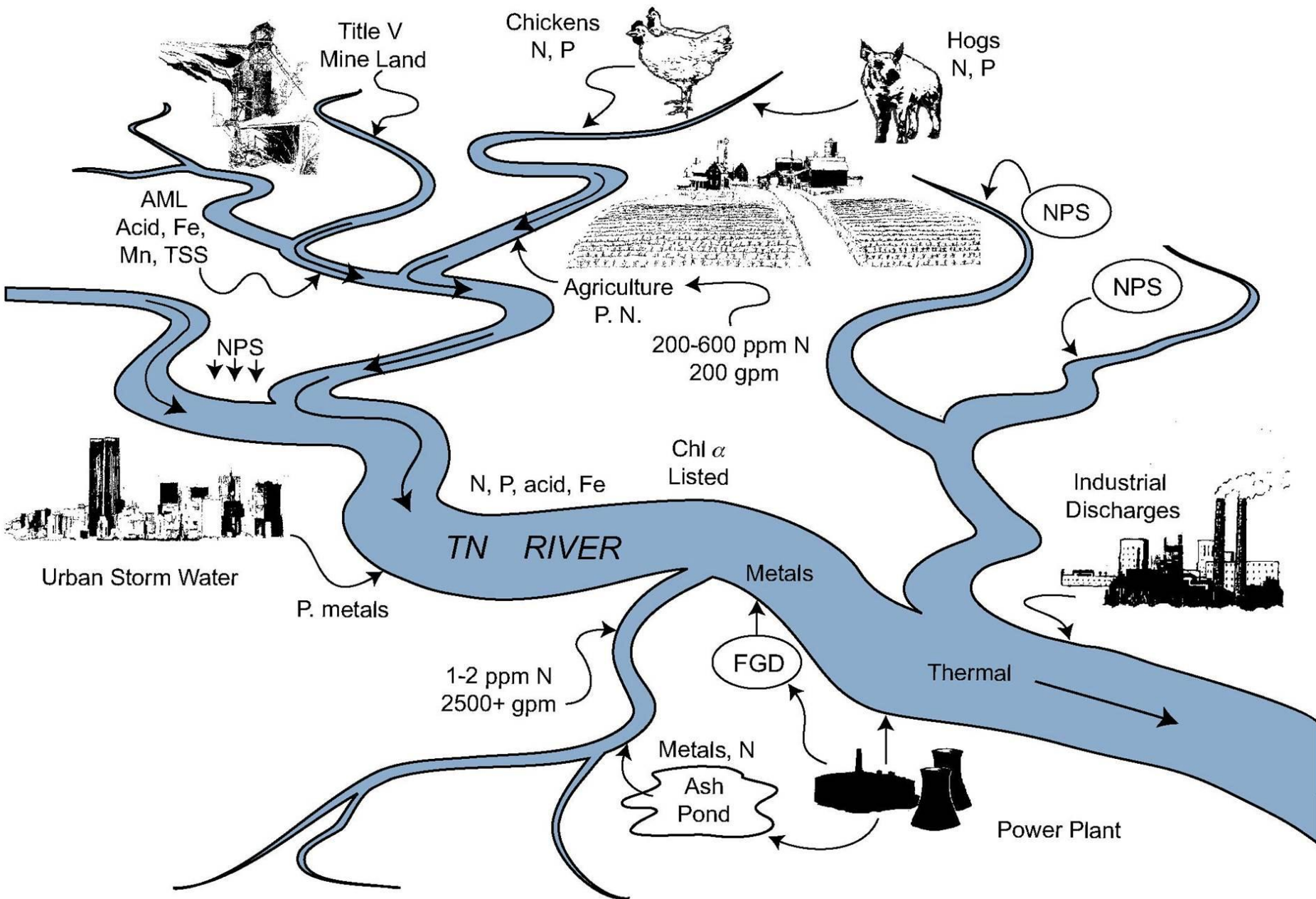




Ohio River Basin Water Quality Trading Project

**Overview for KASMC
April 5, 2012**

Sources of Nutrients



What is WQT Trading?

