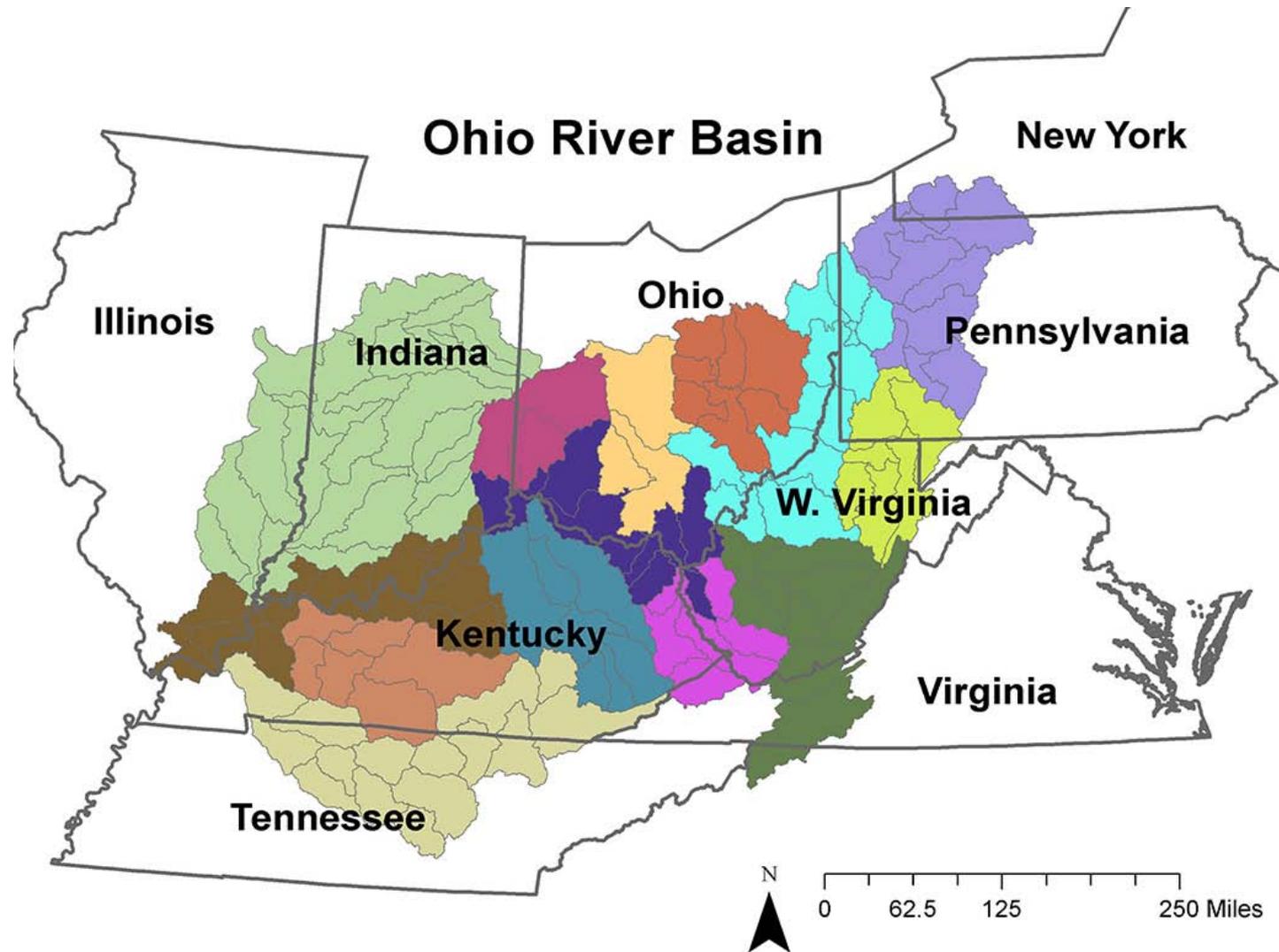




# Ohio River Basin Water Quality Trading Project

**Larry M. Antosch, Ph.D.**  
**Ohio Farm Bureau Federation**  
**Senior Director, Policy Development and**  
**Environmental Policy**

