework (http://epa.gov/athens/wwqtsc/html/warmf.html)
    2. Agricultural baselines
    3. Incentives for pre-compliance trading
    4. Interstate Trading Logistics and Approvals

5. On-line credit trading registry

- Participation of Ohio, Indiana, and Kentucky in a one-day in-person meeting at ORSANCO offices in Cincinnati, OH (March 2012)
- State comments and verbal approval of Trading Plan
- Continue to anticipate Signing of Trading Plan by all states in June or July 2012

EPRI has announced that we plan to execute pilot trades under this project between 2012 and 2013. Based on the active participation of states, these trades will likely occur in OH, IN, and KY. EPRI has also submitted another USDA grant request for $1M to build an on-line credit trading registry for the project.

The project's Agricultural Steering Committee discusses issues related to the pilot trade design and execution once a month, including agricultural baselines, appropriate best management practices, funding to producers, etc. The project's Wastewater Treatment Plant Steering Committee has been launched and we have executed 2 calls since March. The Power Plant Steering Committee continues to be active in advising the project.

Progress on Specific Deliverables

Task 1. Establish supply of credits.
We have conducted field visits to all 9 counties where BMPs are targeted for implementation on the ground. There is robust interest from the agriculture community in engaging with the project. Currently, we have more interest in installing BMPs than our project can support financially. The reibursment to farmers is still being determined, and will be informed by the State Departments of Agriculture, and the Soil and Water Conservation District recommendations.

Task 2. Apply USDA Nutrient Trading Tool (NTT) and assess other calculation methods.
We have not yet applied NTT to the pilot trade areas, as the specifics of these projects are still being determined. It is likely that the EPA Region 5 spreadsheet will be the edge-of-field load estimation tool during the pilot period. However, we continue to intend to apply both NTT and EPA R5 spreadsheet to all projects for comparative and analytical purposes. Credits themselves will likely be generated based on R5 estimates.

Task 3. Execute pilot trades and test an interstate trading framework
This task has not begun.

Task 4. Calculate GHG impact (GHG credits) of pilot trades and assess credit stacking.
This task has not begun.

Task 5. Project Documentation and Reporting.
We are preparing contracts, agreements, and documentation associated with the pilot period. No larger project reporting has taken place.

USDA-NRCS Progress Report. September 2012
Pilot Test Interstate Water Quality Trading Ohio River Basin

2011 Conservation Innovation Grant
Grant Number: NRCS 69-3A75-11-178
Award Number: 69-3A75-11-178
Grant Period: 9/15/2011 to 9/30/2014

Jessica Fox, EPRI Project Manager, jfox@epri.com, 650-855-2138

Please note that EPRI has submitted a request NRCS to reallocate funds under this grant to optimize the implementation of BMPs on the ground during the pilot period. A rapid approval to this budget request is necessary to keep this project on schedule.

This project is on budget and is progressing according to the original contract commitments, as follows:

Project Objective

The project's primary goal is to execute pilot trades of nutrient credits in a regional WQT program. To achieve this goal, we will work through issues related to supply of credits by farmers, including the calculation and verification of credits, regulatory treatment of credits, baseline for credit generation, potential contracting obligations and liabilities, roll of different conservation practices in trading, and many other details critical to a full-scale trading program. The project collaborators will bring actual credits to market for the reduction of nitrogen and phosphorus. At the end of the project period we expect to have tested a set of trading program rules, unraveled the logistics of interstate trading, clarified the appropriate role of the watershed model in the program, summarized the business case for trading partners, estimated the ancillary environmental benefits from trading (specifically GHG sequestration), and provided a historic test-case of how to structure a market to achieve environmental improvements.

General Project Updates

We have made substantial progress on this effort since April when the last progress report was completed. We are very pleased to announce that the Trading Plan has been executed by the first three states: Ohio, Indiana, and Kentucky. The signing ceremony took place on August 9th in Cincinnati, Ohio. The ceremony included comments by Harris Sherman (Undersecretary USDA) and Bob Perciasepe (Deputy Administrator, EPA). This project is now the first interstate WQT project that operates under a shared set of rules. The full trading plan has been posted to the project website at www.epri.com/ohiorivertrading. EPRI has since received media coverage on the project from Washington D.C. to Sacramento, as well as internationally.

Specifically, since April we have:

- Held numerous calls to facilitate agreement on the final trading plan, pilot process, and logistical details related to getting projects on the ground.
- Continued outreach and communication with the Soil and Water Conservation Districts, to support them in scoping the projects that will be implemented with their producers.

- Drafted and socialized contracts that will be necessary to move money to the farmers for BMP installation.
- Hosted a highly attended "field trip" to two of the producers in the pilot area. Attendees include state conservationists, Undersecretary Sherman, EPRI project team, SWCD staff, and state agriculture agencies. The field trip was on August 8th in south-eastern Indiana.
- The National Association of Clean Water Agencies (NACWA) has offered to actively facilitate a wastewater treatment plant advisory committee for the project. We have since had 3 calls with the group to gain input and comment on the pilot period plans, rules, and approach.

EPRI has been notified of receiving a 2012 USDA-NRCS grant award for $1M to build an on-line credit trading registry for the project. This award will be critical to establishing a highly defensible system for tracking and verifying credits.

Progress on Specific Deliverables

Task 1. Establish supply of credits.
In the first half of 2012, we conducted field visits to all 9 counties where BMPs are targeted for implementation on the ground. Since then, we have socialized the specific contract language with the states and field staff. We anticipate these contracts being executed by the end of 2012, with BMPs going in starting in February 2013. It will likely take 3 months to then bring the credits to the market.

Task 2. Apply USDA Nutrient Trading Tool (NTT) and assess other calculation methods.
We have begun testing NTT and EPA Region 5 Spreadsheet model on farms. During a field tour on August 8th, we walked attendees through the details of the edge-of-field estimation tools and looked a several pilot cases of applying the tools. Edge of field estimates vary greatly depending on soil type and slope. We anticipate that the pilot period will generate a number of comments on the robustness of the edge-of-field estimation tools. These worksheets can be provided to USDA-NRCS upon request.

Task 3. Execute pilot trades and test an interstate trading framework
This task has not begun.

Task 4. Calculate GHG impact (GHG credits) of pilot trades and assess credit stacking.
This task has not begun.

Task 5. Project Documentation and Reporting.
We are preparing contracts, agreements, and documentation associated with the pilot period. No larger project reporting has taken place.

USDA-NRCS Progress Report. May 2013
Pilot Test Interstate Water Quality Trading Ohio River Basin

2011 Conservation Innovation Grant
Grant Number: NRCS 69-3A75-11-178
Award Number: 69-3A75-11-178
Grant Period: 9/15/2011 to 9/30/2014
Progress Report Period: October 2012 thru April 2013

Jessica Fox, EPRI Project Manager, jfox@epri.com, 650-855-2138

This project is on budget and is progressing according to the contract commitments, as follows:

Project Objective

The project's primary goal is to execute pilot trades of nutrient credits in a regional WQT program. To achieve this goal, we will work through issues related to supply of credits by farmers, including the calculation and verification of credits, regulatory treatment of credits, baseline for credit generation, potential contracting obligations and liabilities, roll of different conservation practices in trading, and many other details critical to a full-scale trading program. The project collaborators will bring actual credits to market for the reduction of nitrogen and phosphorus. At the end of the project period we expect to have tested a set of trading program rules, unraveled the logistics of interstate trading, clarified the appropriate role of the watershed model in the program, summarized the business case for trading partners, estimated the ancillary environmental benefits from trading (specifically GHG sequestration), and provided a historic test-case of how to structure a market to achieve environmental improvements.

General Project Updates

We have made substantial progress on this effort since September 2013 when the last progress report was completed. Working under the first interstate signed trading plan (Ohio, Indiana, and Kentucky) we have proceeded to implement conservation practices that are proven to reduce TN and TP loading with farmers.

Specifically, since September 2012 we have:

- Submitted and receive approval from NRCS for a revised budget allocation to allow for more effective implementation of this scope of work.
- Established contracts with each state agriculture agency that will move money to SWCDs for establishing farmer cost-share contracts.
- Supported many discussions, webcasts, and in-person meetings with SWCDs to address key questions related to EPRI providing cost-share to farmers.
- Addressed all identified hurdles to proceeding with cost-share application submission in all 3 states.
- Received 4 cost-share proposals from Ohio farmers.
- Applied NTT and EPA Region 5 spreadsheet to estimate edge-of-field reductions for each cost-share proposal.
- Continued engagement via our 4 steering committees: power plants, wastewater treatment plants, environmental groups, and agriculture.

In parallel, we have done extensive work under our 2012 CIG to prepare the core infrastructure for the first credit transaction in the program – a project summary provided separately to USDA (contract NRCS Grant Agreement 69-3A75-12-254).

Progress on Specific Deliverables

Task 1. Establish supply of credits. The majority of effort under this grant between October 2012 and April 2013 has been focused on this task. In the first half of 2012, we conducted field visits to all counties where BMPs are targeted for implementation. Contracts are now in place between EPRI and each State Department of Agriculture. Each state is contracted to receive $100,000, which they will pass through to Soil and Water Conservation Districts (save 10% for overhead costs), who will then contract to farmers for approved BMPs (save 10% for overhead costs). In total, $80,000 will be moved to farmers in each state as cost-share for implementing approved BMPs. There is a maximum of 75% cost-shared offered with a total project cap not to exceed $10K.

Working with the State Ag Departments, we released Requests for Proposals (i.e. Cost-share Applications) in all three states in January 2013. While originally we attempted to release one RFP across all three states, we later customized the package for each state to respond to state-specific questions and needs. We also had to address communication gaps related to staff turnover since August 2012 (date of signed trading plan) within each state at various levels including NRCS, State Ag agencies and SWCD staff. In addition to staff turnover, many key questions and gates were identified during the step of releasing our RFP including: the role of NRCS in providing technical support for implementing BMPs; possible competition between our cost-share and NRCS/state cost-share programs; staff availability to participate in our project discussions; pressure on schedules to socialize the RFP, complete project applications, and implement BMPs prior to spring planting; reluctance to communicate to farmers that our cost-share funds “performance & outcomes” rather than acres of BMPs (which is contrary to NRCS cost-share programs); SWCD board approval for specific revisions to our RFP; time lag for States to establish contracts with SWCD to move money to farmers; reluctance of some SWCDs to proceed until their state-SWCD is signed and sealed; relationships between SWCDs and their State Ag agency that needed to be supported via our project meetings; general balancing between communicating the complexity/rigor of this project (underlying watershed models, credit equations, trade ratios, reserve pool, etc) with the current concern/hurdle; deep concerns over personal liability at SWCD level for engaging in project (if something fails, will they be personally sued by a credit buyer).

At this point, we have addressed all the current concerns and revised RFPs are released in all three states. We already have 4 project proposals from Ohio farmers and have approved the Ohio DNR to proceed with contracts to their SWCDs. All 4 of these projects are structural BMPs related to manure management. For these projects, most are significantly below the 75% cost-share cap (applications are requesting between 55% and 65% cost share). Ohio is already proceeding to collect an additional 4 applications, which are anticipated to fully allocate their $80K of farmer funding (8 projects at $10K cap). Credits from the first 4 farms are anticipated to become “transactable” in the fall of 2013.

For IN and KY, we are working with these SWCDs to support the socialization of the RFP with farmers. In Indiana, they are waiting for the State-SWCD contract before proceeding to talk to farmers (a factor outside the control of the EPRI project team). We anticipate project proposals from these two states by July.

<u>Task 2.</u> Apply USDA Nutrient Trading Tool (NTT) and assess other calculation methods.
Of all scientific aspects of the project, the edge-of-field model has been identified as the area with the greatest uncertainty. EPA Region 5 spreadsheet is the default estimate tool for credit calculations in our project, however, we are comparing these outputs to the current version of NTT that is publicly available. To date we have seen variability between NTT and Region 5, and have noted several specific concerns with both models. For example, in some cases we believe that the models are underestimating load reductions, in other cases they may overestimate reductions. Neither model has an associated "uncertainty factor" that we can incorporate into our trading equation (derived from a sensitivity analysis of the models). This is critical for understanding how accurate the models are. While we have investigated developing such a factor, the lack of calibration of either model with in-stream measured data limits the ability to conduct a rigorous sensitivity analysis. We are working closely with USDA Office of Environmental Markets to support further development of NTT to address this concern. We are also developing a project cost estimate for developing an uncertainty factor for EPA Region 5 model.

As we do not have the funds to advance the development of the edge-of-field model, we are proactively addressing the concern via conservative adjustments to the "Margin of Safety" in our credit equation (i.e., increasing the trade ratio). We anticipate that we will continue to generate specific comments on the robustness of the edge-of-field estimation tools.

<u>Task 3.</u> Execute pilot trades and test an interstate trading framework
The credit transactions have not begun. We anticipate a first round of trades in the fall/winter of 2013.

<u>Task 4.</u> Calculate GHG impact (GHG credits) of pilot trades and assess credit stacking.
This task has not begun, however, based on project discussions, we anticipate reduction of GHG via reduced fertilized application during the pilot period. The EPRI-MSU Nitrous Oxide calculator has completed verification with the Voluntary Carbon Standard (VCS) and we anticipate it's application to this project.

<u>Task 5.</u> Project Documentation and Reporting.
We are preparing contracts, agreements, and documentation associated with the pilot period. No larger project reporting has taken place.

USDA-NRCS Progress Report. October 2013
Pilot Test Interstate Water Quality Trading Ohio River Basin

2011 Conservation Innovation Grant
Grant Number: NRCS 69-3A75-11-178
Award Number: 69-3A75-11-178
Grant Period: 9/15/2011 to 9/30/2014
Progress Report Period: May 2013 thru October 2013

Jessica Fox, EPRI Project Manager, jfox@epri.com, 650-855-2138

This project is on budget and is progressing according to the contract commitments, as follows:

Project Objective

The project's primary goal is to execute pilot trades of nutrient credits in a regional WQT program. To achieve this goal, we will work through issues related to supply of credits by farmers, including the calculation and verification of credits, regulatory treatment of credits, baseline for credit generation, potential contracting obligations and liabilities, roll of different conservation practices in trading, and many other details critical to a full-scale trading program. The project collaborators will bring actual credits to market for the reduction of nitrogen and phosphorus. At the end of the project period we expect to have tested a set of trading program rules, unraveled the logistics of interstate trading, clarified the appropriate role of the watershed model in the program, summarized the business case for trading partners, estimated the ancillary environmental benefits from trading (specifically GHG sequestration), and provided a historic test-case of how to structure a market to achieve environmental improvements.

General Project Updates

We have made substantial progress on this effort since April 2013 when the last progress report was completed. Working under the first interstate signed trading plan (Ohio, Indiana, and Kentucky) we have proceeded to implement conservation practices that are proven to reduce TN and TP loading with farmers.

Specifically, since April 2013 we have:

- Developed active support of the SWCDs involved in the pilot period.
- Via the SWCDs, we have received 19 full applications from farmers, plus approximately 10 other early project ideas. Of these, we have approved 17 project proposals. 15 projects have proceeded to implementation phase. Of these, 7 have already been verified by the State Department of Agriculture as being fully implemented.
- 5 farmers have received their payments, confirming that our cash flow from EPRI, to the State Ag Agency, to SWCD, and to landowner is functional.
- For all projects, we have collected full documentation of baseline conditions, including aerial photography, 579 forms, and other farm records as necessary.
- We have developed and vetted the full project documentation flow including: farmer contract, SWCD installation report, State Ag Agency Verification report, Permit Authority Certification Report, Credit Suspension Notice, Credit Cancellation Notice, and Credit Transfer Notice.
- We have proposed, negotiated, and successfully executed an amendment to the Trading Plan V1.0, which acknowledges the validity of "stewardship credits", that such credits

can be used towards a Supplemental Environmental Project obligation, and clarifies that all edge-of-field load reductions must be based on soil, slope, and field specific values.
- Continued engagement via our 4 steering committees: power plants, wastewater treatment plants, environmental groups, and agriculture.

In parallel, we have done extensive work under our 2012 CIG to prepare the core infrastructure for the first credit transaction in the program – a project summary provided separately to USDA (contract NRCS Grant Agreement 69-3A75-12-254).

Progress on Specific Deliverables

Task 1. Establish supply of credits. Contracts are in place between EPRI and each State Department of Agriculture. Each state is contracted to receive $100,000, which they will pass through to Soil and Water Conservation Districts (save 10% for overhead costs), who will then contract to farmers for approved BMPs (save 10% for overhead costs). In total, $81,000 will be moved to farmers in each state as cost-share for implementing approved BMPs. There is a maximum of 75% cost-shared offered with a total project cap not to exceed $10K.

All past questions and concerns from SWCDs have been resolved and landowner projects have been proposed that meet with the program requirements for participation. Indiana has move particularly quickly, proposing 13 projects, plus another 4 project ideas. Of these, EPRI approved 11 projects that met program requirements and that could provide reasonable nutrient reductions for the cost. 7 of these projects have been installed and verified by the State, and 5 farmers have been paid. Ohio proposed 6 projects, which were approved. For 2 of these, the landowner later decided to not proceed. Installation of approved Ohio projects is expected in November 2013, with another 4 projects expected to be proposed in 2014. Delays in engineering approval and design have delayed the OH project implementation. Full proposals for Kentucky projects are still pending, waiting for engineering designs.

Farmers have signed 5 year contracts with their SWCDs. The contracts are short and straightforward. At present, the project remains on track to deliver approximately 66,000 pounds of TN reductions.

Task 2. Apply USDA Nutrient Trading Tool (NTT) and assess other calculation methods. We are working closely with USDA Office of Environmental Markets to support further development of NTT to address previously identified concerns around calibration and uncertainty. Meanwhile, we are proceeding to apply EPA Region 5 model for quantifying the edge-of-field nutrient reductions. We have observed variation in the load reduction estimates if we use the default values in the model verses the field specific values. Therefore, in the recently executed amendment to the Trading Plan, the States have clarified that the Region 5 model must be run for field, slope, and soil specific values, rather than default values. Due to budget limitations we have not yet developed a scientifically-based estimate of the “margin of safety” for the EPA Region 5 model, however we have flagged this for future funding.

Task 3. Execute pilot trades and test an interstate trading framework
EPRI is proceeding to sell the first credits in the program as “stewardship” credits, which aligns with EPRI’s organizational mission and status. We are in the process of executing over-the-counter contracts with the first buyers in the program and are planning for a full press release and media event in the first quarter of 2014. The credits will be registered and posted in a public view on the on-line credit trading registry, along with appropriate project documentation records. We anticipate the first auction for credits to occur in Sept 2014.

<u>Task 4.</u> Calculate GHG impact (GHG credits) of pilot trades and assess credit stacking.
This task has not begun, however, based on project discussions, we anticipate reduction of GHG via reduced fertilized application during the pilot period. The EPRI-MSU Nitrous Oxide calculator has completed verification with the Voluntary Carbon Standard (VCS) and we anticipate it's application to this project. We do not, however, anticipate selling carbon credits during the pilot period.

<u>Task 5.</u> Project Documentation and Reporting.
We have finished preparing all contracts, agreements, and documentation associated with the pilot period. We are preparing to post all the project templates to the project website. We held a public webcast in September 2013 and have posted the recording to the website. EPRI and the project collaborators participate in various presentations and meeting across the country to share project updates. No larger project reporting has taken place.

USDA-NRCS Progress Report. June 2014
Pilot Test Interstate Water Quality Trading Ohio River Basin

2011 Conservation Innovation Grant
Grant Number: NRCS 69-3A75-11-178
Award Number: 69-3A75-11-178
Grant Period: 9/15/2011 to 9/30/2014
Progress Report Period: November 2013 thru June 2014

Jessica Fox, EPRI Project Manager, jfox@epri.com, 650-855-2138

This project is on budget and is progressing according to the contract commitments, with a possible no-cost extension request needed, as follows:

Project Objective

The project's primary goal is to execute pilot trades of nutrient credits in a regional WQT program. To achieve this goal, we will work through issues related to supply of credits by farmers, including the calculation and verification of credits, regulatory treatment of credits, baseline for credit generation, potential contracting obligations and liabilities, role of different conservation practices in trading, and many other details critical to a full-scale trading program. The project collaborators will bring actual credits to market for the reduction of nitrogen and phosphorus. At the end of the project period we expect to have tested a set of trading program rules, unraveled the logistics of interstate trading, clarified the appropriate role of the watershed model in the program, summarized the business case for trading partners, estimated the ancillary environmental benefits from trading (specifically GHG sequestration), and provided a historic test-case of how to structure a market to achieve environmental improvements.