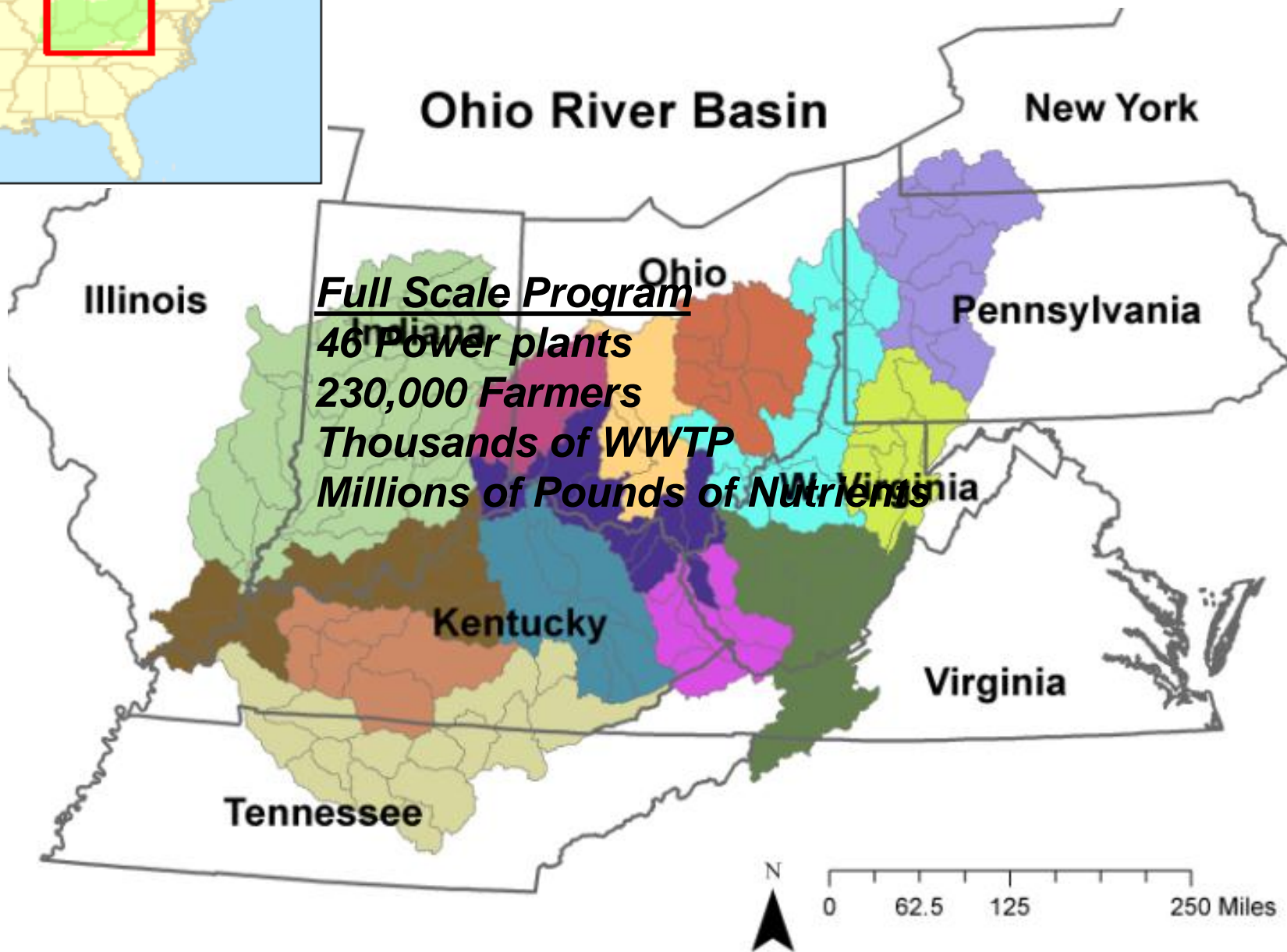
Farm installs
best management practice
to generate credit



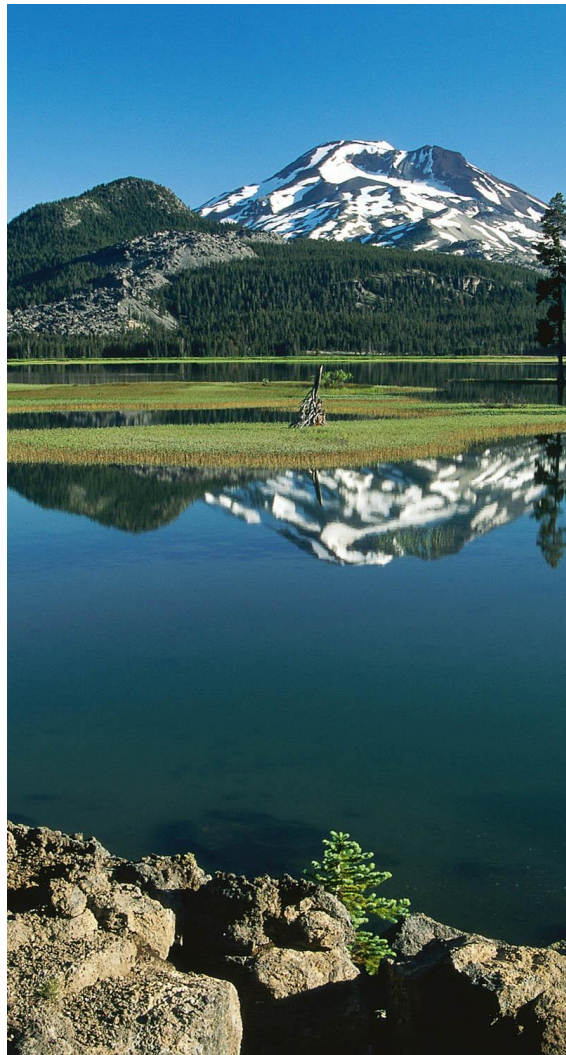
Permitted source
buys credit to meet
regulatory requirement



