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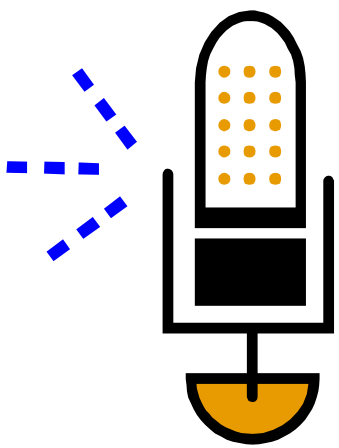
Ohio River Basin
Water Quality Trading Project

Public Webcast Update

July 18, 2012

Audio: 877-789-2085
PIN: 7712

Announcements…



This webcast and the audio will be recorded, and your participation provides consent to that recording.

Questions & Answers:

If you have a question during the webcast you can…

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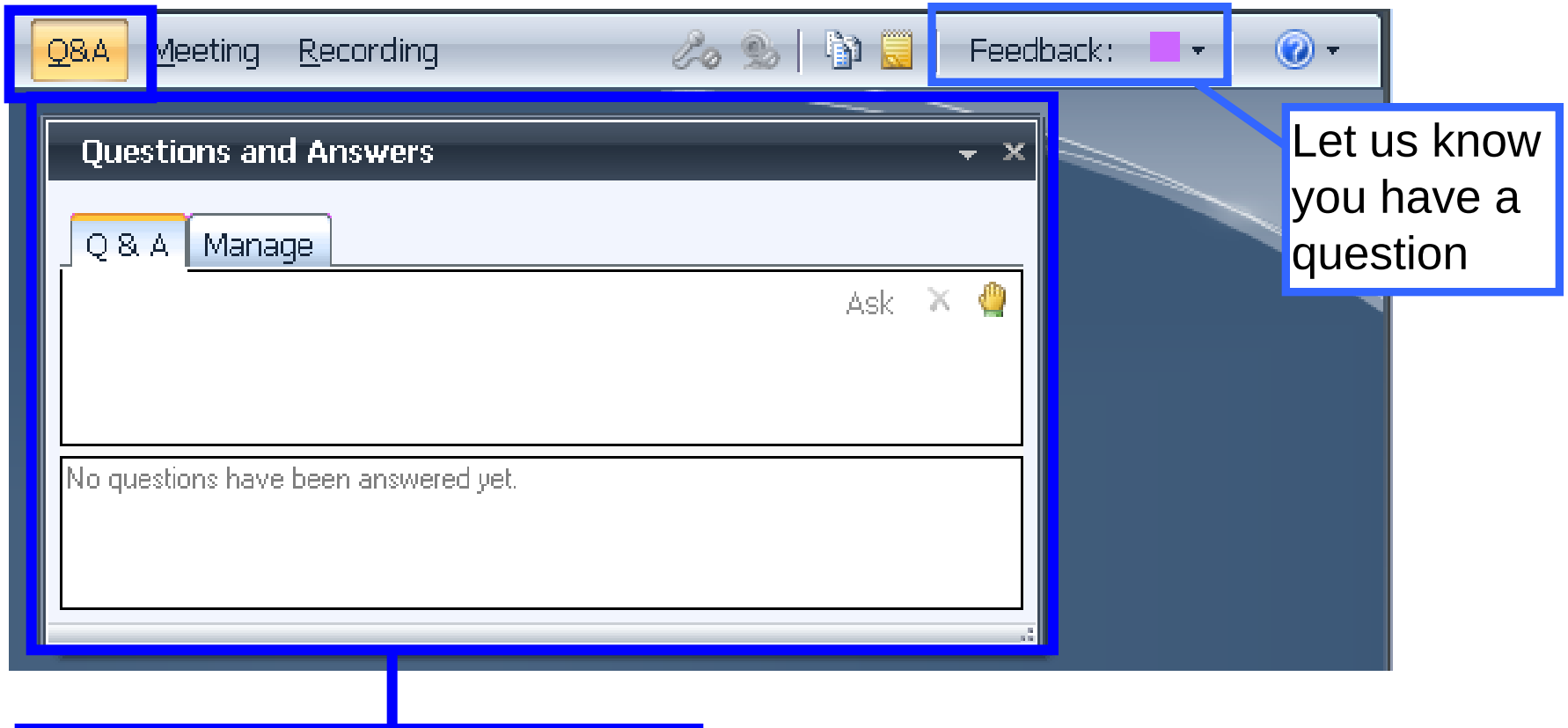

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Purpose of Webcast

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- Public Project Update
- Continue Collaborative Framework
- Invite Comments and Questions

- Overview:
  - General Project Information
  - Details of Trading Plan & Pilot Period
  - Schedule and Next Steps

What is WQT Trading?