# Ohio River Basin



# 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**

# Selling Water Quality Credits

- **Funding source offset the cost of new conservation practices aimed at improving water quality**
- **Participation is voluntary**
- **Must maintain the land management activities that generated the credits**

# WQT in Context...

## Clean Water Act

- Water Quality Standards
- Monitoring
- Assessment
  - 301
  - 303(d)
  - TMDLs
- NPDES Permits
  - CAFOs
  - Wastewater
  - **WQT**
  - Stormwater
- COE wetland banking
- Section 319 & 208

## USDA Farm Bill

- NRCS
- FSA
- Fish & Wildlife
- Forest Service
- EQIP
  - CIG
- WRP
- CRP
- CREP
- Swamp Buster
- Technical assistance

## Non-governmental

- State and County rules:
  - Landuse
  - Districts
  - Cost share
  - Septic systems
  - Erosion ordinances
  - Drainage authorities
- NGOs
  - Implementation
  - Land retirement
  - Education
  - Challenges

# Project Due Diligence

## Phase I: Due Diligence (EPRI Funded)

- 2007 – Scoping of Pilot Project  
Concept (EPRI gave \$1 million)
- 2008 – Feasibility Study and Business  
Case for Power Company  
Participation

## Phase II: Implementation

- 2009 – Received \$2M in Funding  
(EPA, USDA, private)
- 2010 – Outreach, planning, interstate  
collaborations. EPRI Raise  
\$1M of private funds
- 2012 – Scoping pilot trades
- 2013 – Execute pilot trades (subject to  
funding)

**50% of dollars are federal  
grants (EPA & USDA)**

**50% are Private Funds**

# WQT Project Objectives & Approach

## Overall Objective:

Demonstrate how WQT can be used for cost-effective permit compliance, provide ecological co-benefits and support farmers.

## Approach:

Test case: Reduce overall loading of nutrients within the Ohio River Basin using water quality trading.

## Pilot Study Objectives

- Collaboration
- Strong Science
- Defensible Rules
- Ancillary Benefits (ex., Ecosystem Services, Social)

# ORB WQT Collaborators Engagement

## Organizations:

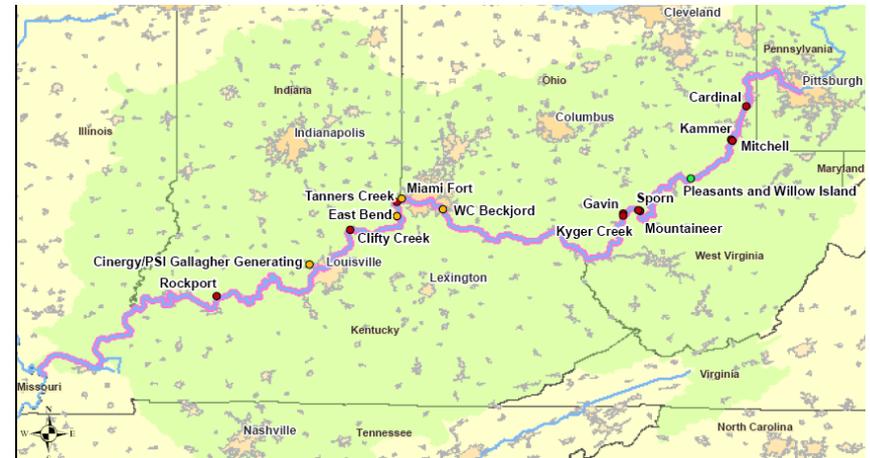
Electric Power Research Institute  
American Farmland Trust  
Ohio Farm Bureau Federation  
ORSANCO  
Tennessee Valley Authority  
American Electric Power  
Hoosier Energy  
Duke Energy  
Hunton & Williams  
Kieser & Associates  
UC Santa Barbara

## States:

Ohio  
Indiana  
Kentucky

## Agencies

US EPA  
USDA



# Steering Committees

- **Agriculture**
  - **Indiana**
  - **Ohio**
  - **West Virginia**
  - **Kentucky**
  - **Illinois**
- **Wastewater Treatment Plants**
- **Power Plants**
- **Environmental Groups**
- **Federal and State Agencies**