General Project Updates

We have made substantial progress on this effort since October 2013 when the last progress report was completed. Working under the first interstate signed trading plan (Ohio, Indiana, and Kentucky) we have implemented conservation practices that are proven to reduce TN and TP loading with farmers, completed a full cycle of credit documentation flow to "verify" and "certify" installed BMPs, registered the credit in the on-line credit trading registry, and completed the first pilot trades in the program.

Specifically, since October 2013 we have:

- Developed active support of the SWCDs involved in the pilot period.
- Via the SWCDs, we have received 34 full applications from farmers. Of these, we have approved 29 project proposals. All of the Indiana projects (11) are fully installed. Kentucky currently has 11 projects in the process of installation. Ohio has 3 projects installed and 4 pending completion.
- All Indiana farmers have received their payments, confirming that our cash flow from EPRI, to the State Ag Agency, to SWCD, and to landowner is functional.
- For all projects, we have collected full documentation of baseline conditions, including aerial photography, 579 forms, and other farm records as necessary.
- We have developed and implemented the full project documentation flow including: farmer contract, SWCD installation report, State Ag Agency Verification report, Permit Authority Certification Report, Credit Suspension Notice, Credit Cancellation Notice, and

Credit Transfer Notice (we have not had cause to use the Credit Suspension Notice, Credit Cancellation Notice, or Credit Transfer Notice).

- Developed and executed contracts with first 3 buyers in the program (Duke Energy, AEP, and Hoosier) for the purchase of Stewardship Credits.
- On March 11, transferred credits via an on-line credit registry (under our 2012 CIG)
- Developed extensive public communication including updating the project website, developing a project U-tube movie, development of a 1-page "infographic", and robust media engagement (including coverage in the Wall Street Journal in February).
- Hosted a full Credit Transfer event, attended by over 125 state and federal agency staff, farmers, power plants, environmental groups, wastewater treatment plants, and interested public.
- Published the first peer-reviewed scientific article to account for attenuation via trade ratios in WQT: Attenuation Coefficients for Water Quality Trading .The paper was published in June 2014 in the respected journal, Environmental Science and Technology. A public webcast is planned for August 2014 to discuss the findings.
- Continued engagement via our 4 steering committees: power plants, wastewater treatment plants, environmental groups, and agriculture. This has included being responsive to Sierra Club regarding specific concerns on the project.

Progress on Specific Deliverables

Task 1. Establish supply of credits. Contracts are in place between EPRI and each State Department of Agriculture. Each state is contracted to receive $100,000, which they will pass through to Soil and Water Conservation Districts (save 10% for overhead costs), who will then contract to farmers for approved BMPs (save 10% for overhead costs). In total, $81,000 will be moved to farmers in each state as cost-share for implementing approved BMPs. There is a maximum of 75% cost-shared offered with a total project cap not to exceed $10K.

Indiana: All projects are contracted and installed except for $10,000 remaining.
Ohio: 3 Projects are installed. Delays in engineering have prevented project installations. We re-released the RFP in Ohio and clarified the date for installations as July 31st. This has led to securing another 4 project contracts and we anticipate their installation by August 31st. Lack of staff time to pursue projects is likely the cause for difficulty advancing projects.
Kentucky: Robust collaboration with the state agencies lead to a very successful RFP in March 2014. All projects are now contracted and installations are proceeding rapidly. We anticipate project completions by July 31.

While we began executing 5 year contracts with farmers, we have transitioned towards 10 year contracts for structural projects. Season projects (cover crops) will still have 5 year contracts. The contracts are short and straightforward. At present, the project remains on track to deliver approximately 66,000 pounds of TN reductions, although we may need a no-cost extension due to project installation delays predominately in Ohio.

Task 2. Apply USDA Nutrient Trading Tool (NTT) and assess other calculation methods. We are working closely with USDA Office of Environmental Markets to support further development of NTT to address previously identified concerns around calibration and uncertainty. Meanwhile, we are proceeding to apply EPA Region 5 model for quantifying the edge-of-field nutrient reductions. We have observed variation in the load reduction estimates if we use the default values in the model verses the field specific values. Therefore, in the recently executed amendment to the Trading Plan, the States have clarified that the Region 5

model must be run for field, slope, and soil specific values, rather than default values. Due to budget limitations we have not yet developed a scientifically-based estimate of the "margin of safety" for the EPA Region 5 model, however we have flagged this for future funding.

Task 3. Execute pilot trades and tested an interstate trading framework
EPRI has competed the first credit sales in the program as "stewardship" credits, which aligns with EPRI's organizational mission and status. This fully meets the goals of this grant.

Task 4. Calculate GHG impact (GHG credits) of pilot trades and assess credit stacking.
We do not anticipate farmers proposing projects specifically for reduced fertilizer application during this grant period. We have determined that a focused effort to solicit such project proposals will be necessary. Based on discussions with the states and our active agriculture steering committee, we believe there to be good opportunity for such projects, given the focus and attention. During this grant period, we do not anticipate the opportunity to calculate GHG credits.

Task 5. Project Documentation and Reporting.
All contract templates, project documentation flow, and related items have been posted to the project website. A U-tube video was developed and posted, as well as an infographic. Attention and care is given to keep a fully updated project website, and we monitor and respond to the project-specific e-mail box (ohiorivertrading@epri.com). EPRI and the project collaborators participate in many presentations and meeting across the country to share project updates. Further, EPRI submitted comments to Congress, associated with Rep Gibbs hearing on water quality trading. These full comments are attached to this progress report.

This grant period ends on September 30, 2014. EPRI is assessing whether a no-cost extension will be needed under this grant.

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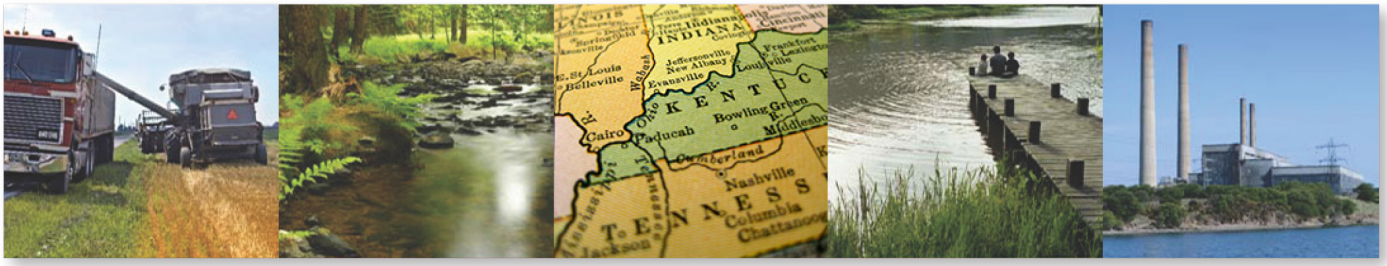


Ohio River Basin Trading Project

Summer 2013 **Project Update**

Project Overview

Water quality trading is a market-based approach to achieving water quality standards through programs that allow dischargers to purchase pollution reductions from another source. EPRI's Ohio River Basin Trading Project is a first-of-its-kind interstate trading program with initial participation from Ohio, Indiana, and Kentucky. The successful implementation of this Project will allow power companies, famers, and other industrial dischargers to work together to improve water quality, minimizing costs to the public and stakeholders. The Project will also benefit receiving water bodies that are now threatened by nitrogen and phosphorus pollution.

Interstate Trading Agreement Signed

In August of 2012, representatives from Indiana, Kentucky and Ohio signed the plan that launched interstate water quality pilot trades in the Ohio River Basin. The plan serves as the basis for these states to implement pilot trades beginning in 2013 through 2015. While some states have adopted trading policies or rules to govern trading within their jurisdictions, this is the first interstate trading program where several states will operate under the same rules and a water quality credit generated in one state can be applied in another.

The pilot Project is also the world's largest water quality trading program. Currently it spans Ohio, Indiana, and Kentucky, but the

Manager Message

The Ohio River Basin Water Quality Trading Project has taken great strides in the last year. The trading plan that was signed last August 2012 by representatives from Indiana, Kentucky and Ohio has created the world's first interstate water quality trading project operating under a common trading plan. This plan represents the culmination of a tremendous collaborative effort across many stakeholders in the Ohio River Basin.

With a signed trading plan providing foundation, the majority of project work since August 2012 has been focused on generating an initial supply of water quality credits that will kick-start a fully functional program. In April of 2013, EPRI released a Request for Proposals to implement agricultural best management practices (BMPs) to reduce nutrients in targeted watersheds in the Ohio River Basin. Twelve Soil and Water Conservation Districts in the three states have stepped up to pilot test our process and have already begun contracting for BMPs with farmers who qualify for participation in our project.

EPRI is committed to supporting a transparent, defensible, and rigorous project. This has been demonstrated through our efforts to advance the **Science** through rigorous watershed modeling; **Consistency** and **Transparency** through the use of an on-line registry; **Stakeholder Engagement** through our multiple steering committees; **Credibility** through our balanced and legally defensible project structure; and **Trust** through our commitment to integrity and open communication. The complexity of this effort has certainly presented challenges and our collaborative team has navigated hundreds of social, economic, and ecological considerations. However, we will not sway from our fundamental commitment to consistency, credibility, and collaboration.

Impacts on water quality in the Ohio River Basin come from many sources including power plants, wastewater treatment plants, urban stormwater, agriculture, and even from origins outside of the Basin via atmospheric deposition. Due to the many sources of impacts and high nutrient loading in some areas, improving water quality requires collaboration among national and state agencies, power plants, wastewater treatment plants, farmers, environmental groups, and others. We thank the efforts of all of the collaborators in the Ohio River Basin in working towards our shared goal of achieving water quality improvements more efficiently.

Sincerely,

Jessica Fox

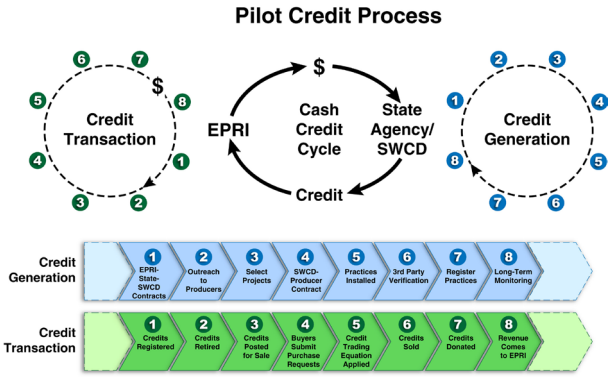
Jessica Fox
EPRI Program Manager

Signing of the Pilot Trading Plan V 1.0. From right to left, Steve Hohmann, Commissioner, Kentucky Department of Natural Resources; Bruce Scott, Commissioner, Kentucky Department of Natural Resources; Thomas Easterly, Commissioner, Indiana Department of Environmental Management; Joseph Kelsay, Director, Indiana State Department of Agriculture; Scott Nally, Director, Ohio Environmental Protection Agency; Karl Gebhardt, Chief and Deputy Director, Ohio Department of Natural Resources.

same structure and tools could expand to include all Ohio River Basin States and would potentially create credit markets for 46 power plants, thousands of wastewater facilities and other industries, and approximately 230,000 farmers. The signed 'Pilot Trading Plan 1.0 for the Ohio River Basin Water Quality Trading Project' can be found on the **Agreements & Letters section of the Project website**. Press coverage of the trading plan can be found on the **Reference Shelf of the Project website.**

Pilot Credit Creation

Contracts are now in place between EPRI and the three state agriculture agencies participating in the pilot period: Ohio Department of Natural Resources, Kentucky Division of Conservation, and Indiana State Department of Agriculture. These contracts commit each state to removing 22,000 pounds of total nitrogen and 11,000 pounds of total phosphorus over a five-year period. Each state is contracted to receive funds ($100,000), which they will pass to Soil and Water Conservation Districts (retaining 10% for overhead costs), who will then contract to farmers for approved BMPs (retaining 10% for SWCD overhead costs). In total, $81,000 will be moved to farmers in each state in the form of cost-share for implementing approved BMPs.



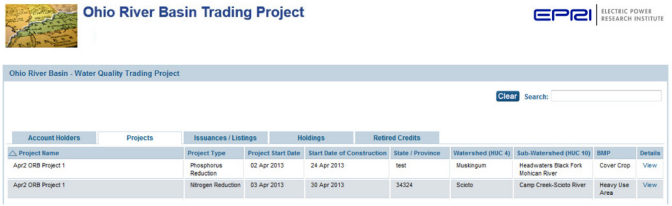
Details of the pilot credit process can be found in the signed 'Pilot Trading Plan 1.0 for the Ohio River Basin Water Quality Trading Project' on the **Agreements & Letters section of the Project website.**

Working with the state Departments of Agriculture, we released Conservation Project Applications (i.e., cost-share applications) in select counties in Indiana (Ripley, Switzerland, Ohio, Dearborn and Wayne counties), Ohio (Columbiana, Jefferson, Mahoning and Morgan counties), and Kentucky (Bracken, Boone and Mason counties) for farmers to apply for funding under the Project. EPRI will be funding 30 or more conservation projects to generate nutrient credits in the three states. Pre-approved BMPs include: (1) cover crops, (2) nutrient management, (3) vegetative filter strips, (4) grass waterways, (5) livestock exclusion, (6) heavy use protection areas, and/or (7) conservation tillage. Other BMPs may be considered on a case-by-case basis. Each BMP project is limited to $10,000 of funding with no more than 75% cost-share. When proposals are accepted, producers sign agreements with their Soil and Water Conservation Districts for the implementation of the conservation practices.

We now are preparing to pilot test our Project documentation stream which will include farm practice history records, BMP verification reports, and credit certification report. We anticipate the credit life to be five years during the pilot period, but may be longer in future phases of the project. The first credit transaction is anticipated to occur in the fourth quarter of 2013.

EPRI Announces $1M for Water Quality Trading Infrastructure

In August of 2012, USDA Under Secretary for Natural Resources and Environment Harris Sherman announced that EPRI received a Conservation Innovation Grant (CIG) of $1 million to deploy an innovative, secure and proven online registry to support the Ohio River Basin Water Quality Trading Project. This will be the third CIG project grant since 2009. The 2012 grant funding added a key component that is critical to the long-term success of water quality trading in the region: transparent, efficient and robust market infrastructure. This infrastructure, provided by Markit, will include a sophisticated credit registry (see screenshot below), documentation flow tools, and a secure transaction platform. The registry system tracks credits through the credit lifecycle and provides appropriate public access to the documentation for each credit listing. Read the full press release on the **Reference Shelf of the Project website.** Markit has been named Best Registry Provider for four consecutive years in the annual survey conducted by Environmental Finance magazine and we are proud to be working with them on this effort.



Customized Public View of Project Trading Registry

Watershed Modeling and Credit Calculation

A fundamental challenge for water quality trading is understanding, quantifying, and managing the uncertainty associated with the implementation of practices on-the-ground and their associated water quality benefits over time and place. This challenge is especially pronounced when trading involves agricultural nonpoint sources as credit sellers. The Ohio River Basin Water Quality Trading Project is using a scientifically-based credit equation methodology that will account for location-specific nutrient attenuation factors, rather than a blanket trading ratio throughout the entire Ohio River Basin. The use of models ensures that the credits in the project appropriately account for both farm and watershed unique characteristics on a transaction by transaction basis.

The Project uses two models used for estimating nutrient reduction from the point of generation (credit seller) to the point of use (credit buyer). We are currently using EPA Region 5's spreadsheet model for estimating nutrient reductions at the edge of the field as different Best Management Practices (BMPs) are implemented. However, we continue to monitor opportunities to improve the edge-of-field estimates, including the USDA/NRCS Nutrient Tracking Tool (NTT) and others. The Watershed Analysis Risk Management Framework (WARMF) model is used for estimating nutrient attenuation (reduction) from the edge-of-field to the point of use. Under funding from USDA and EPA, the Project collaborated with the University of California Santa Barbara to calibrate the WARMF model with observational data. Nutrient load attenuation factors were developed for total nitrogen (TN) and total phosphorus (TP) for the watersheds in the Project pilot area. Modeling this attenuation creates a trade ratio of the amount of nutrients at the point of creation to the amount of nutrient reduction at the buyer location specific to each credit. More results of the model calibration can be found in the EPRI report (1025820) "Implementation of the Watershed Analysis Risk Management Framework (WARMF) Watershed Model for Nutrient Trading in the Ohio River Basin" which can be found on the **Reference Shelf of the Project website.**

Nutrient Reduction at Lower Cost

Project Collaborator's Spotlight – American Farmland Trust Discusses Farmer Involvement in the Trading Project

Long before the Ohio River Basin Water Quality Trading Project headed out into the field to test pilot trades, American Farmland Trust (AFT) and our collaborator, the Ohio Farm Bureau Federation, asked approximately 150 farmers and other agricultural stakeholders for their input regarding concerns with WQT, and incorporated their suggestions into the design of how the Ohio River Basin WQT Project would work. An EPRI report (1023642) summaries those six agricultural listening sessions and can be found on the **Reference Shelf of the Project website**. Farmers wanted straightforward applications and contracts, trusted market intermediaries like Soil and Water Conservation District (SWCD) staff, access to technical assistance, synergy with existing federal and state conservation incentive programs, and consistent and transparent rules. By incorporating this early farmer feedback we ensured the Project works for both buyers and sellers. Now that we have a signed trading plan, we're continuing to benefit greatly from the feedback provided by farmers, SWCD staff, State agricultural agency staff, USDA Natural Resources Conservation Service staff and the Project's active and engaged Agricultural Stakeholder Advisory Committee.

During the pilot trading period, project collaborators and participants get invaluable real time experience with establishing conservation practices on the ground while learning what works and what doesn't. We are looking for BMP projects that provide cost-effective nutrient reductions, address priority concerns for the county or State, produce ancillary benefits for the basin (improvements in air quality or wildlife habitat), and provide the Project with a range of different practices to test. By calculating potential nutrient reductions in terms of pounds reduced (or credits) from various practices and their costs, the Project helps farmers and SWCD staff focus on how many pounds of nutrients they can keep out of the watershed. This focus on being paid for performance will be critical to efficiently improving the overall water quality from agriculture practices going forward.

American Farmland Trust's interest in private ecosystem services markets is deeply rooted in its 33-year history of protecting farmland, promoting sound farming practices and keeping farmers on the land. As AFT's Director of Research and project lead Ann Sorensen points out, *"AFT believes water quality trading markets can be an important tool to improve water quality better, faster, and cheaper by paying farmers to implement needed conservation practices to reduce nutrient run-off, provide additional environmental benefits to the watersheds and protect critical farmland soils in the process."*

Documentation and Consistency

The Project team is currently vetting a comprehensive documentation portfolio that will ensure the pilot credits are consistent and defensible. 100% of our BMP projects will be verified with on-the-ground field visits by the state agriculture agency, then monitored at a minimum of once per year for the five year term of the funding agreements. All projects will need to be reviewed and confirmed by the permitting authority in each state prior to credits being released for transaction. A full set of project documentation will be required prior to credit release, including Farm Practice History Affidavit, Baseline Certification Report, BMP Verification Report, Annual Monitoring Report, aerial farm photos, as well as others. We will also have records for numbers of credits held in the project reserve pool (to mitigate unforeseen BMP failures), as well as Credit Suspension Notifications in the event the credits are suspended for any reason. The entire documentation flow process will be enforced via the on-line credit registry provided by Markit, and will not allow projects to proceed unless the necessary documents have been completed, reviewed and approved by the State Agriculture Agencies and the State Permitting Authority. Hunton & Williams is providing legal support for this effort as we strive for simplicity yet completeness.