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Farm installs
best management practice
to generate credit

Permitted source
buys credit to meet
regulatory requirement

Nutrient Reduction at Lower Cost

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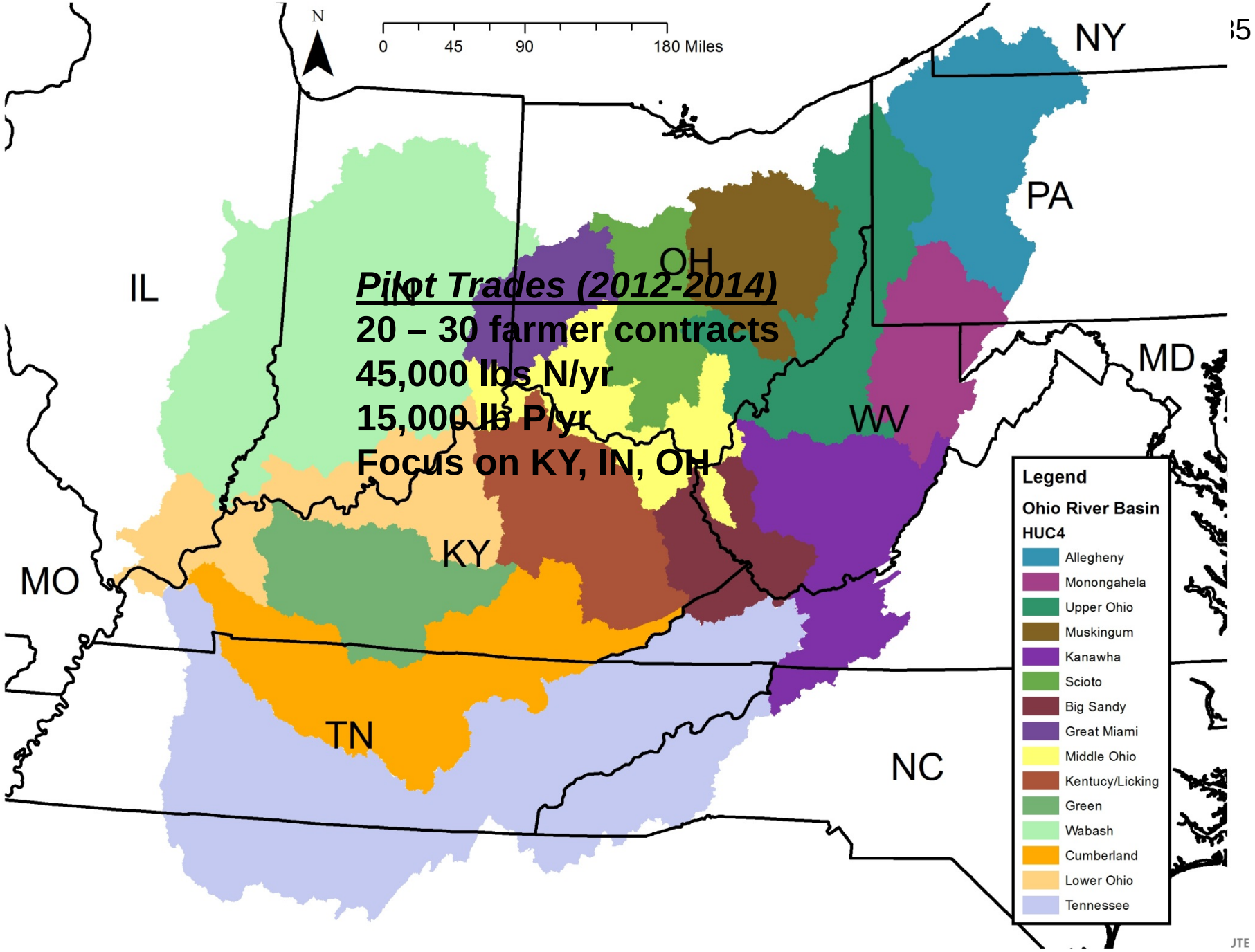