# Agriculture – Outreach & Engagement

- **American Farmland Trust**
  - direct involvement of farmers during the development of the Ohio River Basin Trading Project
- **Listening Sessions**
  - opinions, concerns, and suggestions
- **Agriculture Steering Committee**
- **Site Visits**

# Indiana Farmer Field Trip – August 8<sup>th</sup>

- Toured 2 farms in south-eastern Indiana
- Heard farmer & buyer perspectives
- Walked through mock credit estimates
  - Nutrient Tracking Tool
  - Region 5 Spreadsheet
  - WARMF



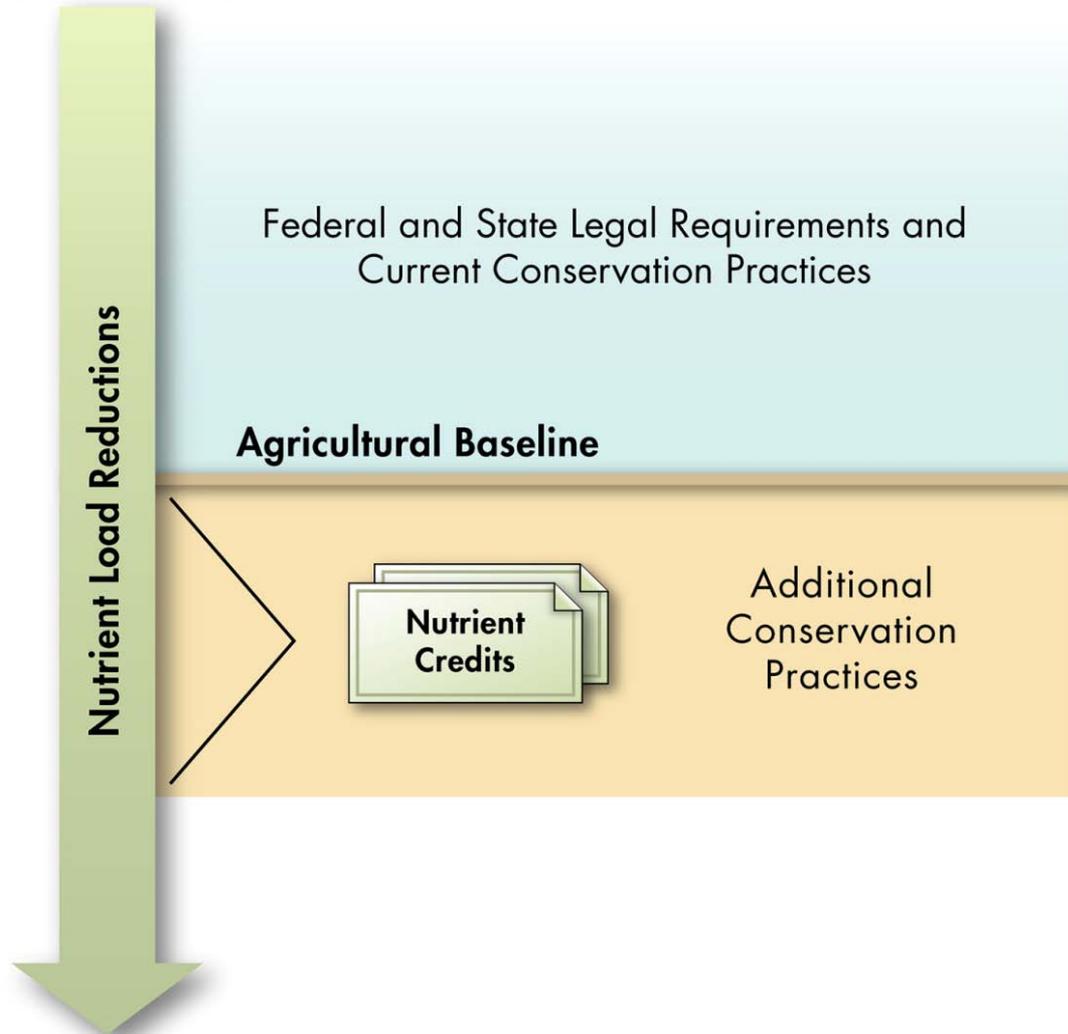
# Opportunities for BMPs

- BMP Examples:
  - Cattle Exclusion Fencing
  - Nutrient Management
  - Cover Crops
  - Buffer Strips
  - Grass Waterways
  - Heavy Use Pads
  - Manure Pits
- Ecosystem Services:
  - Carbon Sequestration,
  - Native Plants
  - Habitat



# Baselines

Higher Loading



Federal and State Legal Requirements and Current Conservation Practices

**Agricultural Baseline**



Additional Conservation Practices

**Nutrient Load Reductions**

Lower Loading

# Crediting Equation: Attenuation Factors

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



# Watershed Model

US EPA Watershed Analysis Risk Management Framework (W...)

