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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

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[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.

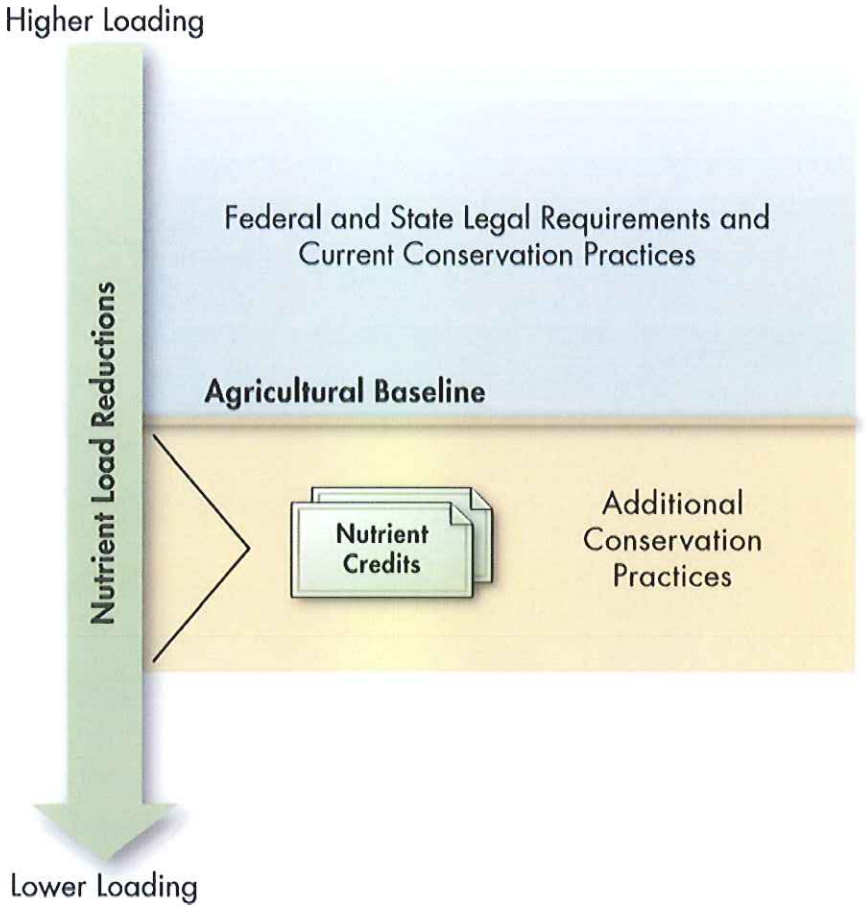

Figure 1: Agricultural Baselines

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

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[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 Allegheny 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

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

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.