Project Collaboration

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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:
USEPA
USDA-NRCS

Stakeholder Engagement

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- Federal Agencies
  - USDA
  - USEPA
  - EPA Regions 3, 4, 5
- States
  - IDEM
  - IN Dept of Agriculture
  - OH DNR
  - OH EPA
  - KY Dept. Environment
  - KY DNR

- Environmental Groups
  - The Nature Conservancy OH
  - Sierra Club OH
  - OH Environmental Council
  - Environmental Law and Policy Center IN
  - MN Center for Env't Advocacy
  - KY Water Alliance
  - Kentucky Resources Council
- Industries
  - Power Industry
  - Agriculture
  - Wastewater

What Makes This Project Different

Purpose:

Test first Interstate WQT Program for Nitrogen and Phosphorus credits.

Unique Features:

- Interstate collaboration & consensus
- Seeking broader ecosystem service benefits
- Use of mechanistic watershed model
- Local Soil and Water Conservation Districts are brokers
- Unique trade ratio for each trade
- Robust market activity projected (supply and demand solid)

ORSANCO Resolution

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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. Tomes
Chairman

Letter from USEPA

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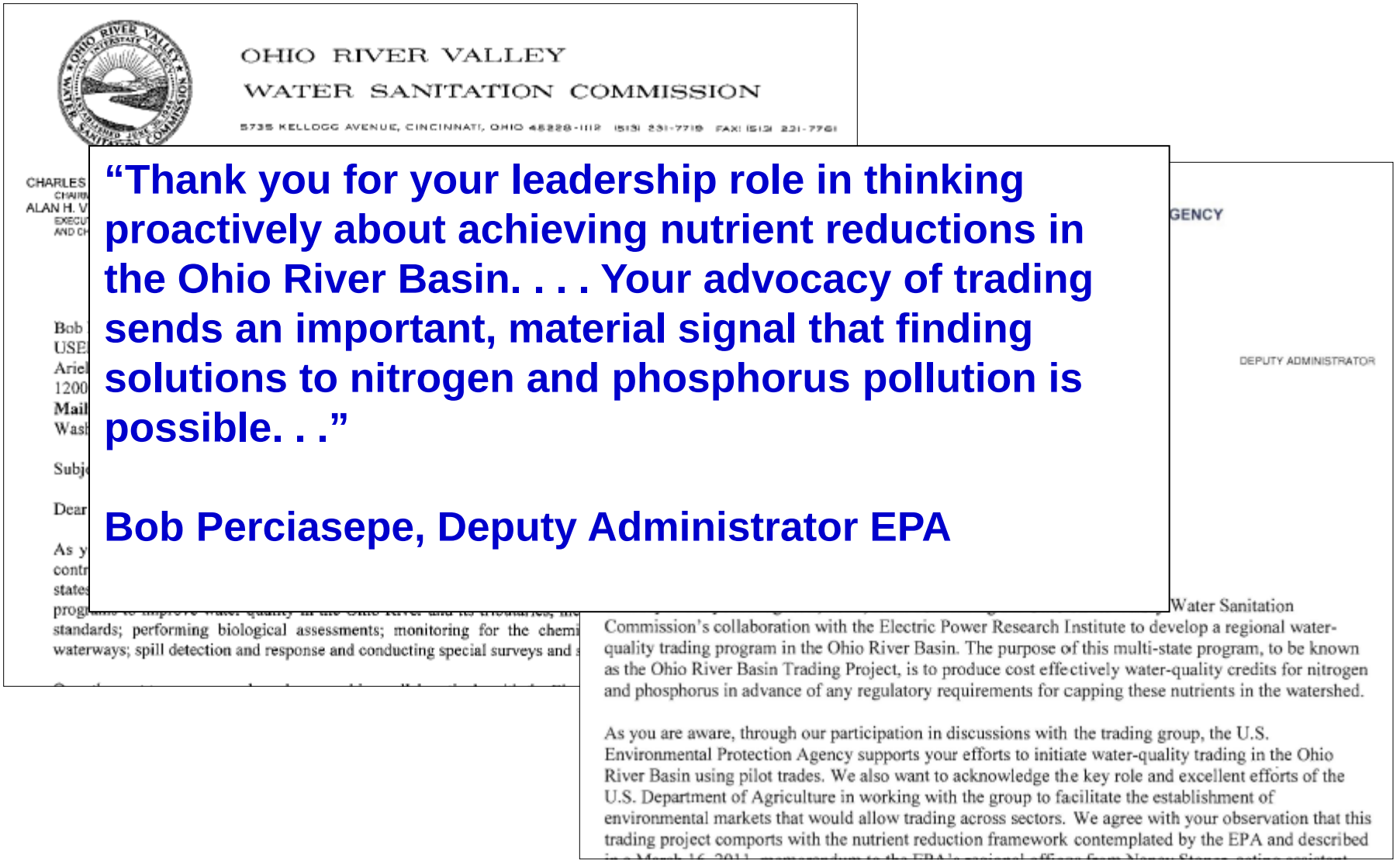