Nutrient Reduction at Lower Cost



Project Collaboration



Electric Power Research Institute
American Electric Power
Duke Energy
Hoosier Energy
Tennessee Valley Authority
American Farmland Trust
Ohio Farm Bureau Federation
ORSANCO
Hunton & Williams
Kieser & Associates
US EPA
USDA

Project Due Diligence

Phase I: Due Diligence

2005 – EPRI Water Quality Trading Focus Group

2007 – Scoping of Project Concept

2008 – Feasibility Study

2008 - Business Case for Power Companies

EPRI invested \$1 Million in project planning and due diligence.

Phase II: Implementation

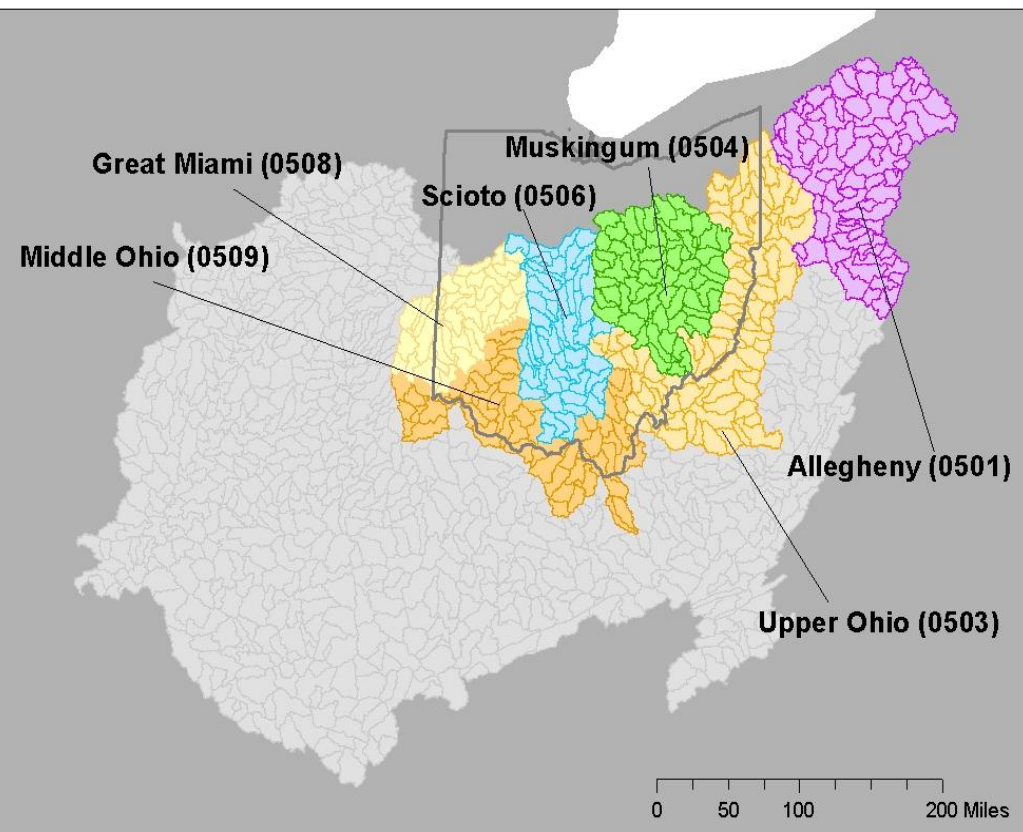
2009 – Received \$1.6M in Funding (EPA, USDA, private)