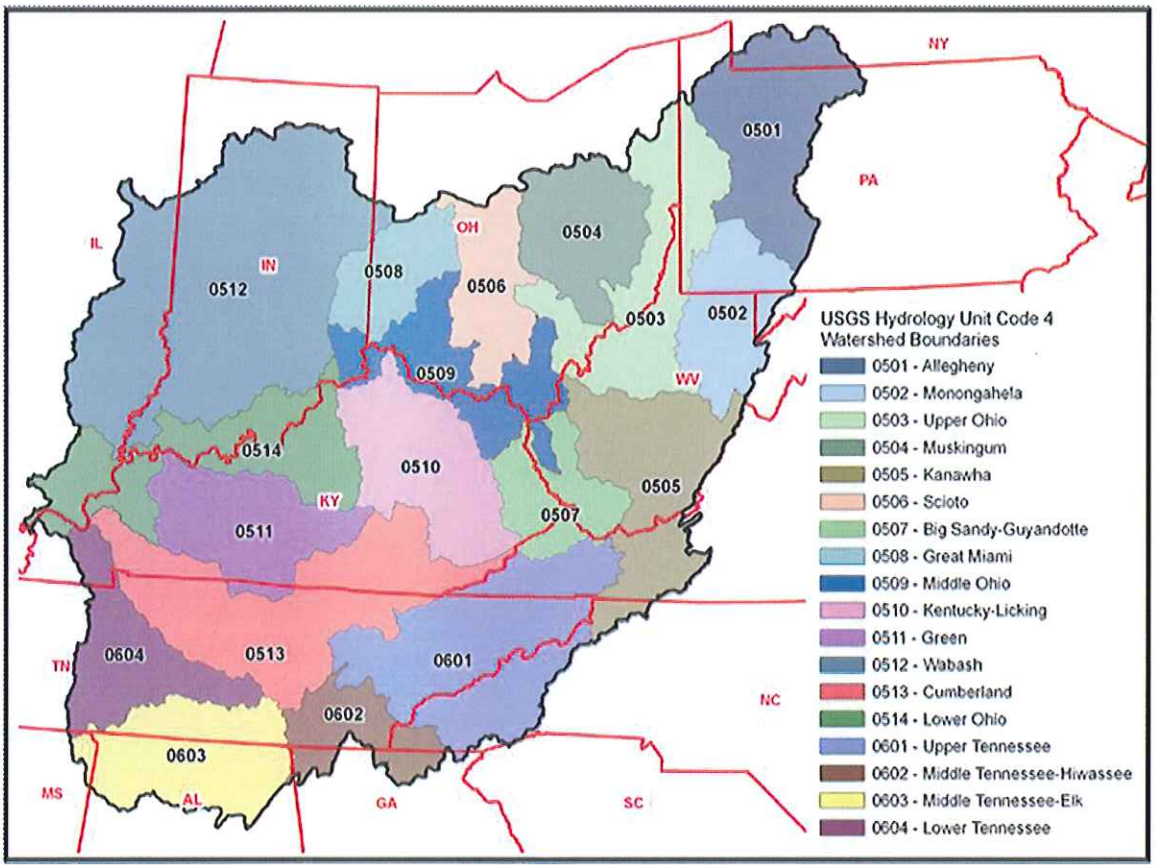

Figure B-1: Subwatersheds in the Ohio River Basin

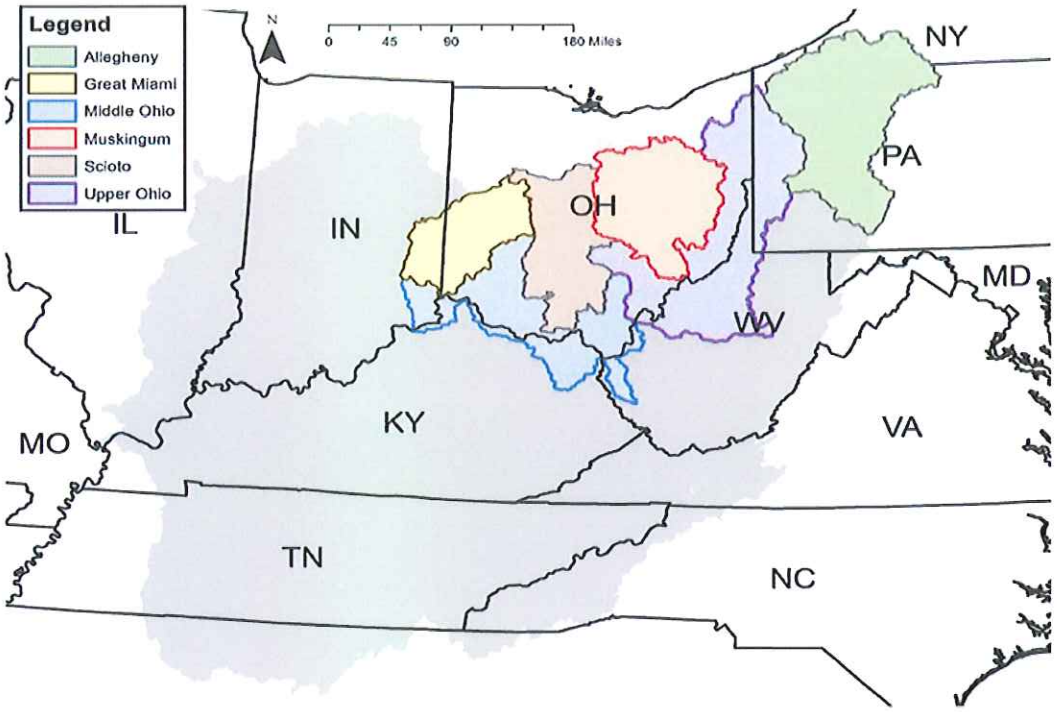

Figure B-2: Watersheds Calibrated with WARMF Model

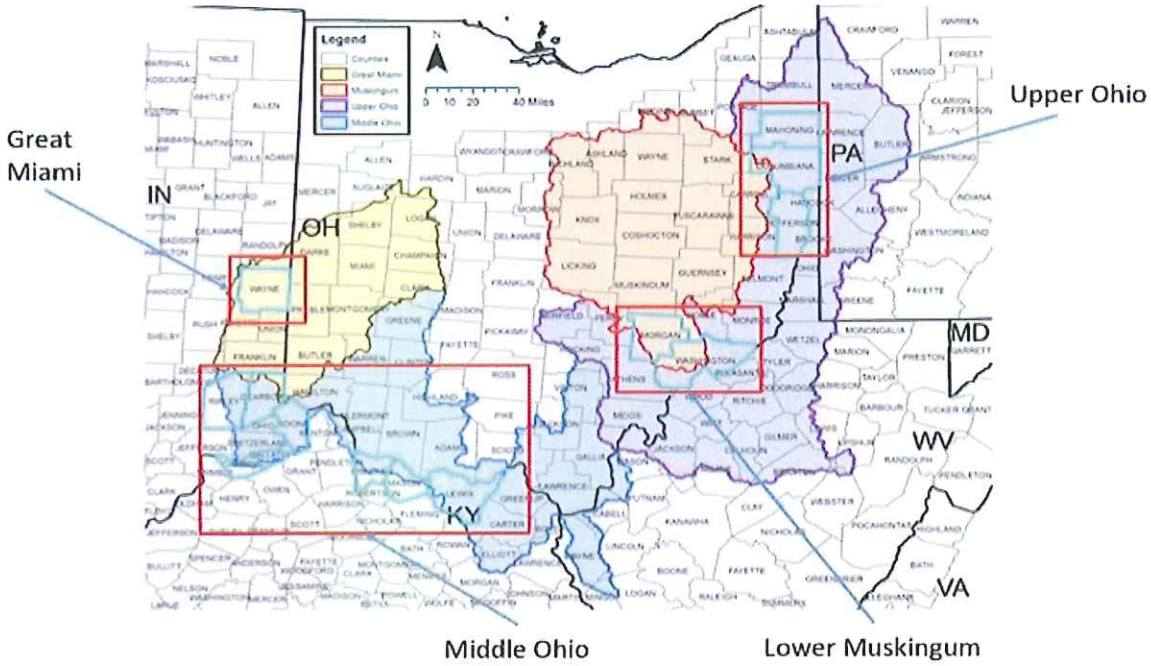