U.S. ENVIRONMENTAL PROTECTION AGENCY

**Ecosystems Research Division**

Recent Additions | Contact Us Search: All EPA This Area Go

You are here: EPA Home » athens » wwqtsc » html » Watershed Analysis Risk Management Framework (WARMF)

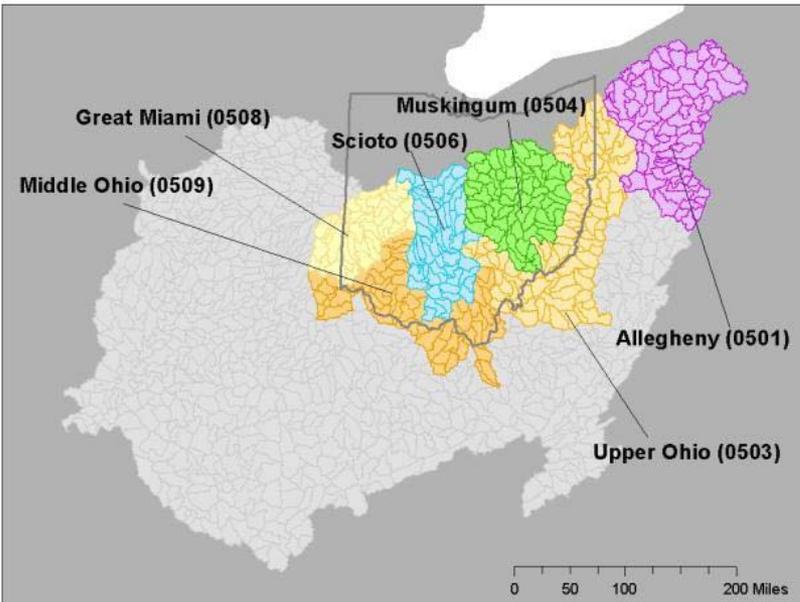
## Watershed Analysis Risk Management Framework (WARMF)

To facilitate TMDL analysis and watershed planning, WARMF was developed under sponsorship from the Electric Power Research Institute (EPRI) as a decision support system provides a road map to calculate TMDLs for most (e.g., nutrients). It also provides a road map to guide implementation plan. The scientific basis of the model is based on several peer reviews by independent experts. The model is organized into five (5) linked modules under one, making it a very user friendly tool suitable for expert users.

Watershed model that calculates daily runoff, shallow water quality of a river basin. A river basin is divided into a grid (copy and soil layers), stream segments, and lake relationships. Land surface is characterized by land use / cover in the land catchments to calculate snow and soil infiltration and groundwater seepage to river segments. Water is

**WWQTCS Info**

- [WWQTCS Home](#)
- [Technical Support](#)
- [Tools](#)
  - [Watershed Models](#)
    - [Basins](#)
    - [LSPC](#)
    - [WAMView](#)
    - [SWMM](#)
    - [WARMF](#)
  - [Water Quality Models](#)
    - [WASP](#)
    - [QUAL2K](#)
    - [Aquatox](#)
    - [EPD-RIV1](#)
  - [Hydrodynamic Models](#)
    - [EFDC](#)
    - [EPD-RIV1](#)