2011 – \$1.4M USDA-NRCS CIG

2012-2013 – Execute pilot trades

Total Project Funding: \$4M

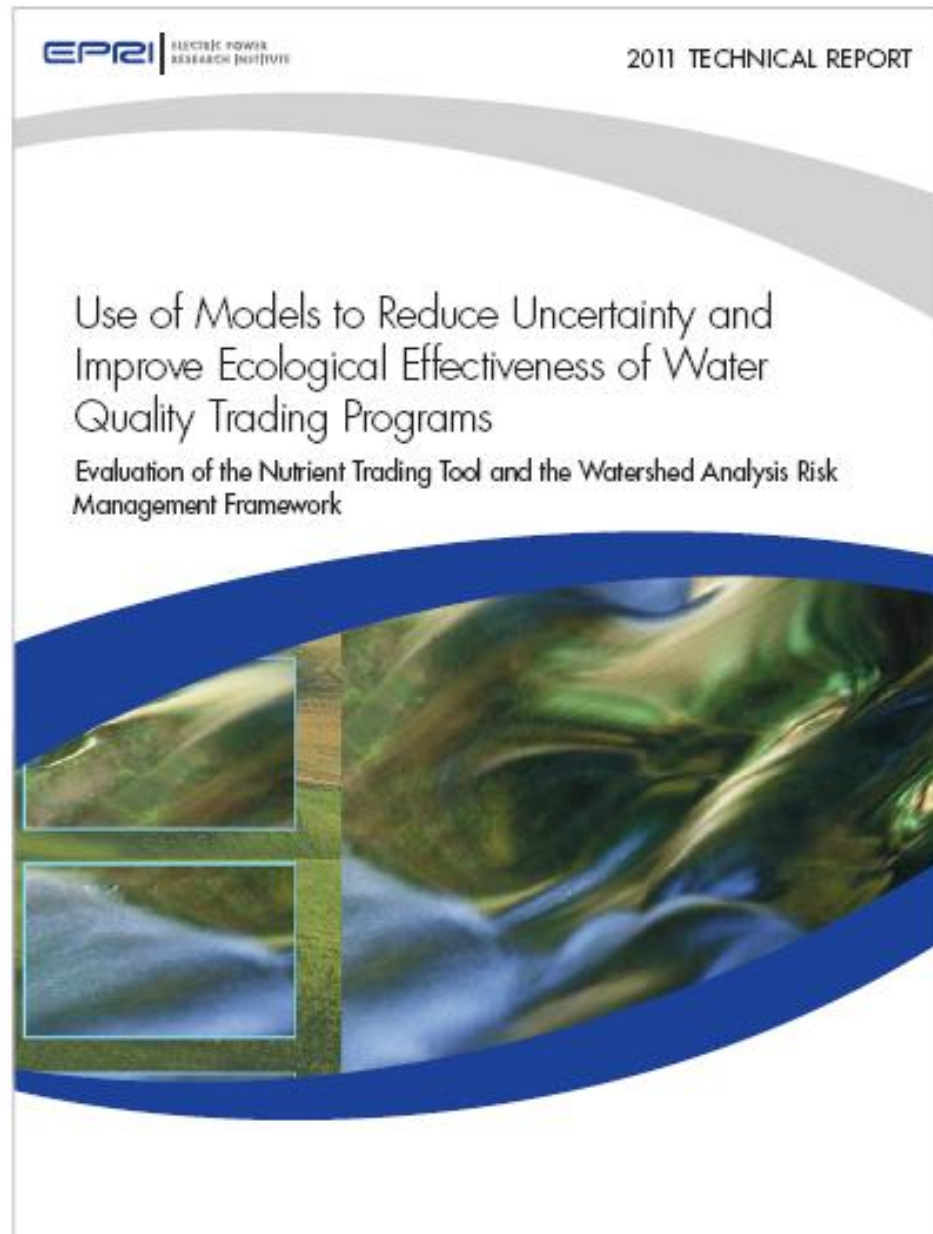
Uses Watershed Modeling (WARMF)



Model Provides Scientific Foundation for Project:

- Agriculture Best Management Practices
- Trading Ratios
- WQ Hot Spots
- Nutrient Attenuation
- Future land use scenarios
- Adaptive Management

TP Load to River



ding

Regional Loading
Source Contributions

tal Phosphorus, kg/d

Upstream Reservoir
Non-point Sources
Point Sources

Click on a
ding chart to see a
readsheet

Scioto_base

Cancel Help

| Total Phosphorus, kg/d | |
|---------------------------|------------|
| | Scioto bas |
| Corn | 253 |
| Soybean | 250 |
| Winter Wheat | 728 |
| Corn/Soybean | 0 |
| Soybean/Winter Wheat | 225 |
| Corn/Soybean/Wheat | 0 |
| Alfalfa | 0.415 |
| Seed/Sod | 0.00532 |
| Grass/Pasture/Hay | 28.4 |
| Grains/Sorghum/Barley/Rye | 0.0135 |
| Potatoes/Beans | 0.000607 |
| Fruits/Vegetables | 0.0311 |
| Idle Cropland | 0.0265 |
| Dev (Low) | 102 |
| Dev (Med) | 57.4 |
| Dev (High) | 22.5 |
| Open Space | 3.52 |
| Deciduous | 22.4 |
| Evergreen | 1.95 |
| Mixed Forest | 0.0485 |
| Shrubland | 0.107 |
| Wetlands | 0.00381 |

Total Loading

Pilot Trades (2012-2013)

- 50 farmer contracts
- 20,000 acres
- 45,000 pounds Nitrogen Annually
- 15,000 pounds Phosphorous Annually

ORSANCO Resolution



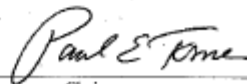
OHIO RIVER VALLEY WATER SANITATION COMMISSION

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.