OHIO RIVER VALLEY
WATER SANITATION COMMISSION

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

"Thank you for your leadership role in thinking proactively about achieving nutrient reductions in the Ohio River Basin. . . . Your advocacy of trading sends an important, material signal that finding solutions to nitrogen and phosphorus pollution is possible. . ."

Bob Perciasepe, Deputy Administrator EPA

GENCY

DEPUTY ADMINISTRATOR

standards; performing biological assessments; monitoring for the chemi
waterways; spill detection and response and conducting special surveys and

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.

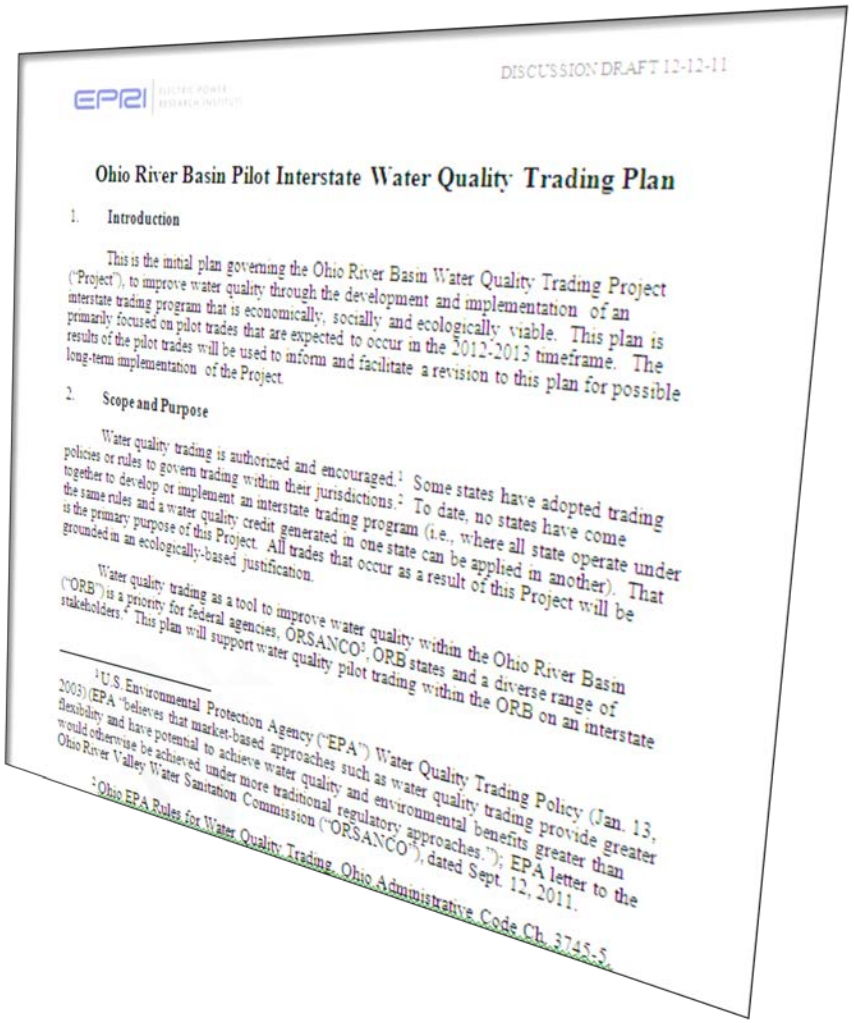
As you are aware, through our participation in discussions with the trading group, the U.S. Environmental Protection Agency supports your efforts to initiate water-quality trading in the Ohio River Basin using pilot trades. We also want to acknowledge the key role and excellent efforts of the U.S. Department 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