Stakeholder Steering Committees

The project has actively sought input with stakeholders at appropriate intervals since 2009. We have three organized stakeholder steering committees including Agriculture, Power Plants, and Environmental Groups. We appreciate the National Association of Clean Water Agencies (NACWA) for hosting project calls with their WQT wastewater treatment plant committee, as needed. Further, we have direct engagement with State and Federal Agencies at appropriate levels and frequencies. We are grateful for the energy and candid input from all of our participating stakeholders, without whom the project would not be possible.

Funders and Collaborators

Project Funders

American Electric Power
Duke Energy
Electric Power Research Institute
Exelon Corporation
Hoosier Energy
Tennessee Valley Authority
U.S. Department of Agriculture – Natural Resources Conservation Services
U.S. Environmental Protection Agency

Cost-Share Contributors

American Farmland Trust
Kieser & Associates, LLC
Markit
The Mosaic Company Foundation (via American Farmland Trust)
Ohio Farm Bureau
Ohio River Valley Water Sanitation Commission (ORSANCO)

Project Technical Support Team

American Farmland Trust
Electric Power Research Institute
Hunton & Williams
Kieser & Associates, LLC
Markit
Ohio Farm Bureau
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EPRI intends to support a collaborative process for the development of this project. The project website was designed to facilitate communication of important project materials, and to solicit questions, comments, and feedback from the many interested stakeholders. Please visit the project website for more information and to download meeting materials, related EPRI reports, Frequently Asked Questions, and additional project resources.

3002001718 Summer 2013

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ELECTRIC POWER RESEARCH INSTITUTE

Ohio River Basin Trading Project

March 2014 **Project Update**

Project Highlights

Ohio River Basin Stewardship Credit Transactions

With participation from Ohio, Indiana, Kentucky, United States Department of Agriculture, United States Environmental Protection Agency, Soil and Water Conservation Districts, advisory groups, farmers and other stakeholders, the Electric Power Research Institute (EPRI) will showcase the first voluntary, verified, and quantified stewardship credits for water nutrients in the Project. The public event on March 11th in Cincinnati marks a historic milestone for the only interstate water quality trading project in the world.

What is a Stewardship Credit?

A "stewardship credit," like any other water quality credit, is a quantified and verified representation of a reduction of a pollutant. What makes a stewardship credit different is that it will not be applied towards a regulatory permit obligation. A stewardship credit can therefore create a net gain in water quality. In order to test program design elements, the Ohio

River Basin Water Quality Trading Project had to promote early and voluntary participation by point source buyers, even in advance of compliance drivers such as numeric nutrient criteria. The business case reasons for purchasing stewardship credits that cannot be applied towards a

Manager Message

The project is coming to a crescendo, centered on the first credit transactions happing on March 11, 2014 with the transfer of "stewardship" credits to **American Electric Power**, **Duke Energy**, and **Hoosier Energy**. These three organizations will long be remembered as the first buyers in this program. With the official transfer of the first interstate, voluntary, and quantified stewardship credits, we are testing many critical program design elements. With the support of state agriculture agencies and soil and water conservation districts, we have moved private money from EPRI all the way to farmers. We've funded cover crops, heavy use areas, milk house waste management, and other conservation projects that are designed to reduce nitrogen and phosphorous loading. Many of these projects have now been installed, *verified* with on-ground inspection by the state agriculture agency, and *certified* via desk audit by the state permitting authority. We are also ready to officially launch the credit Registry—a secure, online tracking system that follows a credit from creation to sale and beyond. To support our commitment to public engagement, we've posted many more resources to our website, published a project video with footage of a few of our farmers, and posted a water quality trading infographic that even my neighbor can understand!

There has been tremendous input, technical research, infrastructure development, and on-the-ground work. We commend the contributions of all of the stakeholders and participants in this project. We have learned many lessons and look forward to brainstorming the resolution of open issues as we continue to advance the science and understanding of water quality trading.

Sincerely,

Jessica Fox
EPRI Technical Executive

permit obligation include: 1) Quantified ecosystem benefits that can be applied towards corporate sustainability goals; 2) Flexible compliance schedules in the future, if stricter permit limits are assigned, and 3) Experience in the program that will create comfort for future participation. In acting as the credit seller for the first transactions, EPRI requires that "... the Parties recognize that improving water quality in the Ohio River Basin is of individual and collective value; that the transaction of nutrient credits for stewardship purposes may advance this shared value by reducing nutrient loading in the Ohio River Basin and providing additional ecological and social benefits; and that the experience gained and the reporting of the results of this undertaking are expected to benefit the public."

Price of Credits

This is a new program and there is little market-based pricing information available. Therefore, we chose to use a cost-based price model to support the first credit transactions in the program. Our goal was to use a pricing method that incorporates the full cost of implementing the program assuming there was no government or state subsidy. At a summary level, we included: 1) the cost of project activity done on the farm, 2) the cost of project administration, and 3) the cost of addressing project risk. For the first transactions, we have sold a 3-year stewardship credit for $10 each. Each stewardship credit represents a bundle of quantified nitrogen and phosphorous reductions, plus qualitative ancillary ecosystem benefits (pollinators, soil health, greenhouse gas reduction, etc). If the credits were unbundled and sold as individual pounds of nitrogen or phosphorous, each pound of either nitrogen or phosphorous would cost $10 under our pricing system. Going forward, we plan to use an auction to sell credits, where the credit price will be determined by traditional market supply and demand forces. Our program will only issue credits after conservation projects have been implemented and verified. Our ultimate goal is to have a sustainable, replicable and independent program less reliant on state and federal funding.

Does Water Quality Trading Improve Water Quality?

Water quality trading matches buyers and sellers to reduce nutrients to a level that is required by a facility's Clean Water Act permit (NPDES permit). A permit requirement has to be met no matter what, either through use of installed technology or by other approaches that can achieve the same pollution management targets. So in the cases of water

quality trading to meet permit requirements, as with most environmental market off-set approaches, there is no inherent net improvement. Trading is a mitigation alternative intended to offset ecosystem impacts, but not inherently designed to restore or improve ecosystems. However, trading can be more cost-effective than installing treatment technology and may provide important ancillary benefits like carbon sequestration, enhanced wildlife habitat, and better farming practices. Stewardship credits on the other hand, do represent voluntary improvements in water quality that would not otherwise occur (see Stewardship discussion above).

Trading Plan Amended in October 2013

The nation's first interstate trading plan was signed by Ohio, Indiana, and Kentucky on August 9th, 2012. The trading plan describes the rules and approach for the pilot period, and includes an adaptive management component to allow for adjustments in the plan to achieve optimum effectiveness, efficiency and environmental improvement. In October of 2013, the Signatories signed the plan's first amendment.

The amendment included:

- **Incentives for stewardship credits** (mentioned above in 'What is a Stewardship Credit?').
- **Requirement that modeling take into account farm specific variables.** The Pilot is utilizing the EPA Region 5 spreadsheet and the amendment now clarifies that rather than using generic default values, the calculations must take into account variables such as soil types, slopes, cropping history, prior tillage practices, and number of livestock to calculate edge-of-field load reduction estimates for each project.
- **Approval of the use of the Ohio Department of Natural Resource's Load Reduction Spreadsheet V2.2.** This calculator is recognized by the Ohio Water Quality Trading Policy and is needed since the EPA Region 5 spreadsheet model (the approved credit estimation tool during the Pilot) does not estimate nutrient reductions for milk house management practices.
- **Support of the use of stewardship credits as supplemental environmental projects** or for other appropriate mitigation purposes in environmental enforcement proceedings (see p. 12 for additional details).

THE WALL STREET JOURNAL.

Wall Street Journal Features Ohio River Basin Water Quality Trading Project

The February 19th edition of the Wall Street Journal featured the story "Trading System Tackles Waste: New Plan Pays Farmers to Curb Agricultural Runoff that Pollutes the Gulf of Mexico." The article described the projects of Arthur Hollinger and Allen Kirkpatrick, two of the farmers participating in the pilot. The article also described the link between actions in the Ohio River and the greater Mississippi River Basins.

Lights! Camera! YouTube!

Check out our video about water quality trading and the Ohio River Basin Water Quality Trading Project

Project Resources Going Public

The Ohio River Basin Water Quality Trading Project undertook a thorough update of its website in February of 2014. The website is designed to be a public resource for information and expertise on water quality trading in the Ohio River Basin. New resources posted include:

- The calibrated watershed models used in the Project
- Project templates including a farmer funding announcement, farm baseline eligibility form, sample farmer contract, credit verification report, credit certification report, and many more
- The amended trading plan (October 2013)
- A new agricultural engagement webpage
- An updated advisory committee webpage

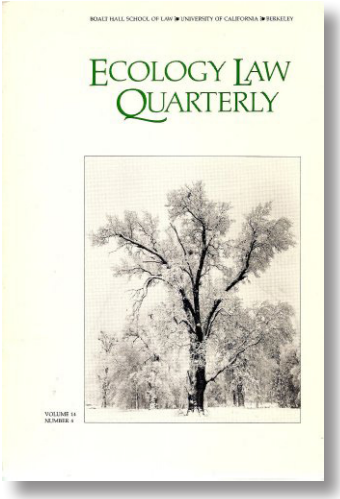
EPRI Publishes Technical Report with Case Studies of Water Quality Trading Being Used for Compliance with Permit Limits

For a dive deep into the world of water quality trading, EPRI compiled a series of 18 case studies on National Pollutant Discharge Elimination System (NPDES) permits that incorporate water quality trading. While there is a great deal of published work describing, instructing and analyzing water quality trading, there is little if any research regarding the permits in which water quality trading is operationalized to meet compliance obligations. This EPRI report (3002001454) aims to illuminate otherwise hypothetical discussions regarding the status, details, and frequency of applying water quality trading credits towards permit compliance obligations in the United States. Some overall observations are as follows:

- Of the permittees: ten were wastewater treatment plants or authorities, four covered multiple individual facilities, two were food or beverage companies, one was an electric power plant, and one was an agricultural cooperative.
- The main categories of sellers were agricultural landowners, individual point source facilities, and credit exchange associations.
- Seven of the permits have language that allows water quality trading, but to the best of our knowledge, credits have not been applied towards a permit obligation. There are various reasons for this including a lack of regulatory need for applying the credits, not having had time to execute trades due to relative nascence of the permit, or the water quality trading program not maturing to the point of trading.
- Fifteen of the permits allowed trading for nutrients (nitrogen and/or phosphorus), two for temperature reduction, two for CBOD5 (five-day carbonaceous oxygen demand), one for ammonia, and one for total dissolved solids (TDS).

EPRI's Research on Credit Stacking

Environmental credit markets have been established to offset impacts to wetlands, endangered species' habitat, water quality, and the global climate system. There have been ongoing hypothetical debates that explored the concept of credit stacking, whereby a conservation project can produce credits in multiple markets. The rules governing sales of these stacked credits are still in development and proper balance must be struck to protect the environment and the market participants.



EPRI and research collaborators have informed the credit stacking debate for the last decade by providing facts and research. In January, Royal C. Gardner, Stetson University College of Law, and EPRI's Jessica Fox published a comprehensive article in Ecology Law Quarterly, The Legal Status of Environmental Credit Stacking (40(4):713-758), providing background on environmental markets, credit stacking, and considerations for a credit stacking protocol. The authors offer six con-

siderations for striking a balance between the public interest in environmental mitigation and the credit producers' interest in financial return. On February 11, 2014, EPRI supported a full public webcast where Gardener and Fox presented the results of the research and answered audience questions; this webcast can be downloaded from http://wqt.epri.com/credit-stacking.html.

Beyond the First Trades: What's Next?

EPRI's interest in the Ohio River Basin Project has been to apply rigorous systems to test whether water quality trading can be economically, socially, and ecologically viable over the long run. The collaborators have learned many things to reach this point and we plan to capture our observations in a full EPRI report. Our commitment to an adaptive management approach has been fundamental to the project, as well as the unwavering commitment to defensible science, transparency, and integrity. The next phase will include describing the remaining issues before credits can be used for permit compliance obligations, such as how to provide the public the ability to ensure permit obligations are being met when trading is used. EPRI plans to also test the auction functionality of the Registry, by holding a public auction for stewardship credits in late 2014. It is still to be determined if, after applying all necessary rigor and science, the market will support the resulting price of the credits.

Project Collaborators

- American Electric Power
- American Farmland Trust
- Duke Energy
- Electric Power Research Institute
- Exelon Corporation
- Hoosier Energy
- Markit Environmental Registry
- Ohio Farm Bureau Federation
- Ohio River Valley Water Sanitation Commission (ORSANCO)
- Tennessee Valley Authority
- Troutman Sanders, LLP
- The Mosaic Company Foundation (via American Farmland Trust)
- U.S. Department of Agriculture
- U.S. Environmental Protection Agency
- University of California at Santa Barbara

Project Overview

Water quality trading is a market-based approach to achieving water quality standards through programs that allow permitted dischargers to purchase pollution reductions from another source. EPRI's Ohio River Basin Trading Project is a first-of-its-kind interstate trading program with initial participation from Ohio, Indiana, and Kentucky. The successful implementation of this Project will allow power companies, farmers, and other industrial and municipal dischargers to work together to improve water quality, minimizing costs to the public and stakeholders. The Project will benefit receiving water bodies that are now threatened by nitrogen and phosphorus pollution, which drain to the Gulf of Mexico. New developments in the project are leading towards selling "stewardship" credits, rather than simply selling credits used towards meeting a permit requirement.

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EPRI intends to support a collaborative process for the development of this project. The project website was designed to facilitate communication of important project materials, and to solicit questions, comments, and feedback from the many interested stakeholders. Please visit the project website for more information and to download meeting materials, related EPRI reports, Frequently Asked Questions, and additional project resources.

3002002884 March 2014

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Ohio River Basin Trading Project

March 2015 **Project Update**

The Project Receives United States Water Prize!

The U.S. Water Alliance selected The Electric Power Research Institute's (EPRI's) Ohio River Basin Water Quality Trading Project for its 2015 United States Water Prize that honors individuals, institutions, and organizations that have made an outstanding achievement in the advancement of sustainable solutions to national water challenges."American Electric Power is very pleased that EPRI's Ohio River Basin Water Quality Trading Project has been selected for the 2015 U.S. Water Prize," said Nick Akins chairman, president, and CEO of American Electric Power. "We have recognized for years the importance of protecting the water and ecosystems in the Ohio River Basin and have been a partner in the trading program since its inception. This project gives us an entirely new option for meeting our broader sustainability targets, supports farmers, and contributes to our community. We congratulate EPRI on this effort and look forward to their next steps when the project will engage many more stakeholders." (Continue on Page 2)

UNITED STATES
WATER PRIZE

Manager Message

The Ohio River Basin Water Quality Trading (WQT) Project is applying rigorous systems to test whether WQT can be economically, socially, and ecologically viable over the long run. After more than 6 years of building a program, we are confident that the credits are scientifically defensible and ecologically valid. We have also demonstrated that the program can work socially with more counties interested in participating than we can fund. The question now is whether, after building a program that is ecologically and socially viable, can we sell enough credits to keep the cash-credit cycle flowing?

We are excited to announce that we will hold the first public auction of voluntary stewardship credits on May 20th of 2015. 100% of proceeds from the auction will be re-invested back into the program for more conservation. As another innovative lift on this project, we are testing opportunities to sell the credits to meet broader corporate sustainability goals, offsetting supply chain impacts, and recognizing the credits in sustainability "standards" such as the Global Reporting Initiative (GRI). We know that sustainable companies are financially outperforming their counterparts, experiencing lower corporate risk, and creating new business opportunities. Purchasing quantified, verified, and state-approved credits from this program provides a rigorous opportunity for turn-key corporate benefits.

A lot of work has been leading up to this. This past summer was the second growing season of the project and we saw 30 farms implement conservation practices including cover crops, heavy use areas, and cattle exclusion fencing. All told, these practices will reduce the equivalent of nearly 130,000 pounds of nutrients. All conservation practices have also been verified by the state agricultural agency and the state permitting authority. Check out the "Projects" tab on our online registry, which provides full details as part of our commitment to transparency.

We would like to say "thank you" to team members, collaborators, and technical reviewers who continue to ensure robust project implementation.

Jessica Fox

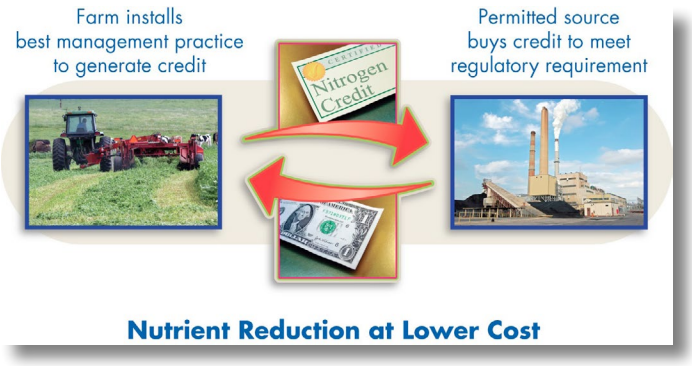
Jessica Fox
EPRI Technical Executive

The project received letters or support from the following:

- Nick Akins, CEO, American Electric Power
- Bob Perciasepe, President, C2ES (Former Deputy Administrator, EPA)
- Dave White, President, Ecosystem Service Exchange (Former Chief, USDA-NRCS)
- John Hardin, President, Hardin Farms (Former President, National Pork Producers)
- Tom Easterly, Commissioner, Indiana Department of Environmental Management
- Steve Hohmann, Commissioner, Kentucky Department of Natural Resources

The U.S. Water Alliance emphasizes the importance and value of each aspect of the water cycle and promotes more sustainable management of water. Receiving this honorable prize is a reflection of the commitment of those who have spent time on this project. It is the diligent work of many who make such a complex effort possible. On behalf of the entire project team and supporting organizations, Jessica Fox will humbly accept the award on April 13 during a ceremony at the National Geographic Headquarters in Washington, DC.

Water Stewardship Credit Auction



Private dollars have been invested in farm management practices to reduce nutrient runoff, support farmers, and provide important ecosystem benefits in the Ohio River Basin. Now, the resulting credits are available for purchase in the effort's first public auction. Backed by science, metrics, and state approvals, "stewardship credits" can be applied toward sustainability goals, offsetting supply chain impacts, or even Supplemental Environmental Project (SEP) obligations in Ohio, Indiana, and Kentucky.

Credit auction will be May 20th in the New York Times building, New York City.

Benefits to Buyers

- Document and register offsets for supply chain impacts
- Achieve corporate sustainability goals and commitments
- Tell compelling stories about proactive corporate sustainability efforts
- Support local farmers and enhance agricultural sustainability
- Meet Supplemental Environmental Project obligations in Indiana, Ohio, and Kentucky
- Gain experience and recognition in the world's only interstate water quality trading program
- Credits backed by metrics, modeling, and full state approvals
- 100% of proceeds are re-invested back into the program for more conservation

Buyers must be a public, private or nonprofit organization that is duly organized, validly existing and in good standing, with power and authority to perform its obligations as part of the auction process. Individuals with prior written approval from EPRI may also participate. Minimum purchase commitment $10,000 for publically traded companies, or $2,500 for individuals, non-profits, and municipalities. Proof of financial capability is required upon request. While the credits being offered are "compliance-grade," credits sold during this auction cannot be applied towards compliance with National Pollutant Discharge Elimination System permit obligations. As a condition of sale, EPRI will be restricting use of these credits to immediate "retirement" in order to promote broader societal benefits.