Chairman



The image is a composite of several elements:

- Top Left:** The official seal of the Ohio River Valley Water Sanitation Commission. It features a circular design with a river winding through hills, surrounded by the text "OHIO RIVER VALLEY WATER SANITATION COMMISSION".
- Top Center:** The text "OHIO RIVER VALLEY WATER SANITATION COMMISSION" followed by the address "5735 KELLOGG AVENUE, CINCINNATI, OHIO 45228-1112" and phone/fax numbers "(513) 231-7719 FAX: (513) 231-7761".
- Left Margin:** Partial text from a document, including "CHARLES CHAIRMAN", "LAN H. V.", "EXECUTIVE AND CH", "Bob I", "USEE", "Ariel", "1200", "Mail", "Wash", "Subje", "Dear", "As y", "contr", "states", "prog", "standards, performing biological assessments, monitoring for the chemi", "waterways; spill detection and response and conducting special surveys and s".
- Center:** A large white rectangular box containing a prominent blue quote:

"Your project's efforts to facilitate a broad non-traditional collaboration . . . to achieve water quality improvements in the Ohio River Basin through water quality trading are commendable."
- Right Side:** Partial text from a letter, including "Y ADMINISTRATOR", "on", and "all 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."
- Bottom Right:** Further text from the letter:

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

Draft Trading Plan Presented to States

Ohio River Basin Pilot Interstate Water Quality Trading Plan

1. Introduction

This is the initial plan governing the Ohio River Basin Water Quality Trading Project ("Project"), to improve water quality through the development and implementation of an interstate trading program that is economically, socially and ecologically viable. This plan is primarily focused on pilot trades that are expected to occur in the 2012-2013 timeframe. The results of the pilot trades will be used to inform and facilitate a revision to this plan for possible long-term implementation of the Project.

2. Scope and Purpose

Water quality trading is authorized and encouraged.¹ 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. All trades that occur as a result of this Project will be grounded in an ecologically-based justification.

Water quality trading as a tool to improve water quality within the Ohio River Basin ("ORB") is a priority for federal agencies, ORSANCO³, ORB states and a diverse range of stakeholders.⁴ This plan will support water quality pilot trading within the ORB on an interstate

¹U.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.

²Ohio EPA Rules for Water Quality Trading, Ohio Administrative Code Ch. 3745-5.

December 2011
In-Person Meetings

Ohio
Kentucky
Indiana

Trading Plan Execution
By June 2012.

Credit Trading Registry

Store

Registry

BOAT

Dividends

Source

CDS & Bonds

RED

Loan Pricing

Indices

3

Welcome, Ufe Test1 | Logout | Support

markit environmental registry

Home

All Units

Projects/Issuances

RFI

Bids/Offers

User Admin

Activity Log

Find Units By

More Options... Show All Units

Project

Account

Search...

Name

American Farmland Trust

American Farmland Trust Sub-Account

Standard

Project Type

Unit Measurement

Unit Class

Unit State

Transfer List Refire Discard Export to Excel Export to PDF New

Search by serial no..