# 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 Refresh 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

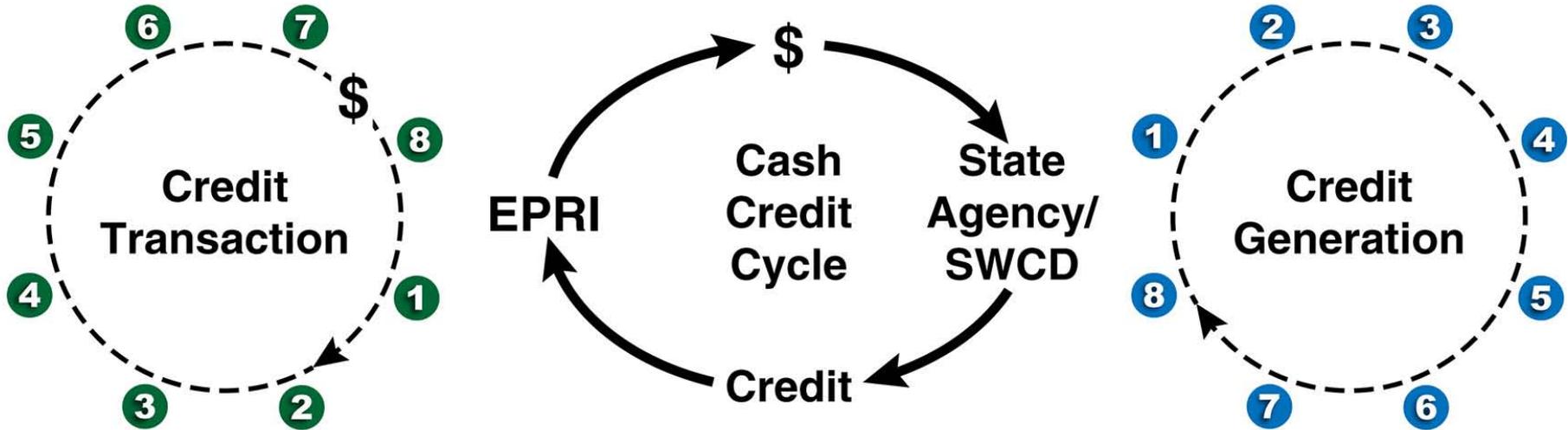
Displaying 1 - 9 of 9

Copyright © 2011 Markit Group Limited. ALL DATA PROVIDED AS IS, WITH NO WARRANTIES. All rights reserved.  
 Privacy Policy Terms Of Use Disclaimer Contact Us

# Credit Stacking

<b>Not Stacked</b> (Spatially Distinct)		<b>Stacked</b> (Spatially Overlapped)
1 acre forest earning carbon credits	1 acre forest earning endangered species habitat credits	1 acre forest earning both carbon credits and endangered species habitat credits
 <p><i>One property</i></p>		 <p><i>One property</i></p>
<b>Total Credits = 2</b> <b>Total Acres = 2</b>		<b>Total Credits = 2</b> <b>Total Acres = 1</b>