You MUST be cleared to participate in the auction.
Submit Interest to Jessica Fox, jfox@epri.com

EPRI Transacts First Credits in World's Largest Water Quality Trading Program (March 2014)

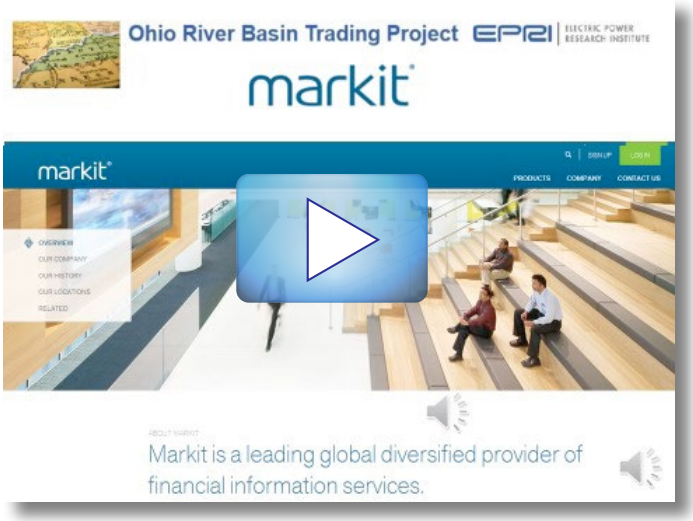
The Electric Power Research Institute (EPRI) in March of 2014 transacted the first interstate credits for water nutrients in the United States, officially launching water quality pilot trades in the Ohio River Basin. The goal was to test water quality improvement strategies in the world's largest and only interstate water quality trading program. Duke Energy, Hoosier Energy, and American Electric Power were the first buyers in the program. Collectively, the companies purchased 9000 stewardship credits, agreeing to retire the associated nutrient and ecosystem benefits, rather than apply them towards possible future permit requirements. Representatives from Ohio River Basin states, the U.S. Department of Agriculture, Natural Resources Conservation Service, U.S. Environmental Protection Agency, credit buyers and other stakeholders witnessed the first credit sales in the program. Read more about the March 2014 event here. Wall Street Journal, February 20, 2014. "Trading System Tackles Waste --- New Plan Pays Farmers to Curb Agricultural Runoff That Pollutes the Gulf of Mexico." Link.

Congressional Testimony

In April of 2014, EPRI provided written testimony to the U.S. House of Representatives, Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment. The testimony, titled "The Role of Trading in Achieving Water Quality Objectives," notes that the defensibility of WQT rests largely on the specific protocols of each WQT program, which vary considerably across the country. The testimony summarizes the credit verification requirements, modeling tools, and lessons learned. Peter Tennant, Executive Director of the Ohio River Valley Water Sanitation Commission (ORSANCO), also provided testimony on behalf of the Ohio River Basin Trading Project and the Association of Clean Water Administrators on March 25, 2014. See video here (@ 13:31).

FIRST Peer-Reviewed Article Assesses Appropriate Trade Ratios for Water Quality Trading

In June of 2014, Dr. Arturo Keller, Jessica Fox and other researchers published the first peer-reviewed article to rigorously assess appropriate trade ratios for WQT transactions: "Attenuation Coefficients for Water Quality Trading" in Environmental Science and Technology. The methodology itself can be applied to other water quality trading programs, and may have broader application for determining safety margins for related modeling efforts, such as determination of Total Maximum Daily Loads. This is an important step for ensuring that credits represent the offsets towards which they are applied at the point of compliance, and if the methods are enforced through program design, adds to the integrity and defensibility of water quality trading. A recording of a webcast on the research is available: view the public webcast.



Caption: Check out credit registry provider Markit's video explaining the registry for the Ohio River Basin Water Quality Trading Project:
Project registry video

NEW EPRI Technical Reports Related to Water Quality Trading Nationally

Case Studies of Water Quality Trading Being Used for Compliance with National Pollutant Discharge Elimination System Permit Limits (Report # 3002001454).

While there is a great deal of published work describing, instructing and analyzing water quality trading , there lacks research regarding the permits in which water quality trading is operationalized to meet compliance obligations. This report aims to provide transparency to National Pollutant Discharge Elimination System (NPDES) permits that incorporate water quality trading through a series of eighteen case studies. The research did not attempt to provide comprehensive coverage of every NPDES permit using water quality trading. Rather, case studies of eighteen NPDES permits are provided as a sample of permits known to allow water quality trading to meet compliance obligations. The case studies focus on the language within the permit itself, supplemented with external information to inform the context of water quality trading in the permit.

Development of Water Quality Trading Standards
(Report # 3002003619).
This report presents a summary of the developments in the U.S. towards creating standards for water quality trading. The research team reviewed publically available reports, project documents, articles, and online resources regarding federal agency and practitioner activities related to standards development. For the purposes of this report, we consider "standards" to be methodologies for ensuring the implementation, monitoring and verification of credits, which might include "best practices," "principles," and "technical guidelines," and could be either agency or independently developed. While the 2003 EPA policy on water quality trading provides certain federally issued guidance, the need for more explicit details to direct the formation of programs has created several ad hoc efforts aimed at clarifying criteria for defensible programs. The report provides background on developments in water quality trading standards, and reviews examples of standards development in other environmental markets.

Check out our U-Tube Video that summarizes the Project!
http://wqt.epri.com

Ohio River Basin Water Quality Trading Project - by the Numbers	
Number of credits (pounds) sold to date:	9,000
Number of farmers funded:	32
Pounds of Total Nitrogen Contracted:	98,314
Pounds of Total Phosphorous Contracted:	28,699
Acres of land under seasonal practices:	516.2
Credits available in May 2015 Auction:	~100,000

Key Project Participants

Technical Team:

- Electric Power Research Institute
- American Farmland Trust
- Ohio Farm Bureau Federation
- ORSANCO
- Troutman & Sanders
- University California Santa Barbara
- Markit

States:

- Ohio
- Indiana
- Kentucky

Agencies:

- USEPA
- USDA

External Advisory Groups:

- Electric Power Industry
- Environmental Groups
- Municipal Wastewater Treatment Plants
- Agriculture

Project Overview

Water quality trading is a market-based approach to achieving water quality standards through programs that allow permitted dischargers to purchase pollution reductions from another source. EPRI's Ohio River Basin Trading Project is a first-of-its-kind interstate trading program with initial participation from Ohio, Indiana, and Kentucky. The successful implementation of this Project will allow power companies, farmers, and other industrial and municipal dischargers to work together to improve water quality, minimizing costs to the public and stakeholders. The Project will benefit receiving water bodies that are now threatened by nitrogen and phosphorus pollution, which drain to the Gulf of Mexico. New developments in the project are leading towards selling "stewardship" credits, rather than only selling credits used towards meeting a permit requirement.

Project Contact

Jessica Fox, Technical Executive
Phone: 650-855-2138
Email: JFox@epri.com
Project e-mail: ohiorivertrading@epri.com
http://wqt.epri.com

EPRI intends to support a collaborative process for the development of this project. The project website was designed to facilitate communication of important project materials, and to solicit questions, comments, and feedback from the many interested stakeholders. Please visit the project website for more information and to download meeting materials, related EPRI reports, Frequently Asked Questions, and additional project resources.

3002005592 March 2015

Electric Power Research Institute
3420 Hillview Avenue, Palo Alto, California 94304-1338 • PO Box 10412, Palo Alto, California 94303-0813 USA
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Invitation to
Water Stewardship Credit Auction

Private dollars have been invested in farm management practices to reduce nutrient runoff, support farmers, and provide important ecosystem benefits in the Ohio River Basin. Now, the resulting credits are available for purchase in the effort's first public auction. Backed by science, metrics, and state approvals, "stewardship credits" can be applied toward sustainability goals, offsetting supply chain impacts, or even Supplemental Environmental Project (SEP) obligations in Ohio, Indiana, and Kentucky.

"There is potential from a broader societal basis to achieve ancillary benefits from a credit trading program that go beyond just our power plants. The fact that EPRI has created an opportunity for our company to contribute to on-the-ground improvements that have been confirmed through rigorous audit and oversight, gives us an entirely new option for meeting our broader sustainability targets."

Mr. John McManus, *Vice President, American Electric Power*

"Through solid science, transparency, and exceptional management, the EPRI project is a national model for how to advance non-traditional collaborations that benefit our common good. Now companies have the opportunity to be part of this effort, receive turn-key verified credits to meet their stewardship goals, and support local communities. Efforts like this will be critical for protecting America's waters for years to come."

Mr. Bob Perciasepe, *President, Center For Climate and Energy Solutions. Former Deputy Administrator, EPA*

When:
Credit auction will be April 16th in New York City. Includes networking opportunity. You MUST be cleared to participate. Physical attendance required - no internet access. Submit Interest by March 16th to Jessica Fox, Technical Executive, EPRI. 650-855-2138. jfox@epri.com

Benefits to Buyers

- Document and register offsets for supply chain impacts
- Achieve corporate sustainability goals and commitments
- Tell compelling stories about proactive corporate sustainability efforts
- Support local farmers and enhance agricultural sustainability
- Meet Supplemental Environmental Project obligations in Indiana, Ohio, and Kentucky
- Gain experience and recognition in the world's only interstate water quality trading program
- Credits backed by metrics, modeling, and full state approvals
- 100% of proceeds are re-invested back into the program for more conservation
- Network with like-minded leaders

Buyer Requirements
Must be a public, private or nonprofit organization that is duly organized, validly existing and in good standing, with power and authority to perform its obligations as part of the auction process. Individuals with prior written approval from EPRI may also participate. Minimum purchase commitment $20,000 for publically traded companies, or $5,000 for individuals, non-profits, and municipalities. Proof of financial capability is required upon request. While the credits being offered are "compliance-grade," credits sold during this auction cannot be applied towards compliance with National Pollutant Discharge Elimination System permit obligations. As a condition of sale, EPRI will be restricting use of these credits to immediate "retirement" in order to promote broader societal benefits.

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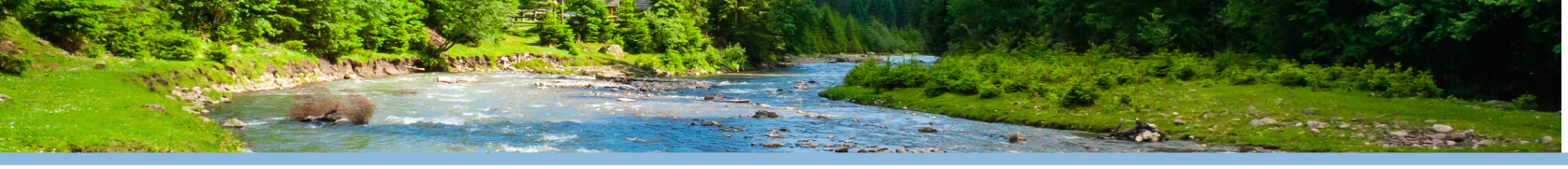

What are stewardship credits?

A stewardship credit is a quantified reduction of a pollutant. Each credit equals one pound of nutrient (nitrogen or phosphorous) reduction, plus associated ancillary ecosystem benefits including pollinator habitat, greenhouse gas avoidance, carbon sequestration, soil health, rare species, and habitat enhancement. A thorough and transparent process ensures that credits represent real environmental improvements which have been verified by State agricultural and permitting agencies. All monitoring and verification documents, including farm photos, are posted on an online trading registry.

Project Background and Overview

Since 2009, the Electric Power Research Institute and a strong collaboration of power companies, farmers, state and federal agencies and environmental interests have been working to develop an interstate Water Quality Trading (WQT) program in Ohio, Indiana, and Kentucky. Focused on environmental impacts from multiple, diverse sources, the project is facilitating broad non-traditional collaborations to achieve a common goal of water quality improvements and broader environmental improvements. It is the world's largest WQT program and has the potential to move millions of private dollars to help farmers reduce nutrient loading. The project has the support of federal agencies, and the states of Indiana, Ohio, and Kentucky.

Recognition

In March 2014, Duke Energy, American Electric Power, and Hoosier Energy purchased the first stewardship credits in the program. They earned accolades from the U.S. Environmental Protection Agency, U.S. Department of Agriculture, environmental groups, and many other stakeholders. The project has received extensive media coverage, including in the *Economist*, the *Wall Street Journal*, and other national and industry trade publications. Companies have highlighted project participation in their Corporate Sustainability Reports.

Collaborators:

Electric Power Research Institute
American Farmland Trust
Troutman Sanders, LLP
Markit
Ohio River Valley Water Sanitation Commission
University of California at Santa Barbara
American Electric Power
Duke Energy
Exelon Corporation
Hoosier Energy
Tennessee Valley Authority
U.S. Department of Agriculture
U.S. Environmental Protection Agency
Ohio Farm Bureau
Coalition on Agricultural Greenhouse Gases (C-AGG)
Delta Institute
States of Ohio, Indiana, and Kentucky
and others, see http://wqt.epri.com

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Credit Definition and Price Details – March 2014

What is a stewardship credit?

A "stewardship credit," like any other water quality credit, is a quantified and verified representation of a reduction of a pollutant. The stewardship credits being transacted in March 2014 are a "bundle" of benefits, including nitrogen and phosphorous reductions, as well as ancillary ecosystem benefits. At this time in the pilot program, credits sold by EPRI cannot be used to satisfy regulatory permit obligations and must be retired by the buyers. Therefore, in this case, a stewardship credit can create a net gain in water quality and support ecosystems.

Who might purchase stewardship credits and why?

Anyone who would like to support water quality and ecosystems in the Ohio River Basin or that would like to test how the EPRI pilot project operates might purchase these credits. The primary business case reasons for corporations to purchase stewardship credits are to:

- Advance corporate sustainability goals by buying quantified nutrient reductions as well as supporting other ecosystem and social benefits.
- Secure a flexible compliance schedule in the future if stricter permit limits are assigned.
- Participate in the pilot program to gain experience for future compliance requirements.

Who were the first buyers of credits?

The first corporate buyers were American Electric Power, Duke Energy and Hoosier Energy. In the purchase of stewardship credits, these companies have reduced nutrient loading and may have provided ancillary benefits such as improved soil health, habitat enhancement, reduced greenhouse gas emissions, and social and economic support to farmers. Purchasing these credits represents an important contribution to the watersheds and communities in the Ohio River Basin, and could provide ecosystem benefits all the way to the Gulf of Mexico.

How many credits have been traded so far?

On March 11, 2014, EPRI sold a total of 9,000 stewardship credits for $10.00 each. The breakdown of the 9,000 credits consists of approximately 6,500 lbs. total nitrogen (TN) reductions and 2,500 lbs. total phosphorus (TP) reductions for delivery over three years. Additional credits are available for purchase, up to approximately 66,000 lbs. of TN and 30,000 lbs. of TP during the pilot period through 2015.

How was the price determined for the initial transactions?

The Ohio River Basin Water quality trading project is a new program so there is little market-based pricing information available. Therefore, we chose to use a cost-based price model. Our goal was to use a pricing method that incorporates the full costs associated with implementing practices, managing the infrastructure and protocols, and documenting all credits including serial numbers.

What are the costs that were included in the pricing model?

At a summary level, we included: (1) the cost of project **activity** done on the farm, (2) the cost of project **administration,** and (3) the cost of addressing project **risk**.

Examples of what was included in the costs include:

1. The cost of the project activity includes the cost of implementing best management practices (BMPs) at the farm such as cover crops, filter strips (hay coverage), and heavy use area protection (HUAP), among others.
2. Administrative costs include project management, regulatory oversight, agency overhead, and infrastructure costs.
3. Project risk includes the cost of credits set aside for a reserve pool to account for non-performing BMPs and a safety factor to account for modeling uncertainty.

Since this pilot program is supported by grants, why do you need to recapture costs?

EPRI is grateful for multiple grants from USEPA and USDA dating back to 2009. We have also raised an equal amount of private funding in the program. The private money is what has paid for the conservation projects on-the-ground, while the federal grants have supported critical infrastructure development, watershed modeling, and stakeholder engagement. It is the leveraging of the two funding sources that has allowed for robust advancement of the project. In order for the program to continue, it is important for the pilot transactions to reflect the full unsubsidized cost of the program. Our goal is to have a sustainable, replicable and independent program less reliant on grant funding.

Does a credit price of $10 meet your objectives of recovering full costs?

No. The price of $10 is a good start for signaling to the true cost of each credit. However, the pilot project still needs to reassess the full costs for states and the soil and water conservation districts for implementing the program, including engineering, planning, and oversight. Since we are still in the middle of the pilot program, we could only estimate a portion of these costs for the cost-based pricing model that supported the sale of Stewardship credits in March 2014.

What will happen with the proceeds from the sale of these credits?

The proceeds will be used for two purposes: (1) to re-invest and broaden the program for greater nutrient reductions, and (2) to fund the post-pilot transition to a compliance program.

Do you anticipate moving to market-based pricing?

Yes, market-based pricing is an important element to test the long-term success of this project. In fact, during the pilot program, we plan to conduct an auction for the stewardship credits in the four quarter of 2014. Auctions help to concentrate liquidity – which is important for an emerging market and critical for establishing a real market-based price signal.

Pilot Trading Plan 1.0

for the

Ohio River Basin Interstate Water Quality Trading Project

1. Introduction

This project is a collaborative effort to improve water quality in the Ohio River Basin ("ORB") through the development and implementation of an interstate trading program (the "Project"). A pilot phase of the Project from 2012 to 2015 (the "Pilot") will provide an opportunity to test different trading mechanisms in advance of new or more stringent regulatory drivers. This plan governs the Pilot (the "Plan").

In anticipation of new or more stringent numeric water quality criteria, total maximum daily loads ("TMDLs"), and/or water quality-based National Pollutant Discharge Elimination System ("NPDES") permit limits, it is critical to the public, stakeholders, and regulators to have an economically, socially, and ecologically viable option for compliance and water quality improvement. When structured appropriately, water quality trading may provide such an option.

This Plan is designed to establish a framework for interstate trading. The results of the Pilot will be used to inform the future direction of the Project.

2. Scope and Purpose

Water quality trading is authorized and encouraged.[1] Trading provides point sources with a cost-effective option for meeting nutrient reduction targets and may result in ancillary ecological and social benefits, such as additional and/or expedited water quality improvement, restoration of habitat, sequestration of greenhouse gases, reduced rate of top-soil loss, and financial support for farmers and local counties. These ancillary benefits may not otherwise be achieved solely through the installation of on-site technologies for managing point source nutrient reductions.

Some states have adopted trading policies or rules to govern trading within their jurisdictions[2] To date, no states have come together to develop or implement an interstate trading program (i.e., where all states operate under the same rules and a water quality credit generated in one state can be applied in another). That is the primary purpose of this Project and

[1] U.S. Environmental Protection Agency ("EPA") Water Quality Trading Policy (Jan. 13, 2003) (EPA "believes that market-based approaches such as water quality trading provide greater flexibility and have potential to achieve water quality and environmental benefits greater than would otherwise be achieved under more traditional regulatory approaches."); EPA letter to the Ohio River Valley Water Sanitation Commission ("ORSANCO"), dated Sept. 12, 2011.

[2] *See*, *e.g.*, Ohio EPA Rules for Water Quality Trading, Ohio Administrative Code Ch. 3745-5.

Plan. All trades that occur as a result of this Project will be grounded in a scientifically-based justification.

Water quality trading as a tool to improve water quality within the ORB is a priority for federal agencies, ORSANCO,[3] ORB states, and a diverse range of stakeholders.[4] This Pilot will support water quality pilot trading within the ORB on an interstate basis, but will not preempt any new, or supersede any existing water quality trading program agreements or initiatives at the state or local level.

The pollutants identified for trading in the Pilot are total nitrogen ("TN") and total phosphorus ("TP"). These pollutants have been selected because of their contribution to water quality problems within the ORB and downstream, as well as their suitability for trading. TN and TP originate from a range of different sources. Some sources may be able to reduce their loadings more economically than others. The Project is designed to achieve water quality improvements more quickly, with less burden, and at lower costs than through the design and installation of on-site point source controls by enabling sources facing high reduction costs to buy credits from sources with lower reduction costs.

3. Measures of Success

This Pilot is designed to assess and validate or improve the economic, social, and ecological underpinnings of the Project. The Pilot trades governed by this Plan are expected to result in the implementation of agricultural conservation best management practices ("BMPs") in states across the ORB with initial focus on, at a minimum, Ohio, Indiana, and Kentucky.

Measures of success during the Pilot will include: (a) identifying and overcoming barriers to successful full-scale roll-out; (b) implementing trading mechanisms[5] that are ecologically effective and acceptable to participants and other stakeholders; (c) promoting early, voluntary participation; (d) measuring the extent to which broader ecosystem services can be supported through the Project; and (e) establishing the full suite of systems and protocols needed for a complete and compliant program.