Letters of Support & Acknowledgment

- USDA, Undersecretary Harris Sherman
- NRCS, Jane Hardisty, State Conservationist Indiana
- USEPA
- EPA Region 4
- Soil and Water Conservation Districts
  - Indiana: Dearborn, Switzerland, Ohio, Wayne

Details of Pilot Program

- Location of Pilot Trades
- Overall Credit Process
- Watershed Model
- Agricultural Baselines
- Reserve/Insurance Pool
- Incentives for Early Buyers
- Adaptive Management



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DISCUSSION DRAFT 12-12-11

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**

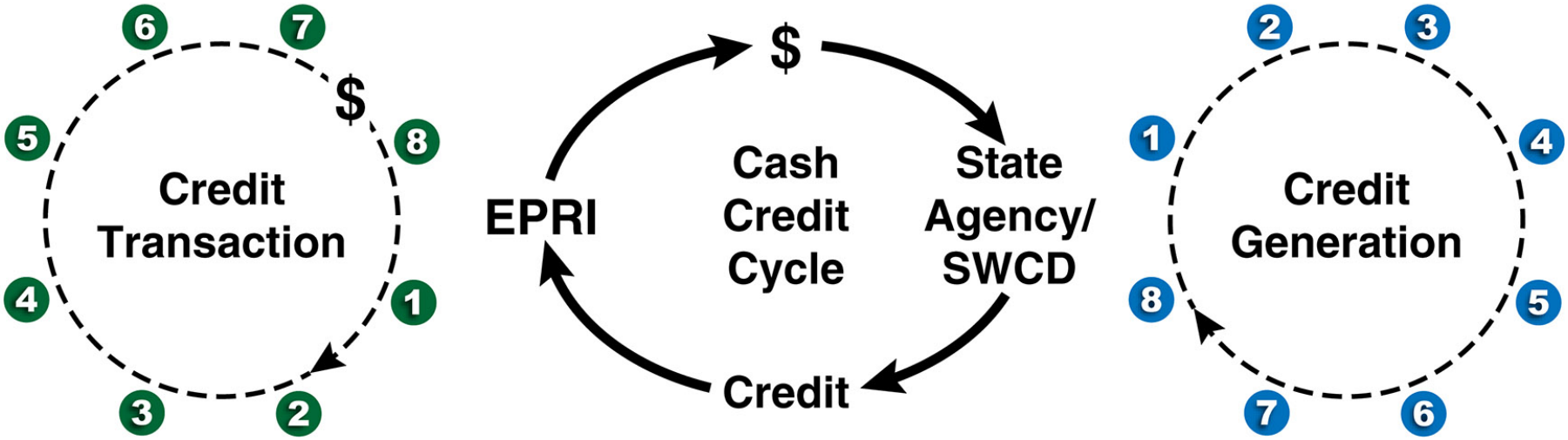
Water quality trading is authorized and encouraged.[1] Some states have adopted trading policies or rules to govern trading within their jurisdictions.[2] To date, no states have come together to develop or implement an interstate trading program (i.e., where all state operate under the same rules and 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, ORSANCO[3], ORB states and a diverse range of stakeholders.[4] This plan will support water quality pilot trading within the ORB on an interstate