# Pilot Credit Process



# The Trading Plan is Signed!

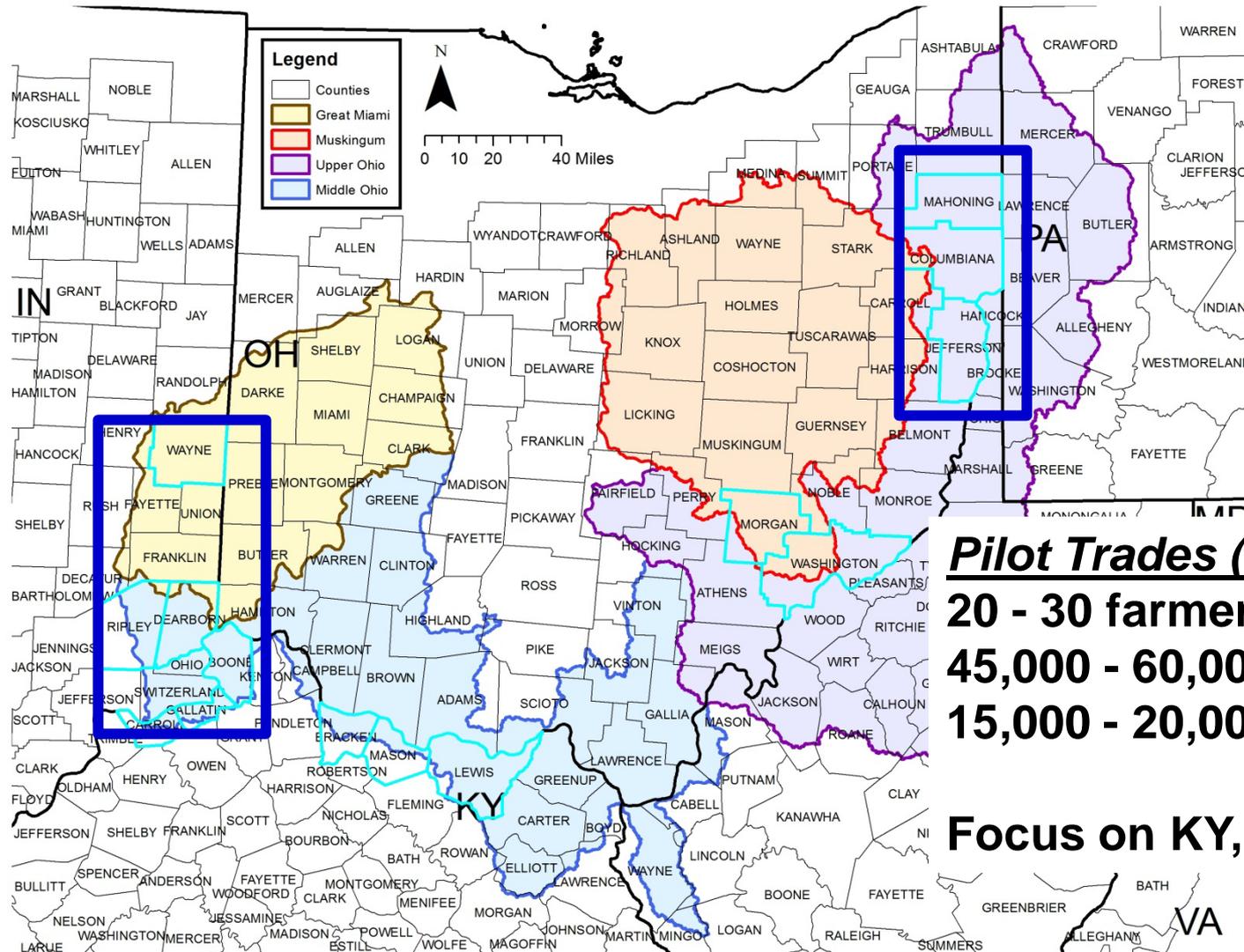
August 9, 2012 in Cincinnati Ohio



**The  
Economist**

June 22: A [nutrient pollution article](#) in The Economist mentions EPRI's Water Quality Trading Program.