After the Pilot, this Plan will be replaced with an updated project plan to address future activities. If and when the Project is fully implemented, the measures of success are expected to include the number of TN and TP credits generated, the number of credit trades executed, the net

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[3] ORSANCO Resolution 2-11: Development of an Interstate Water Quality Trading Program in the Ohio River Basin. June 9, 2011. "Whereas the States of Illinois, Indiana, Ohio, Pennsylvania, New York, Kentucky, Virginia, and West Virginia are signatory to the Ohio River Valley Water Sanitation Commission Compact . . . Now therefore be it resolved, that the Ohio River Valley Water Sanitation Commission endorses the development of an interstate water quality trading program for the Ohio River Basin. Be it further resolved, that the Commission encourages its member States to engage in discussion leading to the development of an interstate water quality trading program, and also endorses participation of other interested states in the Basin."

[4] *See*, *e.g.*, EPA letter to ORSANCO, dated Sept. 12, 2011 ("We are confident that our EPA regions, working in concert with the states, will support and be engaged in the Ohio River Basin Trading Project and will help to explore these and other incentives that promote water quality improvement while reducing costs.").

[5] Some of these mechanisms may be more rudimentary in the Pilot than after full-scale roll-out of the Project.

loading of nutrients prevented from reaching the water,[6] and the final economic benefit to both buyers and sellers. The ultimate goal of the Project is to establish a trading market that is self-sustaining without government subsidy.

4. Prohibitions

No trade may occur if it would cause an exceedance of an applicable water quality standard, impair an applicable designated use, or result in an adverse localized impact (i.e., "hot spot"). Water quality trading cannot be used by an NPDES permittee to meet a categorical technology-based effluent limitation except as authorized by applicable federal effluent guidelines. All trades must comply with all relevant environmental laws and regulations, including those governing the protection of threatened and endangered species and their habitats.

5. Interstate Trading

In addition to intrastate trading, a basic premise of this Project and Pilot is that a credit generated in one state may be applied for the benefit of an NPDES permittee discharging in another state, so long as the trade is scientifically defensible and does not violate the prohibitions set forth above.

6. Credit Definition

One credit is equal to one pound of TN or TP that, through voluntary action, is prevented from discharging into the ORB in a given year. Credits will be based on annual average loading of TN and/or TP.[7] Each credit will have a minimum 12-month term (measured from the date that it is first verified) and may be renewed for successive term(s) provided that it continues to be implemented and verified.[8]

For purposes of this Plan, credits generated by agricultural nonpoint sources equal the load reductions achieved at the edge of the farm field, as estimated by the EPA Region 5 spreadsheet model, described further below. Credits generated by point sources equal the load reductions measured at the end-of-pipe.

Credits will be measured at the point of generation ("Point of Generation Credits") and at the point of use ("Point of Use Credits"). Any difference in value between these two measurements will be the result of attenuation of nutrients between the two points, as calculated using the Watershed Analysis Risk Management Framework ("WARMF") model, described further below.

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[6] Estimated by modeling tools.

[7] Annual average loading is used in Chesapeake Bay water quality trading, as well. *See* Memorandum from James Hanlon, Director, EPA Office of Wastewater Management, *Annual Permit Limits for Nitrogen and Phosphorus for Permits Designed to Protect Chesapeake Bay and its tidal tributaries from Excess Nutrient Loading under the National Pollutant Discharge Elimination System*, March 3, 2004.

[8] If a credit is transacted but then is cancelled before the end of the applicable 12-month term, the credit reserve described in Section 13 will be used to address the shortfall.

7. Generating Credits

Credits may be generated by either nonpoint or point sources, but during the Pilot, the primary focus will be on agricultural nonpoint source credits. The term "baseline" is used in this Plan to define when a water quality credit can be generated. In simplest terms, the agricultural baseline sets the bar that must be achieved by a farm before that farm can generate credits. Once a farm meets the baseline requirements, any further reductions in nutrient runoff achieved by implementing additional BMPs may qualify as Point of Generation Credits.

For a nonpoint source to generate a credit, it must reduce its loading of TN or TP below current conditions (i.e., beyond what is currently being achieved with existing land uses and management practices) as of the date that this Plan is fully executed by the states AND otherwise comply with presently-applicable legal requirements (Figure 1). Agricultural nonpoint sources will need to provide three years of farm practice history to document their current conditions. Federal, state, and local incentive payments (also referred to as "cost share" dollars) or other federal, state, and local grant funding can be used to achieve current conditions; however, they cannot be used to generate credits. Additional eligibility requirements are set forth in Appendix E, Section 4.

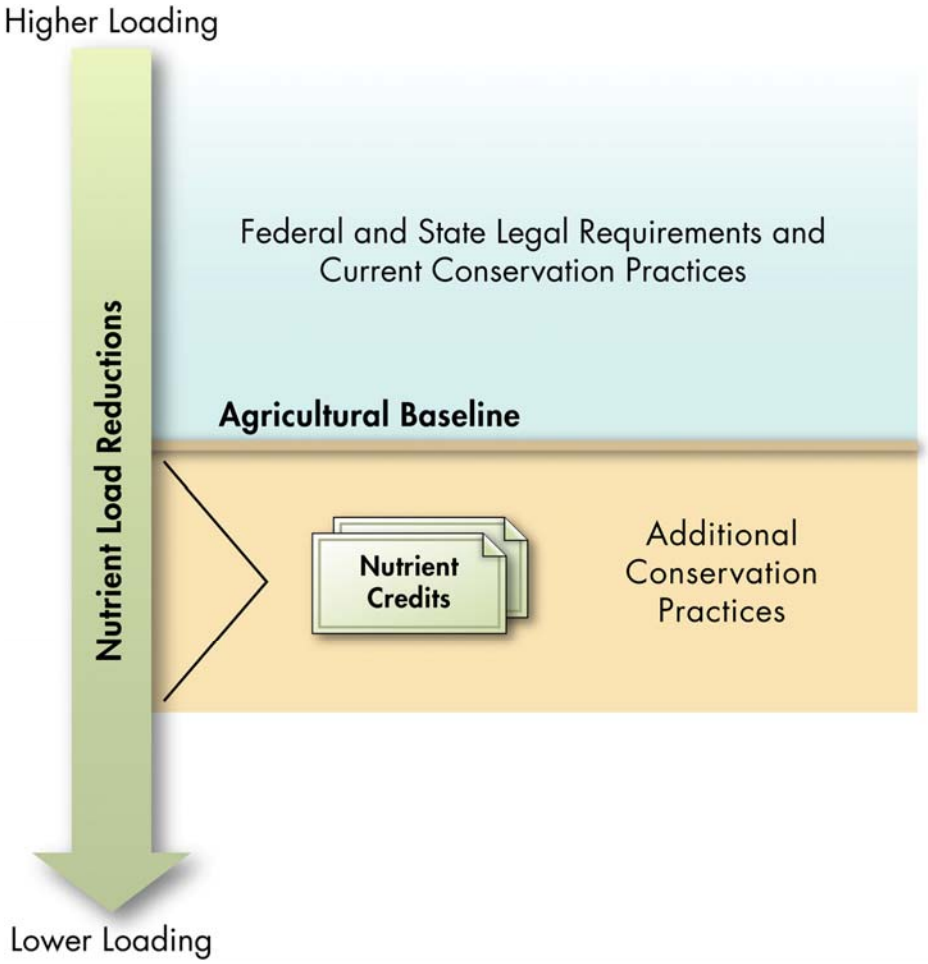

Figure 1: Agricultural Baselines

A practice will generate credits only after it is installed, and only for so long as it is properly operated and maintained. The status of installation, operation, and maintenance will be periodically inspected by an appropriate verifier, such as the state Department of Natural Resources, soil and water conservation district, or resource management specialist. Verification records will be maintained and the non-confidential portions of those records may be made available to the public upon request.

A practice may fail due to unusual weather or other circumstances. Any episodic failure will be subject to corrective action within a specified time period. Any loss of credits resulting from such failure will be managed through corrective action and the credit reserve, as described in Section 13 and Appendix E, Section 11.

For a point source to generate a credit, it must reduce its loading of TN or TP below presently-applicable permit or regulatory limits, or in the absence of such limits, below current conditions.

All credit arrangements will be memorialized through agreements that require implementation of the practices that are identified, as well as independent monitoring, inspection, and verification of those practices. The agreements will describe the credit accounting process, availability of and access to records, schedule, and consequences if practices fail. At a minimum, these consequences will include notice and corrective action. The agreements will also describe grounds for termination (e.g., if either party fails to perform even after notice and an opportunity for cure).

Practices implemented during the Pilot that continue to generate credits after the Pilot may be grandfathered into a future phase of the Project, provided that the credits are verified, continue to protect water quality standards, and meet the expectations set forth in the state-approved successor plan for the post-Pilot period.

8. Credit Calculation Methodologies

A fundamental challenge for trading is understanding, quantifying, and managing the uncertainty associated with the implementation of practices on-the-ground and their associated water quality benefits over time and place. This challenge is especially pronounced when trading involves agricultural nonpoint sources as credit sellers. The Pilot will utilize two models for estimating nutrient reductions from the point of generation (credit seller) to the point of use (credit buyer). The models are: (1) the EPA Region 5 spreadsheet model[9] for estimating nutrient reductions at the edge of the field (i.e., Point of Generation Credits); and (2) the WARMF model[10] for estimating nutrient attenuation (reduction) from the edge-of-field to the point of use (i.e., Point of Use Credits). The Pilot will also test the USDA Natural Resources Conservation

[9] *http://it.tetratech-ffx.com/steplweb/models$docs.htm* (Last accessed July 5, 2012)

[10] *http://www.epa.gov/athens/wwqtsc/html/warmf.html* (Last accessed July 5, 2012)

Service ("NRCS")-developed Nutrient Tracking Tool[11] as an edge-of-field calculator, but this tool will not be used for crediting purposes.[12]

The WARMF model will be applied to predict the in-stream responses to nutrient load reductions between credit sellers and credit buyers, thereby estimating the total nutrient reductions actually achieved at any particular point of compliance. These predictions will account for a number of physical factors (e.g., location of buyer and seller, in-stream fate and transport, specific form of pollutant), as well as the uncertainty inherent in the model itself. The result will be a scientifically-based equation for determining ecologically-appropriate trade ratios, customized on the specific watersheds where trades may occur. There will be a preference to conduct Pilot trades in areas where the WARMF model has already been calibrated.

Point of Use Credits will be calculated as follows: [13]

Trading Ratio = (F_{field} x F_{river} x $F_{instream}$ x $F_{equivalence}$ x F_{safety})

Where:

- **Edge-of-Field (F_{field})** – Magnitude of TN and TP reduction at edge-of-field due to BMPs (estimated using EPA Region 5 spreadsheet model). This equals the Point of Generation Credit.
- **Edge-of-River (F_{river})** – Fate and transport attenuation as load reduction reaches edge-of-river (estimated with WARMF).
- **In-stream assimilation ($F_{instream}$)** – Attenuation due to in-stream processing of TN and TP load (estimated with WARMF).
- **Credit Equivalence ($F_{equivalence}$)** – Considers chemical nature of load reduction (as nitrate, ammonia, organic N, etc.) relative to buyer's need (estimated with WARMF).
- **Margin of Safety (F_{safety})** – Safety factor to account for uncertainties in credit calculation (estimated with EPA Region 5 spreadsheet model and WARMF).

Point of Use Credits = Trading Ratio x Load Reduction (pounds of TN or TP)

To develop the Edge-of-Field factor, the EPA Region 5 spreadsheet model is used to calculate the load reductions as different BMPs are implemented. For the Edge-of-River, the WARMF model is used to estimate the assimilation and transformations that may occur as TN and TP transport from the edge of the farm to the edge of the river. A multi-farm implementation of the WARMF model is used for this calculation. For in-stream assimilation, the WARMF model is implemented for each HUC-4 watershed within the ORB, at a HUC-10 delineation

[11] *http://nn.tarleton.edu/NTTWebARS/* (Last Accessed July 5, 2012)

[12] It is possible that other edge-of-field calculators will be identified during the Pilot. If so, they may be tested but will not be used for crediting purposes. EPRI did a comprehensive assessment of NTT in the report, Use of Models to Reduce Uncertainty and Improve Ecological Effectiveness of Water Quality Trading Programs, 2011.

[13] This credit calculation methodology generally follows EPA's recommendations. *See* EPA Water Quality Trading Toolkit for Permit Writers. August 2007.

level. The in-stream assimilation factors are determined based on a simulation of the effect of a load reduction at one point in the HUC-4 on the TN and TP concentrations at all locations downstream of the reduction. A table with the in-stream assimilations is created for each location within a given HUC-4 watershed.[14] The credit equivalence factor is generated by changing the nature of the reduced load (e.g., ammonia, nitrate, etc.) at the Point of Credit Generation and determining the effect of the various forms of load reduction on the TN and TP concentrations at the point(s) of use, relative to a direct TN or TP reduction. Finally, the Margin of Safety factor is determined by running the WARMF or EPA Region 5 spreadsheet model using a Monte Carlo simulation (i.e., hundreds of runs with a range of parameter values) to determine the possible variance in model output and its effect on the attenuation coefficients.

9. State-approved Incentives for Early and Voluntary Participation by Credit Buyers

The ORB states understand the importance of early and voluntary participation by point sources buyers. As inducements for such participation, the states authorize and support the following incentives for purchasing credits during the Pilot:[15]

- Preferred access to credits: Point sources that volunteer to purchase credits during the Pilot will have preferred access to the credits that they fund, to the extent that those credits are and remain available over time. The basic principle for this preferred access will be "first in time, first in place, first in right."

- Favorable trading terms: Point sources that volunteer to purchase credits during the Pilot may be entitled to favorable trading terms (e.g., lower administrative costs and transaction fees), as well as the advantage of lower uncertainty factors (as supported by the sophisticated watershed model). Such benefits are justified because of the immediate water quality improvements from early and voluntary action and the application of a calibrated watershed model, as well as the increased reliability of BMPs over time (i.e., by establishing the BMPs early, they may become more reliable for subsequent use in generating credits for regulatory compliance purposes).

- Future NPDES compliance flexibility: Point sources that volunteer to purchase credits during the Pilot may be eligible for flexible compliance schedules to achieve regulatory reduction requirements that are imposed in the future if those requirements are more stringent than the reductions achieved through pre-compliance trading.

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[14] An example of the in-stream assimilation tables is presented in EPRI report 1025820, Watershed Analysis Risk Management Framework Watershed Model Implementation for Nutrient Trading in the Ohio River Basin: Analysis of Scioto, Muskingum and Allegheney Watersheds. 2012.

[15] *See* EPA letter to ORSANCO, dated Sept. 12, 2011, which recognizes the state-level authority to offer these pre-compliance incentives. Note that eligibility for these incentives hinges, at least in part, on the extent of a point source's participation. For example, if a source reasonably foresees the need for 10,000 credits and only funds 10 credits during the Pilot, then it may not have met the threshold to receive incentives (in whole or in part). The threshold for the Pilot will be determined in consultation with the states and will be established before the first credit is sold in order to protect the integrity of the Project.

For example, consider the situation where a point source foresees the likelihood of water quality-based nutrient limits in a future permitting action and elects to join the Pilot in order to test the viability of trading and to secure access to future compliance credits. The point source anticipates that it will need a minimum of 1,000 lbs. TN/year and funds this amount of credits during the Pilot. Subsequently, the point source learns that it will actually need 2,000 lbs. TN/year to achieve its assigned permit limits. By participating in the Pilot, the point source will have access to credits sufficient to meet, at a minimum, half of its compliance obligation, but it may need permit flexibility (e.g., an extended compliance schedule) to achieve the other half. The participating states agree that the point source may be entitled to such flexibility, to the extent allowed by law. In this situation, the compliance schedule may extend beyond the five-year permit term if necessary, consistent with relevant EPA guidance.[16]

10. Process Protocols

The protocol for establishing and verifying credits is set forth in Appendix E to this Plan.

11. Credit Registration and Tracking

Credit registration and tracking will be accomplished using a system that builds on the work of other, existing trading programs around the country, where similar systems have already been established. The system will be subject to approval by the participating states.

12. Priorities for Use of Credits

Priority may be given to the sale or transfer of credits within the trading marketplace. Any credits not sold or transferred will be reserved to manage the risk of loss, or retired to produce a public environmental benefit.

13. Credit Reserve / Assurance

A credit reserve will be established to account for uncertainty and/or failure.[17] Credits may be withdrawn from the reserve, as necessary, to replace credits that are lost or fail to materialize.

The reserve will be established initially at 10% of the total credit pool, and will be adjusted periodically to address the degree of risk associated with credit loss. The initial reserve is being established at a conservatively high percentage to reflect uncertainty over the size and scope of the marketplace, as well as to further the Project's commitment to public benefit.

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[16] *See*, *e.g.*, Memorandum from James Hanlon, Director, EPA Office of Wastewater Management, "Compliance Schedules for Water Quality-Based Effluent Limitations in NPDES Permits," May 10, 2007

[17] Note that a reserve is not absolutely necessary unless/until credits are transacted. At that point, if a buyer expects to rely on the availability of the credits for permit compliance or otherwise, the Project will need the reserve to account for any episodic shortfall in credits.

After the Pilot, the reserve will be adjusted using a statistically-sound approach to managing risk. In the event that the reserve is not exhausted in any calendar year, all or a portion of the surplus may be retired as a net water quality benefit.

14. Program Audits

The Pilot will be audited annually for environmental and economic effectiveness, as well as to ensure that the reports and data generated under this Pilot are complete and accurate. The participating ORB states will be authorized to participate in these audits. The results of the audits will be made available to the public and will serve as a basis for validating or amending the Plan in the future.

15. Participation of Non-Signatory States and Third Party Credits

Additional ORB states may participate in the Pilot by executing this Plan and obtaining the concurrence of the original signatory states. Credits generated by third parties (including existing trading programs in the ORB) may be transacted during the Pilot, provided that those credits comply with this Plan and are transacted in the same manner as other credits hereunder.

16. Public Involvement and Participation

This Plan has been vetted by stakeholder advisory committees, environmental groups, and other interested stakeholders, and has been posted for public review and access at www.epri.com/ohiorivertrading.

17. Adaptive Management

An adaptive management approach will be used to periodically review and, if necessary, amend this Plan during the Pilot to achieve optimum effectiveness, efficiency, and environmental improvement. Public outreach will be a component of this adaptive management approach.

18. Supporting Documents

This Plan is supported by six appendices, as follows:

A. Project History
B. Project Maps
C. WARMF Supporting Materials
D. Language for NPDES Permitting Actions During the Pilot
E. Protocol for Establishing, Validating, and Verifying Credits Generated by Nonpoint Sources
F. Relevant Project Letters

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Signatories

By their signatures below, the States of Ohio, Indiana, and Kentucky hereby (a) acknowledge the support this Project has received from EPA and USDA, (b) authorize and endorse this Plan for the Pilot, and (c) agree to work collaboratively toward its implementation.

Ohio

Karl Gebhardt, Chief and Deputy Director — Date 8/9/12
Division of Soil & Water Resources, Ohio Department of Natural Resources

Scott J. Nally, Director, Ohio Environmental Protection Agency — Date 8/9/12

Indiana

Thomas W. Easterly, Commissioner, — Date 8/9/12
Indiana Department of Environmental Management

Joseph M. Kelsay, Director, — Date 8.9.12
Indiana State Department of Agriculture

Kentucky

R. Bruce Scott, Commissioner, — Date 8/9/2012
Kentucky Department of Environmental Protection

Steve Hohmann, Commissioner, — Date 8/9/12
Kentucky Department of Natural Resources

ELECTRIC POWER RESEARCH INSTITUTE

First Amendment

to Pilot Trading Plan 1.0

for the

Ohio River Basin Interstate Water Quality Trading Project

The undersigned parties (the "Signatories") hereby adopt and approve this FIRST AMENDMENT TO THE TRADING PLAN (the "First Amendment") as of the 10th day of October, 2013.

Background

A. On August 9th, 2012, the Signatories signed and approved the Pilot Trading Plan 1.0 for the Ohio River Basin Interstate Water Quality Trading Project (the "Plan"), which sets forth mutually agreed-upon terms for implementing a collaborative effort to improve water quality in the Ohio River Basin ("ORB") through the development of an interstate trading program (the "Project").