| Project | Account | Vintage | Origin | Holdings | Measurement | Status |
|-----------------|---|-------------|---------------|--------------|-------------|------------|
| Angel Mounds | American Farmland Trust Ohio River Basin Interstate Trading Program - Nitrogen reduction/removal ORB-BAW-US-100000000001275-01102012-30092013-2051-2060-MER-0-P | 2012 - 2013 | United States | 10 lbs/year | | RFI Listed |
| Angel Mounds | American Farmland Trust Ohio River Basin Interstate Trading Program - Nitrogen reduction/removal ORB-BAW-US-100000000001275-01102012-30092013-2061-2310-MER-0-P | 2012 - 2013 | United States | 250 lbs/year | | RFI Listed |
| Angel Mounds | American Farmland Trust Ohio River Basin Interstate Trading Program - Nitrogen reduction/removal ORB-BAW-US-100000000001275-01012012-31122012-4101-4134-MER-0-P | 2012 | United States | 34 lbs/year | | Active |
| Angel Mounds | American Farmland Trust Sub-Account Ohio River Basin Interstate Trading Program - Nitrogen reduction/removal ORB-BAW-US-100000000001275-01102012-30092013-2556-2650-MER-0-P | 2012 - 2013 | United States | 95 lbs/year | | Active |
| Lexington Plain | American Farmland Trust Ohio River Basin Interstate Trading Program - Nitrogen reduction/removal ORB-BAW-US-100000000001276-01102012-30092013-3301-4100-MER-0-P | 2012 - 2013 | United States | 800 lbs/year | | Active |
| Lexington Plain | American Farmland Trust Ohio River Basin Interstate Trading Program - Phosphorus reduction/removal ORB-BAW-US-100000000001276-01102012-30092013-3052-3250-MER-0-P | 2012 - 2013 | United States | 199 lbs/year | | Active |
| Lexington Plain | American Farmland Trust Ohio River Basin Interstate Trading Program - Phosphorus reduction/removal ORB-BAW-US-100000000001276-01102012-30092013-2951-2951-MER-0-P | 2012 - 2013 | United States | 1 lbs/year | | RFI Listed |
| Lexington Plain | American Farmland Trust Ohio River Basin Interstate Trading Program - Phosphorus reduction/removal ORB-BAW-US-100000000001276-01102012-30092013-2952-3051-MER-0-P | 2012 - 2013 | United States | 100 lbs/year | | Retired |
| Lexington Plain | American Farmland Trust Ohio River Basin Interstate Trading Program - Nitrogen reduction/removal ORB-BAW-US-100000000001276-01102012-30092013-3251-3300-MER-0-P | 2012 - 2013 | United States | 50 lbs/year | | Active |