# Pilot Trade Locations



## Pilot Trades (2012-2014)

**20 - 30 farmer contracts**

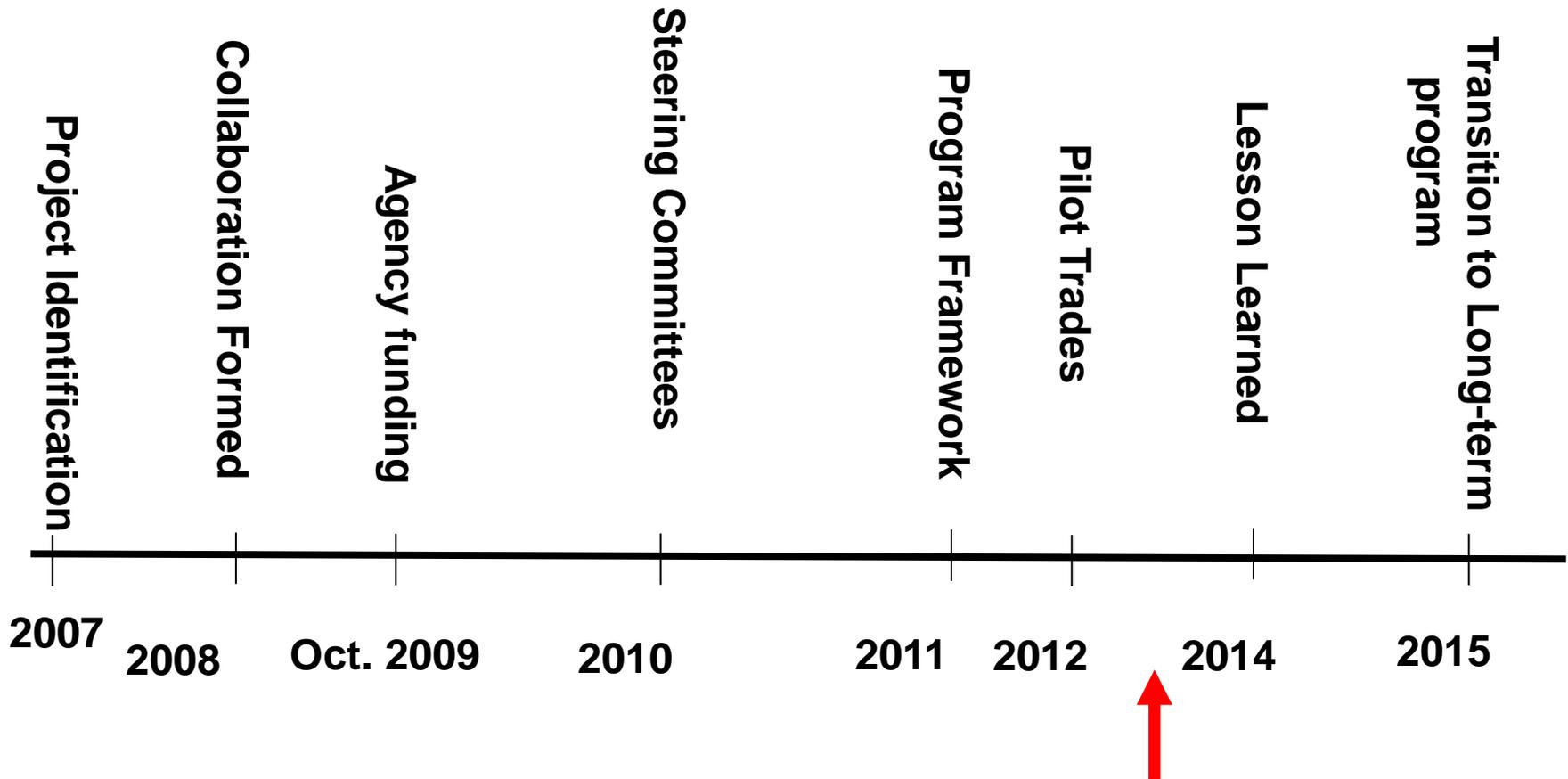
**45,000 - 60,000 lbs N/yr**

**15,000 - 20,000 lb P/yr**

**Focus on KY, IN, OH**

# Project Schedule

- Signed Trading Plan – August 2012
- BMPs: Begin in Spring 2013



# Contacts & Questions

Jessica Fox

[Jfox@epri.com](mailto:Jfox@epri.com)

650-855-2138

[www.epri.com/ohiorivertrading](http://www.epri.com/ohiorivertrading)

Welcome, Guest

[Log in](#) | [EPRI Websites](#) | [Help](#) | [Contact Us](#) | [Site Map](#)

**EPRI** | ELECTRIC POWER RESEARCH INSTITUTE

[Search Tips](#)

[Home](#) | [About EPRI](#) | [Research](#) | [Events](#) | [Careers](#) | [Newsroom](#)

[Overview](#) | [Ohio River Basin Trading Pilot Project](#)

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

### Supplemental Project Notice

- [Read the Full Notice](#) (PDF 169KB) 



### Relevant EPRI Reports

- [Program on Technology Innovation: Modeling Nutrient Trading in the Ohio River Basin](#) (PDF 10.6MB)

### Ohio River Basin Trading Pilot Project

Water quality trading is an innovative market-based approach to achieving water quality standards through programs that allow emitters to purchase pollution reductions from another source. Control costs for any one pollutant can differ from one emitter to another, and water quality trading provides an option for meeting pollution permit targets in a cost-effective manner. Properly designed and deployed, the proposed trading program in the Ohio River Basin will produce water quality credits for nitrogen and phosphorus, protecting watersheds at lower overall costs. The program may also benefit receiving water bodies as far away as the Gulf of Mexico now threatened by nitrogen and phosphorus pollution. This will be a first-of-its-kind regional trading project and represents a comprehensive approach to designing and developing markets for nitrogen and phosphorus. [Read the Program Summary](#) (PDF 367KB) 