Figure B-3: Areas Identified for Pilot Trades

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.

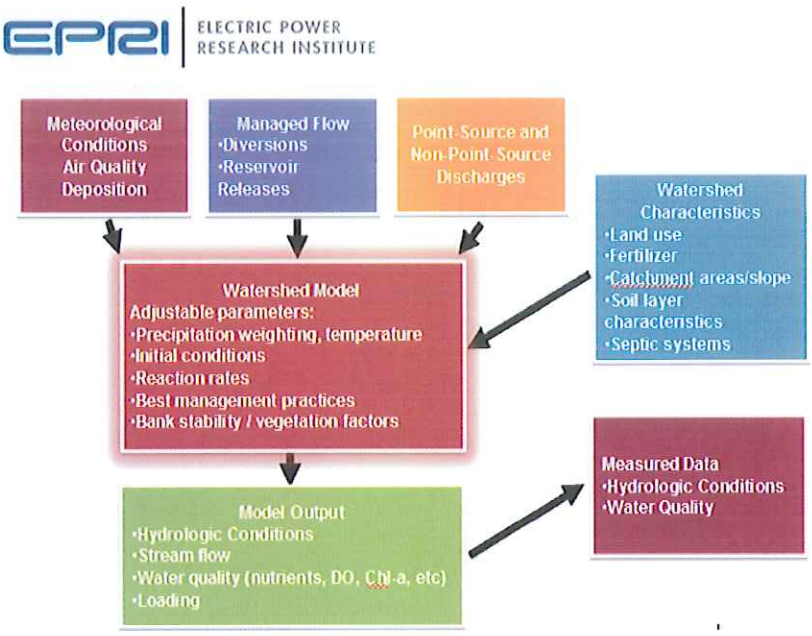

Figure C-1: Summary of WARMF Inputs and Outputs

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.