Page 1 of 1

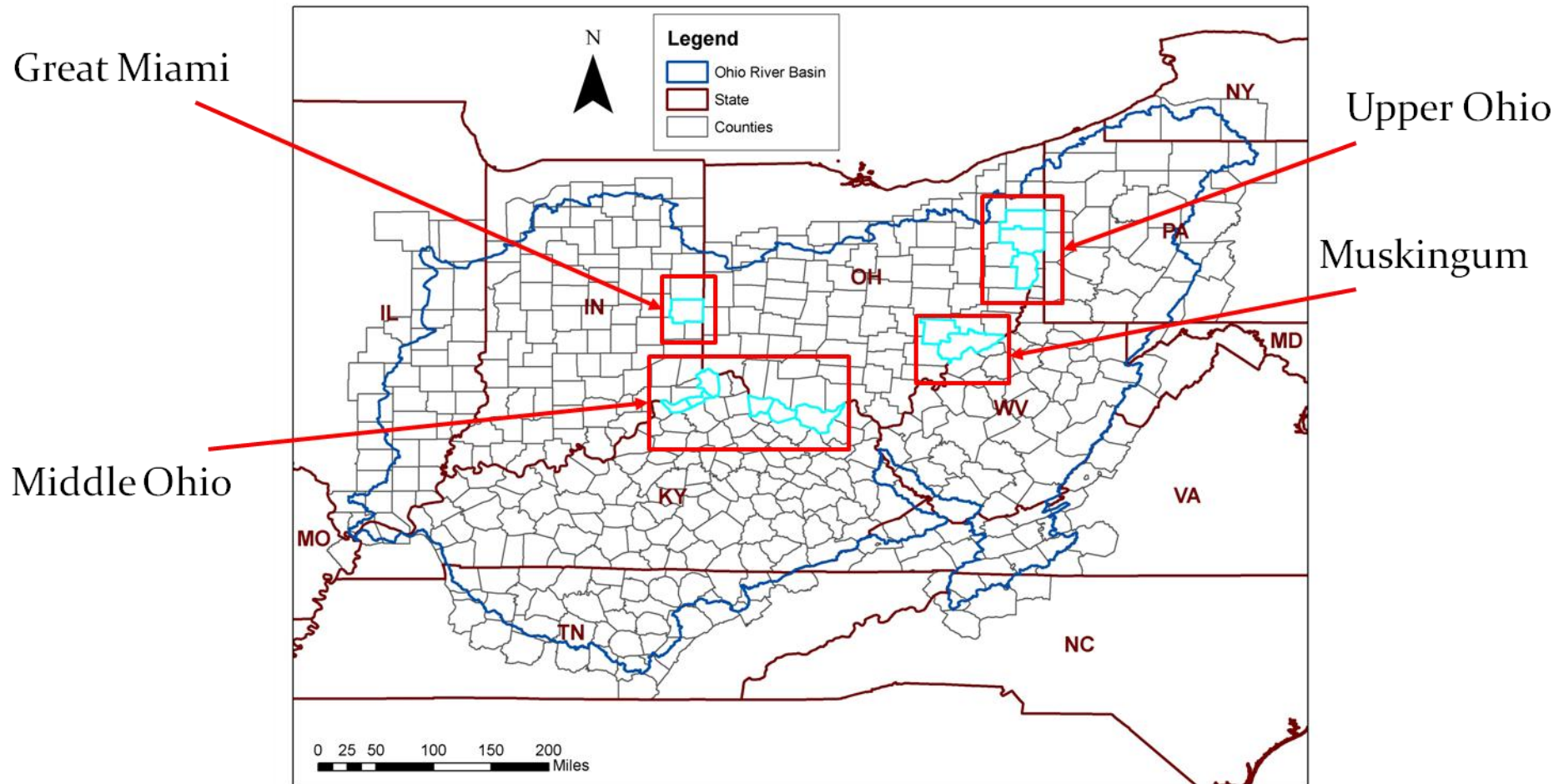
Less Details

Displaying 1 - 9 of 9

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Potential Pilot Trade Locations



Counties of Focus

- Kentucky: Carroll, Gallatin, Boone, Campbell, Bracken
- Ohio: Jefferson, Columbiana, Mahoning, Possibly counties in lower Muskingum Watershed
- Indiana: Ripley, Dearborn, Wayne, Union

Ohio River Trading Project Website

www.epri.com/ohiorivertrading

You are here: [Research](#) > [Environment](#) > [Water & Ecosystems](#) > [Ohio River Basin Trading Project](#) > Overview

- Overview
- Funding Opportunities
- Project Agreements & Letters
- Pilot Trades
- Credit Stacking
- Watershed Model
- Project Collaborators
- Project Stakeholders
- In the Media
- Project Schedule & Updates
- Reference Shelf



Project Contact


EPRI supports a collaborative process for the development of this project. To this end, we invite feedback, questions, and suggestions on a rolling basis. Please feel free to send us input via e-mail.

For Technical or Stakeholder Questions or to be added to the project contact list: ohiorivertrading@epri.com

Ohio River Basin Trading Project

Water quality trading is an innovative market-based approach to achieving water quality goals for nutrients such as phosphorus and nitrogen through programs that allow permitted emitters to purchase nutrient reductions from another source. Control costs for any one nutrient can differ from one emitter to another, and water quality trading provides an option for meeting discharge requirements in a cost-effective manner. Properly designed and deployed, the proposed trading program in the Ohio River Basin will allow exchanges of water quality credits for nitrogen and phosphorus. The outcome will be protecting and improving watersheds at lower overall costs. This will be a regional interstate trading project and represents a comprehensive approach to designing and developing credit markets for nitrogen and phosphorus.

- [Read the Program Summary](#) 
- [Frequently Asked Questions](#) 

EPRI's [Jessica Fox](#)  (PDF 34KB) leads this effort in collaboration with power companies, federal and state agencies, agricultural organizations, academia, the private sector and other industry organizations.




Project Approach

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 sources outside of the Basin. Due to the many