B. Among the key Project goals identified in the Plan is the promotion of early and voluntary participation by point source buyers, even in advance of compliance drivers such as numeric nutrient criteria, total maximum daily loads ("TMDLs") and/or water quality-based effluent limitations in National Pollutant Discharge Elimination System ("NPDES") permits.

C. Section 17 of the Plan promotes an adaptive management approach to Project implementation and, accordingly, authorizes amendments to the Plan where necessary to achieve optimum effectiveness, efficiency and environmental improvement.

D. The amendments set forth below further the goal of promoting early and voluntary participation in the Project by credit buyers.

Amendments

The Plan is hereby amended as follows:

1. Before compliance drivers are in place or widely applicable to buyers, the credits that are transacted hereunder will be deemed to be "Stewardship Credits" that improve water quality in the ORB by reducing nutrient loading and providing additional ecological and social benefits.

2. As inducements for early and voluntary participation by point source buyers, the Signatories authorize and support the incentives for purchasing credits during the Pilot, as set forth in Section 9 of the Plan, whether those credits are for compliance or simply for stewardship; provided, however, that in order for a point source buyer to enjoy any or all of these incentives, the buyer must be meaningfully involved in the Pilot. For these purposes, the Signatories believe that "meaningful involvement" means purchasing a minimum of $10,000 worth of nutrient credits.

As an example of the incentive for future NPDES compliance flexibility, consider the situation where a point source elects to voluntarily purchase stewardship credits in advance of a compliance driver, in recognition of the individual and collective value of reducing nutrient loading in the ORB and providing additional ecological and social benefits. By their nature, those stewardship credits will be immediately retired after purchase, and thus will not be available to the point source buyer for compliance purposes in the future. However, in recognition of the value of early and voluntary participation by the buyer, the Signatories agree that if the buyer needs permit flexibility (e.g., an extended compliance schedule) to achieve a future nutrient compliance obligation, the Signatories will provide such flexibility, to the extent allowed by law.

3. The Signatories also support and may encourage the use of stewardship credits as supplemental environmental projects or for other appropriate mitigation purposes in environmental enforcement proceedings. In such cases, defendants may elect to purchase a certain number of stewardship credits to offset the amount paid as a penalty, subject to approval by the relevant State(s), or in the case of federal enforcement, U.S. EPA. To encourage such decisions, the Signatories are willing to prioritize the use of stewardship credits due to their high conservation, protection and restoration value in appropriate enforcement proceedings (e.g., where there is a geographic nexus to the ORB and a correlation between the violation and benefit).

4. As agreed, the Pilot is utilizing the EPA Region 5 spreadsheet for estimating Point of Generation Credits. In accordance with advancing the greatest possible science and integrity, the Pilot now clarifies that these estimates, rather than using generic default values, must take into account farm specific variables such as soil types, slopes, cropping history, prior tillage practices, and number and type of livestock to calculate reliable and consistent load reduction estimates for each project.

5. The signatories approve the use of the Ohio Department of Natural Resource's Load Reduction Spreadsheet V2.2 (http://www.dnr.state.oh.us/tabid/24157/Default.aspx) for calculating nutrient reductions associated with improved milk house waste handling and controls. This calculator is recognized by Ohio Water Quality Trading Policy.
This additional spreadsheet is needed since the EPA Region 5 spreadsheet model, the approved credit estimation tool during the Pilot, does not estimate nutrient reductions for milk house management practices.

6. The technical guidance contacts listed in Appendix E may change from time to time over the course of the Pilot period. Up-to-date contact information will be maintained in the Project files.

7. Except as amended above, the Signatories hereby ratify the Plan in all other respects.

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Signatories

By their signatures below, the States of Ohio, Indiana, and Kentucky hereby (a) acknowledge the support this Project has received from EPA and USDA, (b) authorize and endorse this Plan, as amended, for the Pilot, and (c) agree to work collaboratively toward its implementation.

Ohio

10/28/13

Karl Gebhardt, Chief and Deputy Director — Date
Division of Soil & Water Resources, Ohio Department of Natural Resources

10/10/13

Scott J. Nally, Director, Ohio Environmental Protection Agency — Date

Indiana

OCTOBER 10, 2013

Thomas W. Easterly, Commissioner, — Date
Indiana Department of Environmental Management

10/31/13

Gina Sheets, Director, — Date
Indiana State Department of Agriculture

Kentucky

10/10/13

R. Bruce Scott, Commissioner, — Date
Kentucky Department of Environmental Protection

Steve Hohmann — 10/28/13

Steve Hohmann, Commissioner, — Date
Kentucky Department of Natural Resources

Appendix A
Project History

The ORB suffers from excessive nutrient loading from various sources that is creating a problem with water quality throughout the Basin. EPA has encouraged all 50 states to consider innovative, collaborative, and cost-effective mechanisms to facilitate nutrient reductions, including water quality trading.[18] After two years of research and feasibility analysis, the Electric Power Research Institute, Inc. ("EPRI") initiated a collaborative effort in 2007 to develop an interstate water quality trading project in the ORB.[19]

At full scale, this innovative project may become the world's largest water quality trading program. It could span portions of at least eight states and create a market for thousands of point sources to purchase nutrient credits, and approximately 230,000 farmers to sell credits.[20] It is an innovative conservation and compliance program with the potential to move millions of private dollars into the economy by paying farmers for reducing nutrient loading. Many farmers in the ORB, while Environmental Quality Incentives Program ("EQIP")-eligible, do not participate in federal incentive payment programs due to perceived onerous application and reporting contracts. This project can effectively engage these farmers and help local agriculture offices establish themselves as the aggregator of credits in their counties. Utilizing solid scientific foundations, this project could result in a multi-industry market that will accelerate cost-effective water quality improvements and provide important ancillary ecological benefits. EPRI intends to support states, local SWCDs, farmers, and point sources in implementing a robust, defensible, and successful trading Pilot.

To implement water quality trading markets, one-time set-up costs are high and typically span several years (EPA, 2007).[21] Unavoidable costs include concept review and approval, baseline assessments, setting objectives, making allowance allocations, developing the market, creating the pricing structure, and securing stakeholder buy-in. Per EPA's assessment, once the market is operational, administration and governance costs can be embedded in transaction costs. The Project is following this path as well, with high initial start-up costs that need government and private subsidies, followed by a trading market where credit transactions carry an acceptable mark-up to cover overhead and management. This project faces unique challenges because it is regional,

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[18] See Memorandum from Nancy Stoner, Acting Assistant Administrator for EPA Office of Water, *Working in Partnership with States to Address Phosphorous and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions, Memorandum*, March 16, 2011.

[19] See www.epri.com/ohiorivertrading (*Last accessed* July 9, 2012)

[20] *Program on Technology Innovation: Water Quality Trading Pilot Programs—Review of Catawba River Basin, Chesapeake Bay, and Ohio River Pilot Projects.* EPRI, Palo Alto, CA, 2007. 1015409; *Program on Technology Innovation: Ohio River Water Quality Trading Pilot Program — Business Case for Power Company Participation, 2008.* EPRI, Palo Alto, CA: 2010. 1018861.

[21] EPA Office of Research and Development, 2007. Wetlands and Water Quality Trading: Review of Current Science and Economic Practices with Selected Case Studies. EPA/600/R-06/155. July 2007. 130 pp.

interstate, and engaging large power companies that require a high-level of due diligence and certainty. Congruent with the increased challenges, however, the project has the potential to generate exponentially more credit purchases over a longer period of time than a smaller watershed-based market, may have substantial environmental benefits, and may bring new point sources to the table that are willing to pay for conservation practices on farms. If 5% of the approximately 230,000 farmers in the ORB actively trade, it could result in new conservation practices to reduce nutrient run-off on as many as 2.2 million acres.

The project has been financially and/or technically supported by the following organizations at various times and to varying degrees between 2008 and 2012:

- Electric Power Research Institute
- American Electric Power
- American Farmland Trust
- Duke Energy
- Hoosier Energy
- Hunton & Williams
- Kieser & Associates, LLC
- Miami Conservancy District
- Ohio Farm Bureau
- Ohio River Valley Water Sanitation Commission (ORSANCO)
- Tennessee Valley Authority
- United States Department of Agriculture, Natural Resource Conservation Service
- United States Environmental Protection Agency
- University of California, Santa Barbara
- Willamette Partnership

The following EPRI reports have been published and are available at www.epri.com/ohiorivertrading:

[1] *Barriers and Solutions for Farmer Participation in the Ohio River Basin Water Quality Trading Program.* EPRI, Palo Alto, CA: 2011. 1023642.

[2] *Ohio River Basin Trading Project Agricultural Stakeholder Listening Workshops: Sardinia,Ohio, October 14th, 2010.* EPRI, Palo Alto, CA: 2011. 1023133.

[3] *Program on Technology Innovation: Modeling Nutrient Trading in the Ohio River Basin: Theoretical and Practical Considerations*, EPRI, Palo Alto, CA, 2009. 1018691.

[4] *Program on Technology Innovation: Water Quality Trading Program for Nitrogen.* EPRI, Palo Alto, CA: 2007. 1014646.

[5] *Water Quality Trading Guidance Manual: An Overview of Program Design Issues and Options,* EPRI, Palo Alto, CA: 2002. 1005179.

[6] *Program on Technology Innovation: Multimedia Management of Nitrogen: Proceedings: Proceedings of the EPRI Environment Multimedia Session, March 6, 2006.* EPRI, Palo Alto, CA. 2006. 1013672.

[7] *Program on Technology Innovation: Water Quality Trading Opportunities for Electric Power Companies: EPRI White Paper*. EPRI, Palo Alto, CA: 2006. 1013193.

[8] *Program on Technology Innovation: Water Quality Trading Pilot Programs—Review of Catawba River Basin, Chesapeake Bay, and Ohio River Pilot Projects.* EPRI, Palo Alto, CA, 2007. 1015409

[9] *Ohio River Basin Trading Project Listening Workshops: Wabash River Watershed, Indiana, March 8-9, 2010.* EPRI, Palo Alto, CA: 2010. 1021543.

[10] *Ohio River Basin Trading Project Joint Session Air, Water, Climate: March 15th, 2010–Orlando, Florida.* EPRI, Palo Alto, CA: 2010. 1021502.

[11] *Ohio River Basin Trading Project Soil and Water Conservation District (SWCD) Informational Meeting: Columbus, Ohio, July 6, 2010.* EPRI, Palo Alto, CA: 2010. 1021539.

[12] *Program on Technology Innovation: Ohio River Water Quality Trading Pilot Program — Business Case for Power Company Participation, 2008.* EPRI, Palo Alto, CA: 2010. 1018861.

[13] *Use of Models to Reduce Uncertainty and Improve Ecological Effectiveness of Water Quality Trading Programs: Evaluation of the Nutrient Trading Tool and the Watershed Analysis Risk Management Framework* EPRI, Palo Alto, CA: 2011. 1023610

Appendix B
Project Maps

The ORB is comprised of 18 Hydrology Unit Code 4 ("HUC-4") unique subwatersheds, as indicated by various colors in Figure B-1. The WARMF model has been calibrated for particular areas within these subwatersheds (Figure B-2). During the Pilot, trades will be targeted in these areas and along the Ohio border, in order to test both intrastate and interstate trading (Figure B-3). Other pilot trading locations will be considered as funding for model calibration is available.

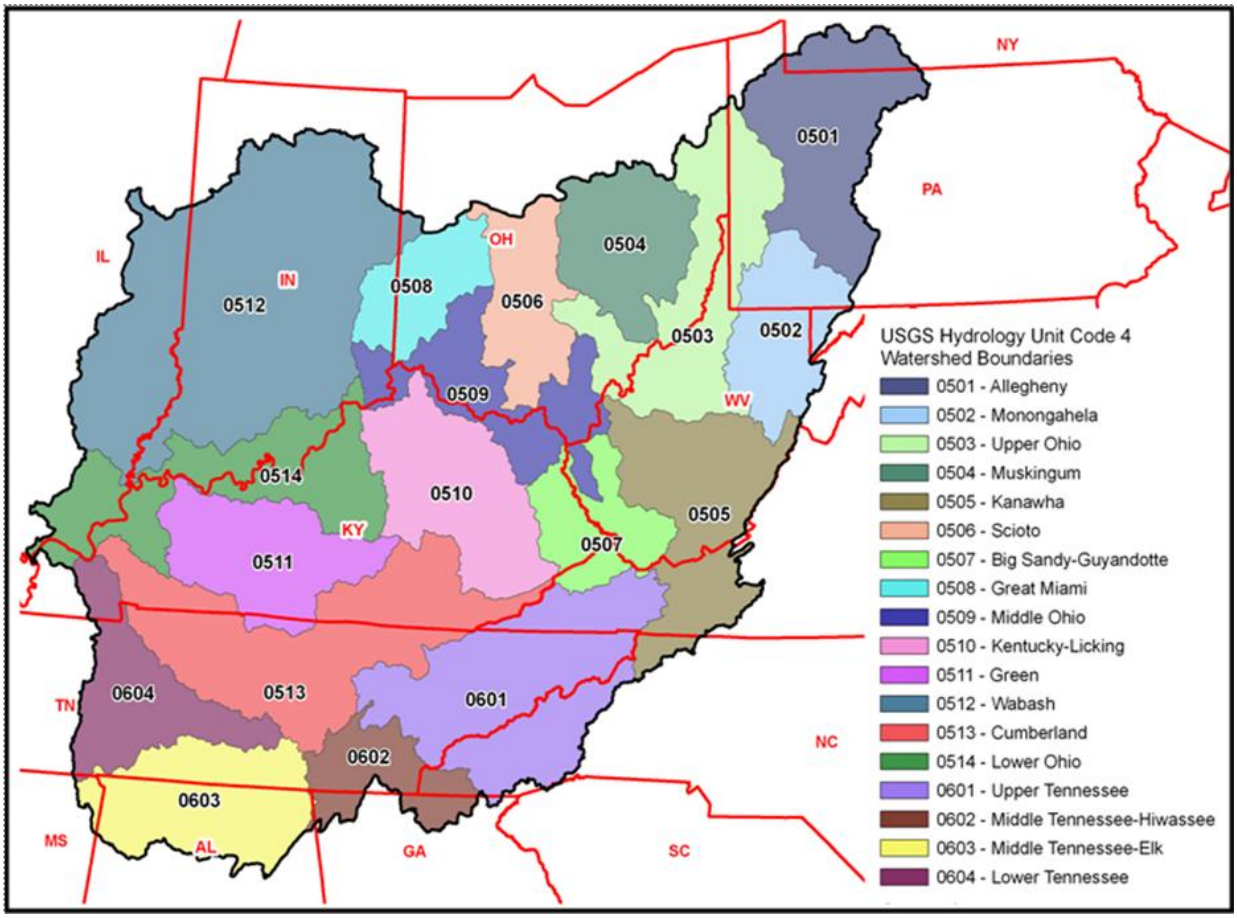

Figure B-1: Subwatersheds in the Ohio River Basin

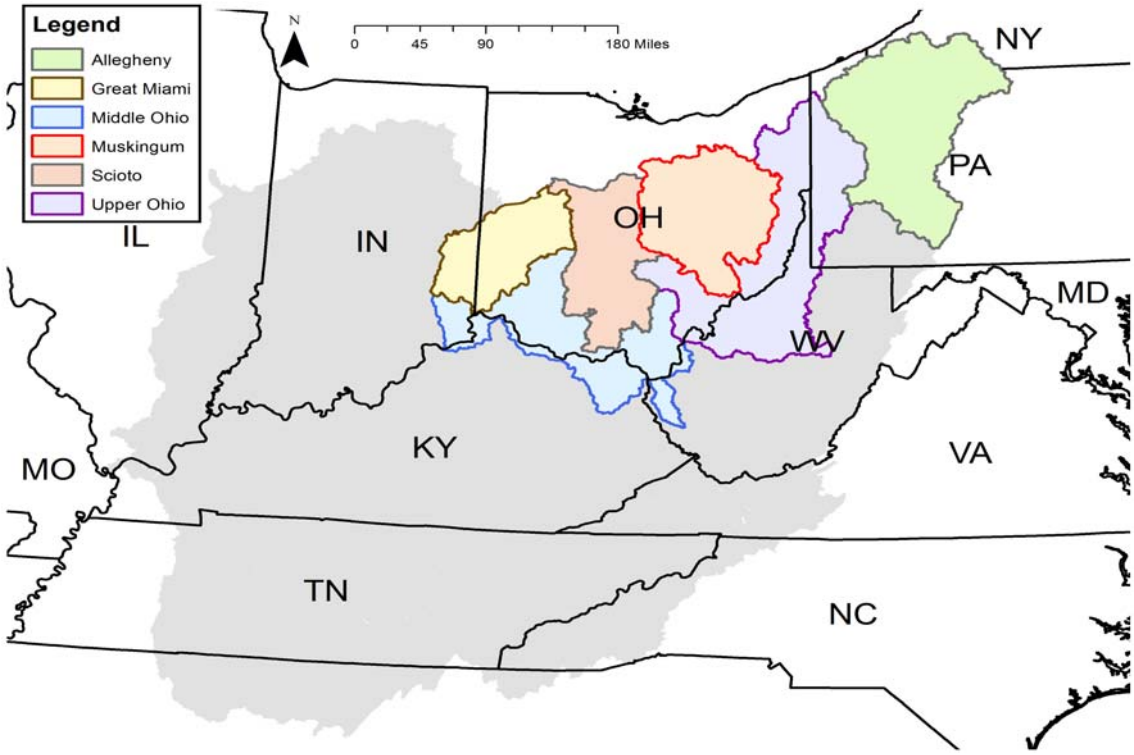

Figure B-2: Watersheds Calibrated with WARMF Model

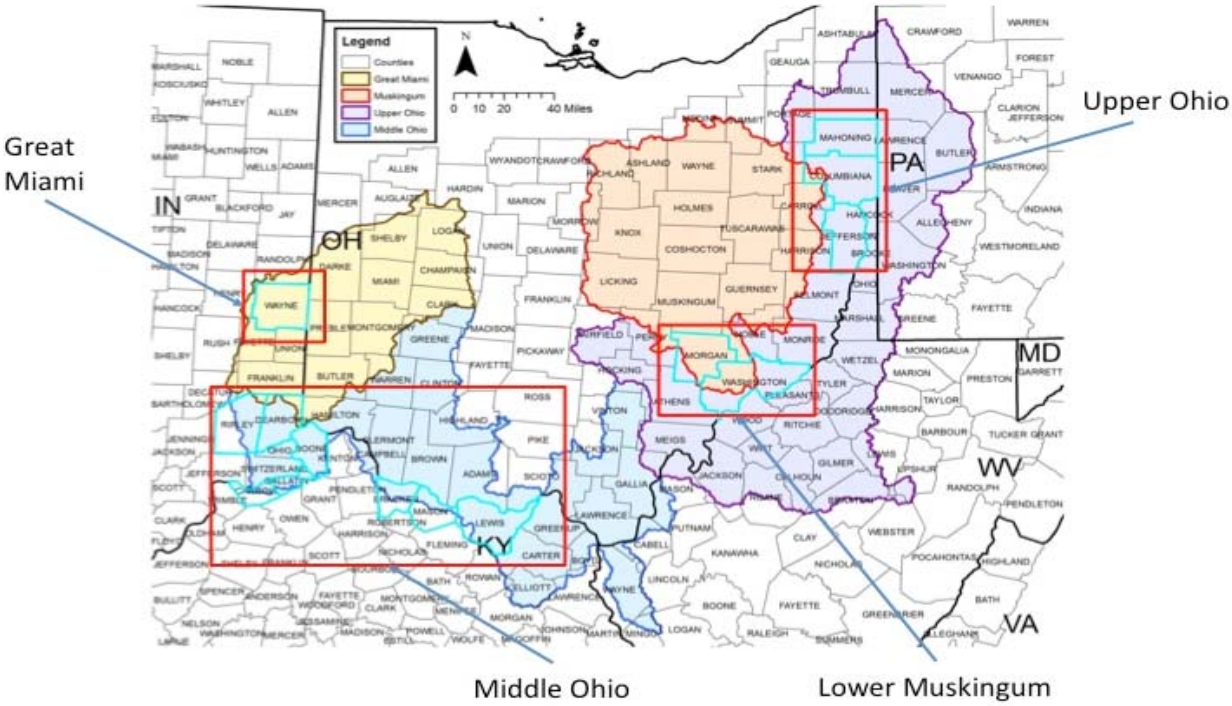

Figure B-3: Areas Identified for Pilot Trades

Appendix C
WARMF Supporting Materials

WARMF (Chen et al. 1996; Chen et al., 1998; Chen et al., 2000[22]) has been implemented in over 30 watersheds throughout the United States and abroad, and is available for download directly from EPA. The model is used for decision-support in watershed management and for regulatory activities, such as TMDLs. Water from precipitation, as rainfall or snowfall, is routed through the canopy, land surface, shallow subsurface flow and deep groundwater flow to receiving water bodies (streams, rivers or lakes), taking into consideration losses due to evapotranspiration, irrigation and other extractive uses which may not return it to the system. Chemicals are (1) in the system initially (e.g., nitrogen in vegetation, groundwater and/or soil minerals); (2) applied to the land surface (e.g., fertilization, irrigation water, atmospheric deposition, septic system discharge, animal waste); and/or (3) are discharged directly into a water body (e.g., discharge of treated effluent). Assimilation and transformation of nitrogen and phosphorus species is simulated on the soil surface and in the various water compartments.