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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.

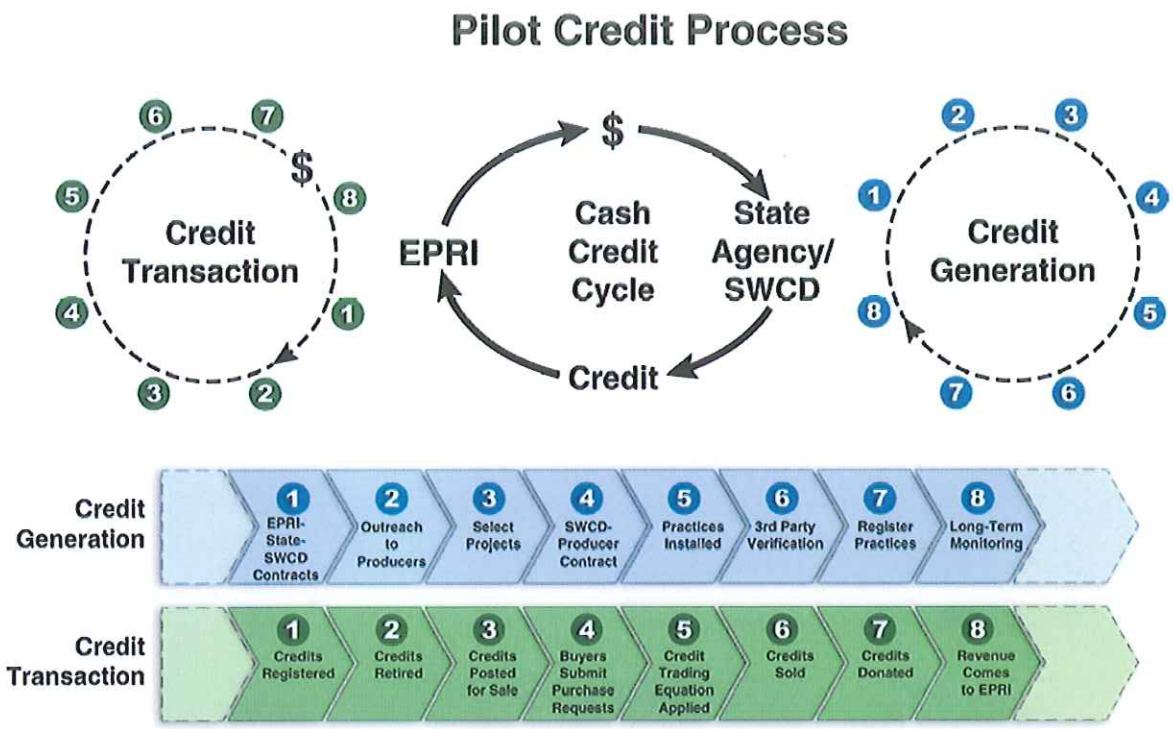

Figure E-1: Credit Generation and Transaction Process

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

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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. Tawney

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:

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:

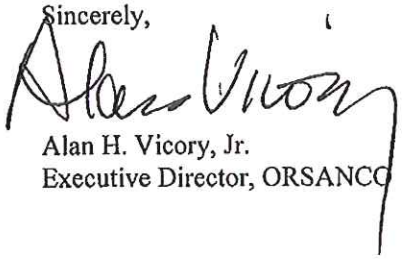
1. Retirement Ratios -- Retirement ratios are not required, but are common in state trading programs to facilitate additional water quality improvements. We seek concurrence from EPA that states may offer credit purchasers smaller retirement ratios for participating in the pilot trades since those trades, 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

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

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

APR 2 0 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,

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