Events Calendar

Upcoming Workshop

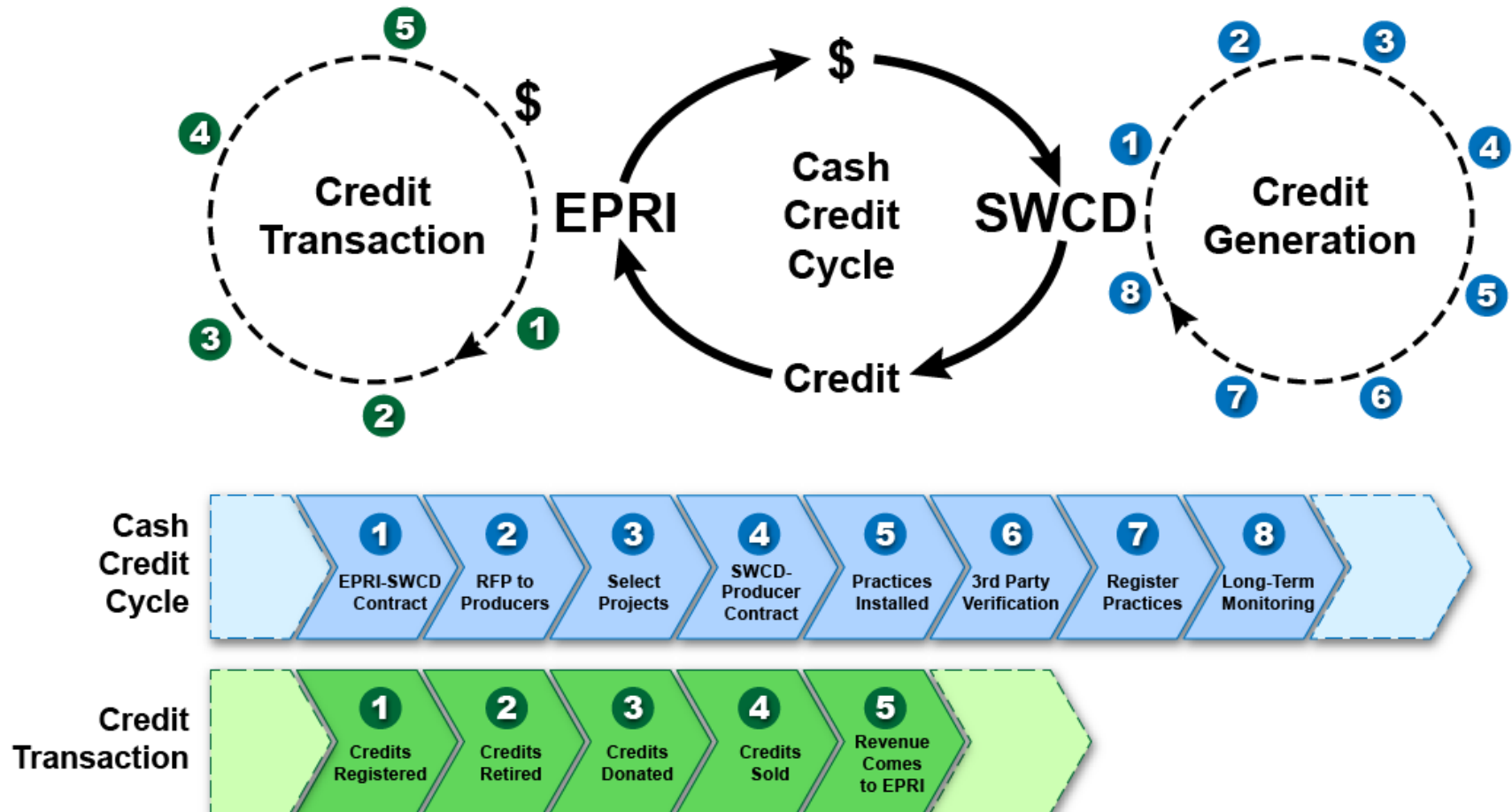
- **Project Update – Public Webcast**
September 15, 2011
1:00 p.m. Eastern/10 a.m. Pacific
Duration: 90 minutes
[Join the Meeting](#) 
- Audio:
 1-877-789-2085 
- PIN: 7712
[Add to Outlook Calendar](#)

Questions?

Project Details

- Process Flow
- Incentives for Pre-compliance Trading
- Credit Equation Calculation

Credit Transaction Process (Draft)



Incentive For Pre-compliance Trading

- What would motivate a point source to get involved in pre-compliance trading?
 - *Good will*
 - *Education*
 - *Relationships*
 - *Authorization to trade in a future compliance scenario*
 - *Preferred access to credits for future compliance scenario*
- What incentives could be offered during the pilot phase to secure point source involvement?
 - *Authorization to trade in a future compliance scenario (model NPDES language)*
 - *Preferred access to credits for future compliance scenario (part of trading plan)*
- What additional incentives might need to be offered after the pilot phase?
 - *NPDES compliance flexibility (e.g., extended compliance schedule)*

Draft NPDES Permit Language

- 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. If the permittee ceases its participation in the trading 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.

Crediting Equation: Attenuation Factors

$$\text{Credit} = (F_{\text{field}} \times F_{\text{river}} \times F_{\text{instream}} \times F_{\text{equivalence}} \times F_{\text{safety}}) \text{ Load Reduction}$$



Attenuation Factors

$$\text{Credit} = (F_{\text{field}} \times F_{\text{river}} \times F_{\text{instream}} \times F_{\text{equivalence}} \times F_{\text{safety}}) \text{ Load Reduction}$$

- **Edge of Field (F_{field})**— Magnitude of TN and TP reduction at edge of field due to BMPs (EPA Region V, NTT or similar model)
- **Edge of River (F_{river})**— Fate & transport attenuation as load reduction reaches edge of river (WARMF)
- **In-stream assimilation (F_{instream})**— Attenuation due to in-stream processing of TN and TP load (WARMF)
- **Credit Equivalence ($F_{\text{equivalence}}$)** – Considers chemical nature of load reduction (as nitrate, ammonia, organic N, etc.) relative to buyer's need (WARMF)
- **Margin of Safety (F_{safety})**— Safety factor to account for uncertainties in credit calculation (Edge of Field + WARMF)