The engineering module of WARMF contains a dynamic watershed simulation tool that calculates daily surface runoff, groundwater flow, non-point source loads, hydrology, and water quality of river segments and stratified reservoirs. In the model, a watershed is divided into a network of land catchments, river segments, and reservoir layers. Land catchments are further divided into land surface and soil layers. These watershed compartments are seamlessly connected for hydrologic and water quality simulations. The land surface is characterized by its land uses and cover, which may include rain and snow that is deposited on the land catchments. The model performs daily simulations of snow and soil hydrology to calculate surface runoff and groundwater accretion to river segments. The water is then routed from one river segment to the next downstream river segment until it reaches the terminus of the watershed. The associated point and nonpoint loads are also routed through the system. Heat budget and mass balance calculations are performed to calculate the temperature and concentrations of various water quality constituents in each soil layer, river segment and lake layer.

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[22] Chen, CW, J Herr, RA Goldstein, FJ Sagona, KE Rylant, and GE Hauser, 1996. Watershed Risk Analysis Model for TVA's Holston River Basin. *Water, Air and Soil Pollution* 90:1-2.

Chen, CW, J Herr, L Ziemelis. 1998. *Watershed Analysis Risk Management Framework - A Decision Support System for Watershed Approach and TMDL Calculation*. Documentation Report TR110709, Electric Power Research Institute, Palo Alto, CA.

Chen, CW, J Herr, and L Weintraub. 2000. *Watershed Analysis Risk Management Framework (WARMF) User's Guide*. Publication No. 1000729, Electric Power Research Institute, Palo Alto, CA.

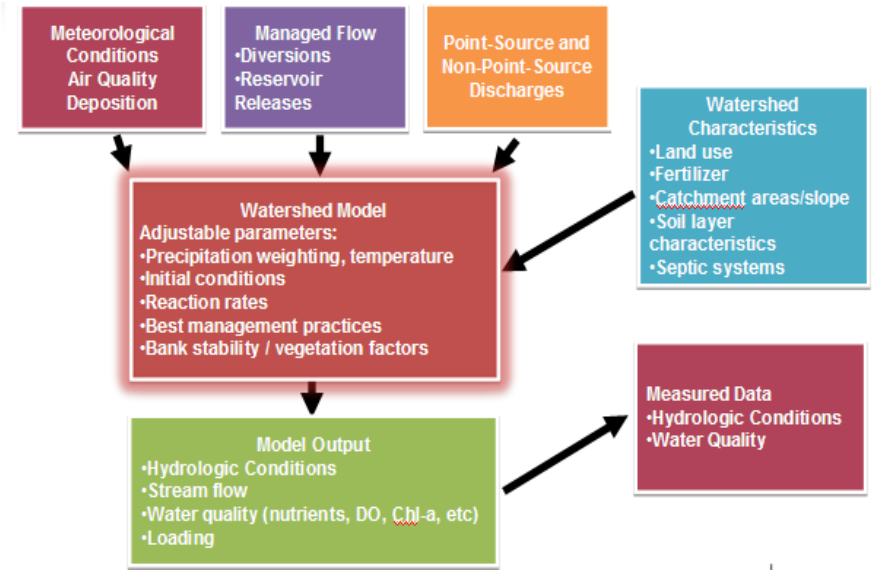

Figure C-1: Summary of WARMF Inputs and Outputs

Implementing the WARMF model requires obtaining a number of datasets such as topography, soils data, and hydrologic network and observed hydrology from USGS and the Army Corps of Engineers; meteorological information from NOAA and local weather stations, land use data from the National Land Cover Dataset supplemented with the Cropland Survey data from USDA; point source data from EPA and state environmental agencies; water quality observations data from EPA, state environmental agencies and local monitoring efforts; and local land use management information from USDA, farmer associations and other participating organizations. While most of this data can be obtained electronically from the corresponding federal agencies, the model can be improved with access to local information.

The WARMF model will be used to inform this Project and Plan. The model will simulate the water quality outcomes of various design options, thereby optimizing decisions related to baselines, credit trading ratios, trading boundaries within the larger project area, and others. Separate from this particular Project and Plan, the model may also be used to evaluate other water quality management decisions, such as TMDLs, water quality standards, effects of land use changes, assessment of different management practices on water quality (sediments, nutrients, pathogens, etc.), and others.

Previous sensitivity analysis will provide quantitative data regarding the necessary safety factor in the crediting equation, as described in the Plan. Additional reports on WARMF, including an analysis of linking WARMF to NRCS Nutrient Tracking Tool (EPRI Report 1023610), can be found at www.epri.com/ohiorivertrading.

Appendix D
Language for NPDES Permitting Actions During the Pilot

The following language is available for the states to use in NPDES permit proceedings involving point sources that volunteer to participate during the Pilot. This language may be placed in either the permit fact sheet or the permit itself. As with any model permit language, it is subject to revision to meet the needs and circumstances of any particular permitting scenario.

If the permittee is assigned limits for pollutants (e.g., TN or TP) for which a water quality trading program is approved and in place, the permittee may elect to demonstrate compliance with those limits, in whole or in part, through participation in, and subject to the terms and conditions of, that program. The Director may consider any pollutant loading reductions funded by the permittee when determining future regulatory requirements. These regulatory requirements may include, but are not limited to, permit limits, compliance schedules, or other actions the Director deems appropriate to achieve water quality standards.

Appendix E
Protocol for Establishing, Validating, and Verifying Credits Generated by Agricultural Nonpoint Sources

1. Introduction

During the Pilot, a series of transactions are contemplated to establish water quality credits. First, EPRI will enter into agreements with the relevant state agencies, Ohio Department of Natural Resources, Kentucky Division of Conservation, and Indiana State Department of Agriculture ("State Agencies") to initiate the downstream flow of funding. Second, the relevant state agency will enter into agreements with the state soil and water conservation districts ("SWCDs") and will arrange to periodically monitor, inspect and verify the BMPs. Third, the SWCDs will enter into agreements with eligible landowner(s) to fund the implementation of BMPs. EPRI will own all of the credits that are established through these BMPs, and will have the right to use them as set forth in the Plan. As a 501(c)3 nonprofit organization, EPRI intends to make credits broadly available.

The relevant State Agency, SWCDs, and landowners bear the following key responsibilities during the Pilot:

State Agency

- Initiate downstream flow of funding to SWCDs
- Review and prioritize BMP projects for EPRI approval
- Arrange to periodically monitor, inspect, and verify the implemented BMPs
- Transfer necessary documentation to EPRI on a rolling basis as BMPs are verified

SWCDs

- Conduct outreach to landowners
- Review projects for eligibility, size, and value, and make recommendations to EPRI
- Fund and oversee implementation of BMPs
- Provide technical service to landowners to implement and maintain BMPs

Landowners

- Implement and maintain BMPs

The credit generation and transaction process is summarized in Figure E-1 and described below.

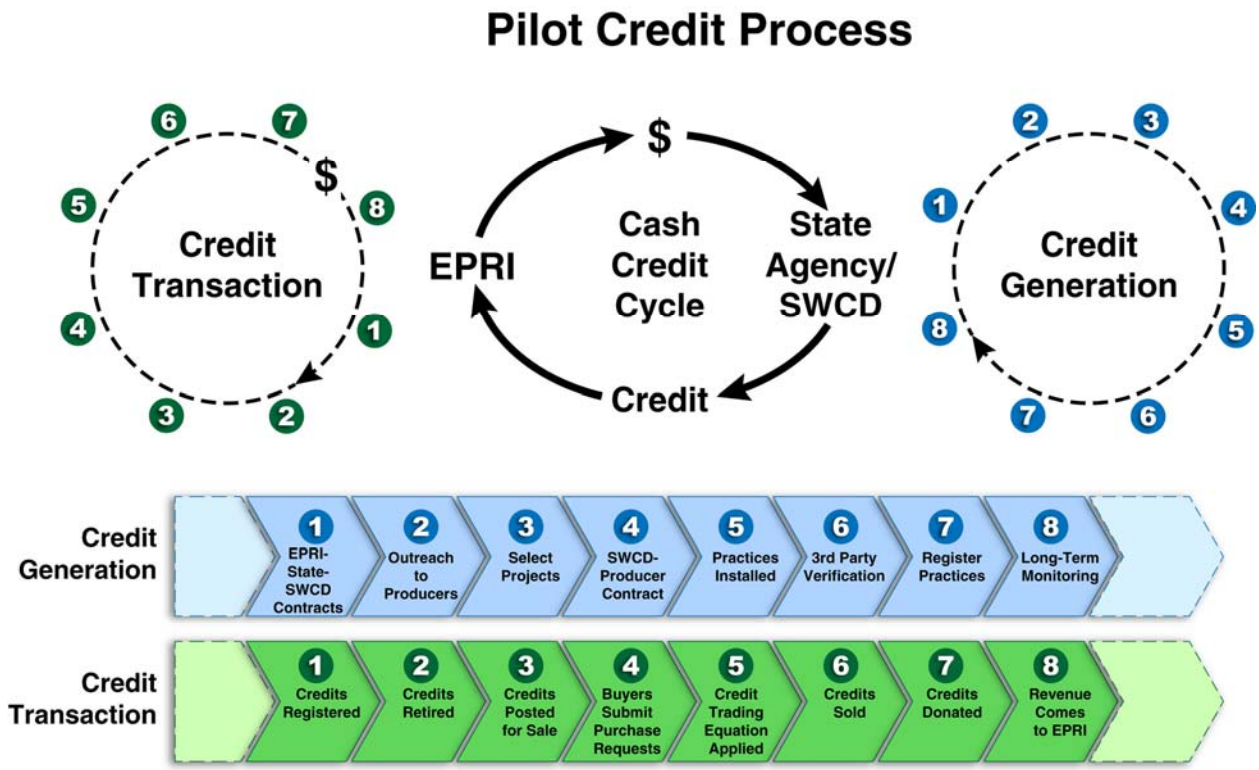

Figure E-1: Credit Generation and Transaction Process

2. Credit Generation Steps

The steps below summarize the process that will be used to generate agricultural credits during the Pilot.

1. EPRI enters into agreements with relevant State Agencies and State Agencies enter into agreements with SWCDs.
2. SWCDs conduct outreach with landowners to secure their participation.
3. SWCDs review BMP projects for eligibility, size, and value, and then make recommendations to EPRI. EPRI selects and approves BMP projects to receive funding.

   Note: EPRI intends to use its available resources to select a range of different practices from a range of different counties and subwatersheds in each of the participating ORB states, so that it gains maximum knowledge and understanding from the Pilot.

4. SWCDs enter into agreements with selected landowners.

   Note: We anticipate that the payment to landowners for implementation of BMPs will be approximately 75% of the costs established by the USDA Natural

Resources Conservation Service ("NRCS") practice payment schedule.[23] Payments may vary depending on the priorities and resources of the Project.

5. Landowners implement BMPs with technical support and oversight from SWCDs.
6. State Agencies serve as verifiers to monitor, inspect, and verify BMPs.
7. SWCDs register BMPs and associated credits using credit registration and tracking system.
8. Verifiers conduct annual monitoring, inspection, and verification of BMPs.

3. Credit Transaction Steps

The steps below summarize the process that will be used by EPRI to transact credits during the Pilot.

1. Register Point of Generation credits using credit registration and tracking system.
2. Set aside, at a minimum, 10% of total credit pool for reserve / assurance, as provided in Section 13 of the Plan. Retire or donate, at a minimum, an additional 10% of the total credit pool to provide additional conservation benefits for the ORB.
3. Post remaining credits for sale.
4. Buyers submit purchase requests.
5. For any credits that are sold, apply trading equation to account for watershed-specific nutrient attenuation between the point of credit generation (defined as the HUC-10 that encompasses the relevant BMPs) and the point of use to determine Point of Use Credits. Attenuation factors will be estimated using the WARMF model, as described in Section 8 of the Plan.
6. Credits are transacted.
7. Unused credits are donated for conservation benefit.
8. EPRI intends to use revenues from credit transactions to support adaptive implementation of the Pilot, including funding for additional credit generation activities and long-term management of the Project.

4. BMP Eligibility Criteria

As SWCDs review BMP projects for eligibility, size, and value, they will be guided by the following criteria:

4.A. Eligible Land Use and BMP Types

All agricultural lands and crop types will be eligible for consideration during the Pilot, provided that they involve one or more of the following BMPs: (1) cover crops, (2) nutrient

[23] Conservation practice costs can be obtained from the County Field Office Technical Guide, within Section 1, General References. The project will use conservation practice costs calculated for the USDA NRCS EQIP program. *See* http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/fotg. (*Last accessed* July 9, 2012).

management, (3) vegetative filter strips, (4) grass waterways, (5) livestock exclusion, (6) heavy use protection areas, and/or (7) conservation tillage. Other BMPs will not be eligible without separate approval from EPRI.

4.B. Baselines

To meet the baseline conditions established in Section 7 of the Plan, all interested landowners must: (1) provide three years of farm practice history to document current conditions (the start date for the three-year look-back period is the date that the Plan is fully executed by the states) (*see* Appendix E, Section 4.C.); (2) demonstrate compliance with presently-applicable legal requirements; and (3) meet relevant Environmental Quality Incentive Program requirements (i.e., must not have exceeded the $450,000 payment limitation, must not have exceeded the Adjusted Gross Income provision, must be in compliance with the Highly Erodible Land and Wetlands Conservation Provisions of the 2008 Farm Bill, and must have control of the land for the term of the proposed BMP project.) Only BMPs that reduce TN and/or TP loads below the baseline will be eligible to generate credits (see Section 7, Figure 1 of the Plan).

4.C. Farm Practice History

To demonstrate their farm practice history, landowners may be required to provide the following information:

- Crop rotations.
  - Crop rotation sequence.
- Crop residue management.
  - Each crop within the rotation for each field.
  - Yield per acre per year and units, date of planting, date of harvest and whether residue is removed from field.
  - If a perennial hay crop is grown, provide typical seeding date, number of cuttings and per-acre yield.
  - For tree crops, provide month and year of establishment.
- Field operations.
  - Provide tillage information for each field including equipment used, soil penetration depth, and type of residue managers.
- Crop nutrient input.
  - Provide field identification, crop and yield goal, date of application, formulation of material applied, method of application, and actual lb/ac of actual nitrogen, phosphorus, and potassium that was applied.
- Irrigation water management (if BMP involves tile drainage).
  - Tile drainage.
- Location and type of conservation practices (buffer strips, filter strips, structural conservation practices such as terracing).
- If operations include livestock, then: (1) livestock inventory, (2) grazing system documentation; (3) manure handling; and (4) location of barns/feeding areas/drainage.

4.D. Compliance with Local and State Regulations

All landowners must be in compliance with presently-applicable legal requirements as of the date that the Plan is fully executed by the states. Among the signatory states, Kentucky has unique legal requirements that require farmers to develop and implement agriculture water quality plans. These plans will serve as the baseline for practices funded in Kentucky during the Pilot. To demonstrate compliance with their plans, participating landowners in Kentucky will be required to provide copies of the Agricultural Water Quality Plan Self-Certification forms that they completed and filed with their local conservation district office.

Examples of going beyond these requirements in Kentucky include:

- A landowner who has selected livestock exclusion fencing as the best way to address immediate water quality concerns and has included this as part of his or her plan may be able to add rotational grazing to further reduce nutrient loading and qualify for nutrient credits.
- A landowner who has chosen to maintain vegetative cover on land areas affected by livestock along stream edges as part of his or her plan may be able to add livestock exclusion fencing to further limit the loss of nutrients and sediments and qualify for nutrient credits.
- A landowner who grows row crops on hilly or steeply sloping land may have chosen to use conservation tillage and contour farming as part of his or her plan but may be able to add a grassed waterway or filter strip to further reduce nutrient loading and qualify for nutrient credits.

4.E. Minimum Quality Standards for BMPs

All BMPs that generate nutrient credits should be designed and installed using the appropriate State NRCS Practice Standards ("Standards"), available through the localized Field Office Technical Guide.[24] The Standards provide information on why and where a practice is applied and the minimum quality criteria that must be met in order to achieve its intended purpose. The Standards also include information about additional criteria that can be followed during implementation of the BMP to increase biodiversity, create, restore, or enhance wildlife habitat, and/or increase carbon sequestration. The Pilot is interested in the extent to which it can support broader ecosystem services and may identify credits that generate additional ecosystem services. If a landowner wants to modify existing Standards (e.g., allowing possible haying or grazing of buffer strips), he or she will need to include an explanation of the modification(s) as part of the preliminary design application to the SWCD.

[24] NRCS Field Office Technical Guide: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/fotg *(Last accessed July 5, 2012)*

5. Edge-of-Field Calculation

As described in Sections 6 and 8 of the Plan, the EPA Region 5 spreadsheet model will be used to calculate the edge-of-field nutrient load reductions. American Farmland Trust will be available to run this model for any State Agency or SWCD lacking the capacity or resources to do so.

6. Project Development

SWCDs should discuss BMP options with landowners, make an initial determination of eligibility based on baseline requirements (including three years of farm practice history), and develop a preliminary design for proposed BMP(s). SWCDs should use the EPA Region 5 spreadsheet model to identify and estimate credits during initial outreach efforts with landowners. SWCDs should then submit this information to their respective State Agency to review or complete the initial calculation of baseline, credits, and costs.

Once the State Agency has reviewed or completed the initial calculation and conferred with EPRI, it will authorize the SWCDs to notify landowners whose projects have passed the initial screening process. If a landowner decides to move forward with implementing the BMP(s), the SWCDs will work with the landowner to develop a project application with finalized design specifications and plans. The State Agency will then complete a revised calculation of baseline, credits, and costs.

If a SWCD decides to work with several landowners, it should rank the project applications in order of priority for the SWCD. When reviewing the applications from the SWCDs, each State Agency should do the same. Examples of ranking factors, in no particular order, include water quality, water quantity, soil health and erosion, invasive and noxious plant species, threatened species and habitat enhancement, energy conservation and greenhouse gas reduction, air quality, maintaining agricultural viability, managing excessive run-off, synergies with other cost-share programs, benefits to surrounding communities, and project visibility.

7. Project Acceptance and Implementation

EPRI will select and approve projects for funding based on the applications and rankings provided by the State Agencies and SWCDs, available resources, market conditions (including buyer demand), ecological benefits, and other factors that are consistent with the goals of the Project. As projects are approved, EPRI will notify the State Agencies so that they, in turn, can notify the SWCDs.

After receiving notice, the SWCDs will enter into agreements with the selected landowners and then provide technical support and oversight during implementation of the selected BMPs.

8. Verification of BMPs

All BMPs must be periodically monitored, inspected, and verified by the State Agency or an EPRI-approved third party. During the Pilot, verification will occur, at a minimum, annually. Verification will be based on visual monitoring and inspection, as well as a review of records provided by the landowner and/or SWCD.

8.A. Who Verifies Credits?

During the Pilot, the State Agency will arrange to periodically monitor, inspect, and verify the implemented BMPs. A verifier will be assigned to a particular BMP project based on: 1) knowledge of the conservation practices implemented; 2) knowledge of the geography; 3) availability; and 4) absence of significant conflicts of interest. All verifiers will be trained on the Plan, credit calculation tools, processes, and protocols. They will have a working knowledge of farm operations and practices to manage nutrients on farms in the ORB. Verifiers will complete regular continuing education training as required by EPRI.

8.B. What is Verified?

Verifiers will confirm that: 1) the landowner's eligibility information is correct; 2) the BMPs were implemented according to the Standards or approved modifications; 3) credits are quantified using appropriate metrics and methodologies; 4) practices are maintained and performing as designed; and 5) appropriate arrangements are in place to ensure practices are maintained.

The supporting data for the BMPs include those features of a practice that can be measured, surveyed, tested, or observed. The completed practice is to be checked against the plans and specifications or other requirements to ensure a satisfactory job. Any notes or observations become a part of the supporting data along with previous planning, layout, or documenting records. Location identification is required for all practices -- this can be a sketch on the job plans, field notes, aerial photographs, special forms, or a reference to the conservation plan map. Design data are required for most engineering practices. The data should be sufficient to show that the installation meets minimum standards and specifications.

Completed BMPs should be checked for compliance with plans and specifications. The type of verification/monitoring needed will vary depending on whether the practice is structural (e.g., livestock exclusion fencing), vegetative (e.g., buffer strip) or management (e.g., nutrient management). Both structural and vegetative practices can be viewed in the field but verifiers will need to check landowner records to confirm that they are being maintained properly. Management practices will mostly be verified by examining landowner records.

8.C. Review and Submission of Verification Report

The verifier must prepare a report of each monitoring, inspection and verification event, along with its opinion as to whether each BMP is, in fact, verified. This report must be submitted to EPRI within 30 days after each event.

9. Certification of Credits

After a BMP is verified, the final step in generating a Point of Generation Credit is certification. During certification, the State Agency will secure any water quality agency approvals needed to authorize a credit (e.g., in Kentucky, the Agriculture Water Quality Authority may need to confirm that the landowner is in compliance with the Agriculture Water Quality Plan). The State Agency will then transfer all documentation to EPRI. EPRI will also check that all documentation is complete including:

- Signed agreement between SWCD and landowner.
- Final application forms with approved credit calculations.
- BMP verification report.

10. Credit Registration

The Project intends to establish a state-approved credit registration and tracking system through which credits will be assigned unique serial numbers to ensure diligent tracking, verification and monitoring. EPRI may request the State Agencies and SWCDs to upload documents and information into the registry at various times during the Pilot.

11. Failed BMPs

If a BMP cannot be verified or fails for any reason, then any resulting credits must be temporarily suspended. Upon discovery of a failure, the SWCD must take or cause to be taken immediate and appropriate corrective action. If the failure is corrected within 90 days, then the temporary suspension will be lifted and the credits will be available for use as originally contemplated (e.g., if they are sold to credit buyers, then they may be used by those buyers for their intended purpose).

If the failure continues unabated for more than 90 days, or is corrected and then recurs within the applicable 12-month credit life, the resulting credits must be cancelled. In the event of cancellation, the State Agency has the right to recover the amount(s) paid and return those amounts to EPRI.

The agreements with credit buyers will describe the process for suspension and/or cancellation of credits, including access to the credit reserve for replacement credits.

12. Early Adopters

The Pilot will explore options for recognizing “early adopters” of conservation practices, in order to address concerns that landowners who have already implemented BMPs (i.e., “early adopters”) may be excluded from trading because they have already reduced nutrient run-off from their farms and any additional practices may be too expensive for the marketplace.

13. Project Contact Information

FOR OVERALL PROJECT ISSUES:

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Appendix F
Relevant Project Letters

The following pages contain:

1. Ohio River Valley Water Sanitation Commission (ORSANCO), Resolution 2-11, Development of an Interstate Water Quality Trading Program for the Ohio River Basin, June 9, 2011.

2. Letter exchange between ORSANCO (August 2, 2011) and USEPA (September 12, 2011) regarding Pilot Water Quality Trading in the Ohio River Basin.

3. United States Department of Agriculture (USDA) Project Letter, June 13, 2012

4. Environmental Protection Agency, Region 4, Project Letter, April 20, 2012

OHIO RIVER VALLEY
WATER SANITATION COMMISSION

RESOLUTION 2-11

DEVELOPMENT OF AN INTERSTATE WATER QUALITY TRADING PROGRAM FOR THE OHIO RIVER BASIN

WHEREAS: the States of Illinois, Indiana, Ohio, Pennsylvania, New York, Kentucky, Virginia and West Virginia are signatory to the Ohio River Valley Water Sanitation Compact; and

WHEREAS: the Compact pledges the states to faithful cooperation in the control of future pollution, and the abatement of existing pollution, from the waters of the Ohio River Basin; and

WHEREAS: excessive nutrient loading has been identified as a water quality problem within the Ohio River Basin; and

WHEREAS: the sources and causes of nutrient loading are many and varied; and

WHEREAS: the States recognize the need for additional mechanisms to facilitate nutrient reductions, including water quality trading; and

WHEREAS: water quality trading offers potential cost and energy savings in nutrient reduction; and

WHEREAS: trading among states may allow for a more effective use of this tool; and

WHEREAS: core aspects of the trading program need to be developed, including the framework and rules for interstate trading, the baseline for generating tradable credits, the ratio for such credits, and the sources entitled to trade; and

WHEREAS: development of an interstate trading program requires discussion of these core aspects of the trading program by the States in a coordinated and collaborative manner.

NOW THEREFORE BE IT RESOLVED, that the Ohio River Valley Water Sanitation Commission endorses the development of an interstate water quality trading program for the Ohio River Basin.

BE IT FURTHER RESOLVED, that the Commission encourages its member States to engage in discussions leading to the development of an interstate water quality trading program, and also endorses participation by other interested States in the Basin.

Adopted by action of the Commissioners of the Ohio River Valley Water Sanitation Commission on this, the 9th day of June 2011.

Paul E. Tome

Chairman

OHIO RIVER VALLEY
WATER SANITATION COMMISSION

5735 KELLOGG AVENUE, CINCINNATI, OHIO 45228-1112 (513) 231-7719 FAX: (513) 231-7761

CHARLES A. DURITSA
CHAIRMAN
ALAN H. VICORY, JR., P.E., BCEE
EXECUTIVE DIRECTOR
AND CHIEF ENGINEER

August 2, 2011

Bob Perciasepe, Deputy Administrator
USEPA Headquarters
Ariel Rios Building
1200 Pennsylvania Avenue, N. W.
Mail Code: 1101A
Washington, DC 20460

Subject: Pilot Water Quality Trading in the Ohio River Basin

Dear ~~Mr. Perciasepe~~ Bob:

As you know, the Ohio River Valley Water Sanitation Commission (ORSANCO) was established in 1948 to control and abate interstate pollution in the Ohio River Basin. We are an interstate commission representing eight states (IL, IN, KY, OH, NY, PA, VA, WV) with representation from the United States. ORSANCO operates programs to improve water quality in the Ohio River and its tributaries, including: setting wastewater discharge standards; performing biological assessments; monitoring for the chemical and physical properties of the waterways; spill detection and response and conducting special surveys and studies.

Over the past two years, we have been working collaboratively with the Electric Power Research Institute (EPRI) to develop a regional water quality trading program in the Ohio River Basin. The Ohio River Basin Trading Project is developing the world's largest multi-state trading program that intends to produce water quality credits for nitrogen and phosphorous. The project involves a broad coalition of organizations representing key stakeholders including power plants, wastewater utilities, farmers and environmental interests. Successful implementation of this effort is expected to improve water quality, while minimizing costs and optimizing environmental improvements. On June 9, 2011, with the support of its member states, ORSANCO adopted a resolution serving to confirm support of the project.

We are now moving forward with defining a set of pilot trades to test the program and quantify the water quality benefits. Given that our project spans the jurisdictions of three EPA regions and may include eight or more states, there is tremendous potential for this effort to support the collaborative approaches described in Coming Together for Clean Waters (EPA, March 2011) and the nutrient reduction framework advanced by Nancy Stoner in a memorandum to EPA Regions (EPA, March 16, 2011). While there are circumstances where trading may meet a compliance target, there are also opportunities for pre-compliance trading where regulatory limits are not yet in place. Direction from EPA on incentives for point sources to voluntarily purchase credits in these pre-compliance settings is expected to accelerate this effort and provide participating EPA regions and states clarity on options for executing the pilot trades.

More specifically, we seek clarification and/or concurrence from EPA on the following specific incentives that may be available to point sources that volunteer to participate in our pre-compliance pilot trades. We understand that, due to delegated NPDES permitting authority to the states, that the state permitting authorities have the final decisions on these matters, with review by EPA. At this time we are asking EPA to weigh in on the viability of the following three incentives, pending further discussion with the state NPDES permitting authorities:

1. Retirement Ratios -- Retirement ratios are not required, but are common in state trading programs to facilitate additional water quality improvements. We seek concurrence from EPA that states may offer credit purchasers smaller retirement ratios for participating in the pilot trades since those trades, in and of themselves, may yield additional water quality benefits. If extended into a post-pilot trading program, credit purchasers that participated in the pilot trades could benefit from an effective discount on all future nonpoint source trades.

2. Uncertainty Ratios -- Modeling-based uncertainty ratios are typically used to account for uncertainties in nonpoint source BMP performance. We plan to use the pilots to field-test the validity of these ratios, and, hopefully to improve the estimates of nonpoint source BMP load reductions used in our model. Once validated, pilot trades would be eligible for smaller uncertainty ratios, and all parties can benefit from improving the model estimates of nonpoint source BMPs more broadly. We seek concurrence from EPA on this approach to reducing the uncertainty ratios through the pilot process.

3. Future Compliance Assumptions and Requirements -- After regulatory drivers (e.g., numeric nutrient criteria, TMDLs and/or water quality-based effluent limitations) are in place, the parties involved in the pilot trades would like assurances that their voluntary efforts will be counted toward any further regulatory requirements, including reasonable assurance under TMDLs. For example, nonpoint sources may generate credits for pilot trades by reducing their loading below current conditions. Likewise, point sources that purchase credits during the pilot trades may seek first rights to the bargained-for reductions in the future. In addition, we would expect permitting authorities to make use of tools like compliance schedules to provide any necessary relief to point sources that volunteer to participate in the pilot trades (e.g., if the pilot program is predicated on overall reductions of 25% and a TMDL eventually dictates reductions of 50%, then permitting authorities may authorize longer-term compliance schedules, if appropriate, for participating point sources to achieve the further reduction). We seek concurrence from EPA on the availability of these options, understanding that the state permitting authority has the final decision on whether to use them.

ORSANCO is proud to be a leader in this innovative project, which builds from over 60 years of collaborative relationships in the Ohio River Basin. We look forward to receiving further direction and/or concurrence from EPA on the points mentioned above, and moving forward with an economical and ecologically effective solution to improving water quality in the basin.

Sincerely,

Alan H. Vicory, Jr.
Executive Director, ORSANCO

cc: Jessica Fox, EPRI
Charles Duritsa

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 12 2011

DEPUTY ADMINISTRATOR

Alan H. Vicory Jr.
Executive Director
Ohio River Valley Water Sanitation Commission
5735 Kellogg Avenue
Cincinnati, Ohio 45228

Dear Mr. Vicory: alan

Thank you for your August 2, 2011, letter concerning the Ohio River Valley Water Sanitation Commission's collaboration with the Electric Power Research Institute to develop a regional water-quality trading program in the Ohio River Basin. The purpose of this multi-state program, to be known as the Ohio River Basin Trading Project, is to produce cost effectively water-quality credits for nitrogen and phosphorus in advance of any regulatory requirements for capping these nutrients in the watershed.

As you are aware, through our participation in discussions with the trading group, the U.S. Environmental Protection Agency supports your efforts to initiate water-quality trading in the Ohio River Basin using pilot trades. We also want to acknowledge the key role and excellent efforts of the U.S. Department of Agriculture in working with the group to facilitate the establishment of environmental markets that would allow trading across sectors. We agree with your observation that this trading project comports with the nutrient reduction framework contemplated by the EPA and described in a March 16, 2011, memorandum to the EPA's regional offices from Nancy Stoner, acting assistant administrator for the Office of Water.

We understand from your letter that you are seeking some clarity from the EPA as you complete the design of the trading project and define a set of pilot trades. It is likely that the implementation of such a program will be a learning process for federal and state regulators and stakeholders, and, as such, we need to remain somewhat flexible in our approaches. While you seek concurrence from the EPA on specific incentives for these pilot trades, we emphasize that these incentives must align with the Clean Water Act and are at the states' discretion as they have been authorized by the EPA to administer the National Pollutant Discharge Elimination System program.

You ask if states may offer credit purchasers lower retirement ratios as an incentive for early participation in pilot trades. Retirement ratios are considered a discretionary program design element of trading programs generally intended to favor or to better ensure environmental protection. As one tool within an overall framework of verification and accountability, however, we agree that under certain circumstances a state may provide lower ratios as an incentive for pilot trades.

The use of uncertainty ratios is standard practice in trading programs. We believe that your plans to explore ways to reduce those ratios to increase participation are worth consideration. In particular,

efforts to field test best-management-practices efficiencies and actual load reductions as well as getting better model estimates all lead to greater certainty of outcomes and thus support lower uncertainty ratios – again at the discretion of the regulatory authority.

It is difficult to definitively answer your question on future compliance assumptions and requirements in advance of knowing the actual regulatory drivers that might be put in place in the Ohio River Basin. However, we understand that after those drivers are established, the parties involved in the pilot trades might expect assurances that their voluntary efforts will be recognized. We believe those assurances could take several forms, where applicable, including the ones outlined in your letter. Keep in mind the details of these options, such as how a total maximum daily load that recognizes prior action would need to be worked out with the state regulators, with concurrence from the EPA's regional staff. The same would be true of applicable eligibility criteria for NPDES compliance schedules. Also, a facility cannot trade to meet an applicable technology-based effluent limitation unless specifically authorized to do so.

Thank you for your leadership role, along with Electric Power Research Institute, in thinking proactively about achieving nutrient reductions in the Ohio River Basin, thus advancing the protection of our nation's waters. It is the EPA's policy that water-quality trading is an important Clean Water Act tool. Your advocacy of trading through pilot trades sends an important, material signal that finding solutions to nitrogen and phosphorus pollution is possible and must include multiple stakeholders. We are confident that the EPA's regions, working in concert with the states, will support and be engaged in the Ohio River Basin Trading Project and will help to explore these and other incentives that promote water-quality improvement while reducing costs.

If you have further questions, please contact Ellen Gilinsky, senior policy advisor in the Office of Water, at (202) 564-2549 or gilinsky.ellen@epa.gov or your staff may call Bob Rose, also in the Office of Water, at (202) 564-0322 or rose.bob@epa.gov.

Sincerely,

Bob Perciasepe

Bob Perciasepe

USDA

United States Department of Agriculture

Office of the Secretary
Washington, D.C. 20250

JUN 13 2012

Jessica Fox
Electric Power Research Institute
3420 Hillview Avenue
Palo Alto, CA 94304

Dear Jessica:

The United States Department of Agriculture highly commends you and your collaborators on the progress that the Ohio River Basin Water Quality Trading program has made over the last few years. We look forward to continuing our work with the project as you begin the pilot trading process.

Through the Office of Ecosystem Markets and the Natural Resource and Environment Mission Area's Regional Environmental Markets Initiative, USDA has established a longstanding commitment to the development of crediting and trading platforms that will result in payments to farmers and landowners and conservation investment opportunities for the private sector. These emerging markets will compliment the work that the Natural Resources Conservation Service is doing to advance conservation practices on the ground and will provide another tool for permitting authorities to use to improve water quality. Although USDA has been involved with several interesting and successful ecosystem service market projects to date, the Ohio River Basin Water Quality Trading effort sets itself apart by proving a tremendous opportunity to bring water quality trading to scale and show broad benefits.

Your project is innovative and unique in its regional and interstate focus, in the leadership that has been shown by the participating states of Ohio, Indiana and Kentucky, in the involvement of major stakeholder groups in the Basin, and in its strong emphasis on a scientific framework. At the same time, the project has been careful to appropriately build on past efforts. We also applaud you and your collaborators for holding listening sessions early on with producers in the Basin to address constraints and inform the development of the trading plan.

The pilot trades will test key technical, regulatory and economic components of a regional interstate trading program—a program that even in its pilot stage will handle more transactions than most current water quality trading programs in the country. Notwithstanding our enthusiasm for the progress achieved to date, please note that EPRI's pending Conservation Innovation Grant proposal will continue to be evaluated through the independent process and criteria established for the program. We are proud of the investments we have made in this project and we look forward to building on our foundation of work together as the project enters the pilot phase.

Sincerely,

Harris Sherman
Under Secretary
Natural Resources and Environment

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

APR 20 2012

Ms. Jessica Fox
Senior Scientist
Electric Power Research Institute
3420 Hillview Avenue
Palo Alto, California 94304

Dear Ms. Fox:

Thank you for your January 30, 2012, email regarding the Ohio River Basin Water Quality Trading Project. We understand that you are in the process of finalizing a draft program framework and ready to begin implementing pilot projects in the near future, with Kentucky being a likely participant in the pilot study.

With over 460,000 miles of rivers and approximately 40 percent of the coastline along the continental United States, the U.S. Environmental Protection Agency Region 4 has long been committed to protecting our water resources. Region 4 has been actively involved in a multi-agency partnership focused on protecting, maintaining and restoring the health of the Gulf of Mexico. Given that the Ohio River contributes over one-third of the Mississippi River's total flow and drains parts of Region 4 states, we have been following the progress of the Electric Power Research Institute's (EPRI's) efforts to develop a nutrient trading program for the Ohio River Basin.

Excessive loading of nitrogen and phosphorus to our nation's waterways is a significant problem that must be addressed through multiple programs. Region 4 is actively supporting our states' efforts to develop nutrient reduction strategies and to adopt water quality criteria for nitrogen and phosphorus. We also oversee state permitting programs that limit nutrient discharges from point sources, provide state funding for implementation of nonpoint source pollution controls and provide State Revolving Fund monies for wastewater infrastructure projects. In addition, Region 4 works with states to identify waters impaired by nutrients and to develop Total Maximum Daily Loads for them. The EPA's Office of Water issued a memorandum on March 16, 2011, that outlined its on-going partnership with states and other agencies and discussed the key elements of a framework for managing nitrogen and phosphorus pollution. While the memo stressed the importance of nutrient criteria, it also recognized the need for innovation and flexibility if states are to achieve nutrient reductions while they continue to work on development of these water quality standards.

Region 4 is committed to exploring the use of water quality trading as a tool for attaining water quality standards and achieving watershed restoration goals in a cost-effective manner. To that end, we encourage and support your efforts to design an interstate trading program for nitrogen and phosphorus in the Ohio River Basin. The project has already established an impressive collaboration between various federal and state agencies and diverse stakeholders in the basin. We believe that the pilot trading project has considerable potential for identifying the challenges and benefits of an interstate trading program, as well as providing valuable information on the workability of different program elements,

including how to calculate and track generated credits, how best to invite public participation and how to verify that meaningful progress in nutrient reductions has been made.

We do not underestimate the complexity of a working interstate water quality trading program. Of particular importance is the issue of state equity in the pollutant reductions and credits. I am confident that EPRI, states, the regulated community and the relevant stakeholders will be sensitive to the equity issues as the pilot is further developed. We are committed to working with our colleagues in Region 3 and Region 5 to ensure the success of the pilot.

Region 4 would like to be involved in your efforts to implement pilot trading and assess the effectiveness of the program framework. If you have further questions or identify opportunities for further collaboration with your project, please contact Ms. Elizabeth Belk of my staff at (404) 562-9377.

Sincerely,

for James D. Giattina
Director
Water Protection Division

cc: Mr. Jon Capacasa
Director, Water Protection Division
U.S. EPA Region 3

Ms. Tinka Hyde
Director, Water Division
U.S. EPA Region 5