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

Pilot Credit Process



Pilot Trade Locations

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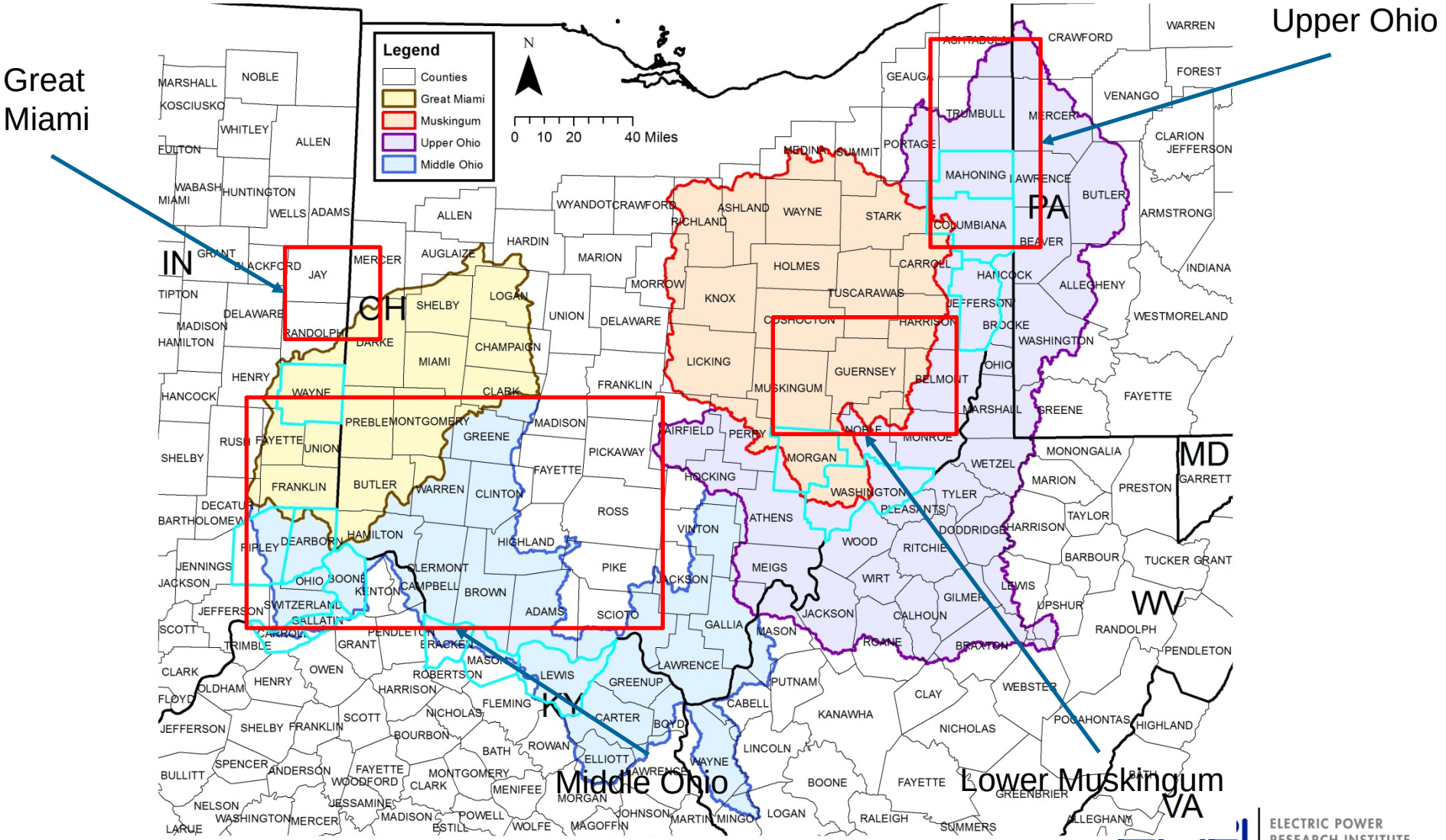

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Counties and BMPs

Counties:

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

BMPs:

- Cattle Exclusion Fencing, Nutrient Management, Cover Crops, Buffer Strips, Grass Waterways, Heavy Use Pads, Manure Pits
- Enhance ecosystem services: carbon sequestration, native plants, habitat, etc.

Field Trips

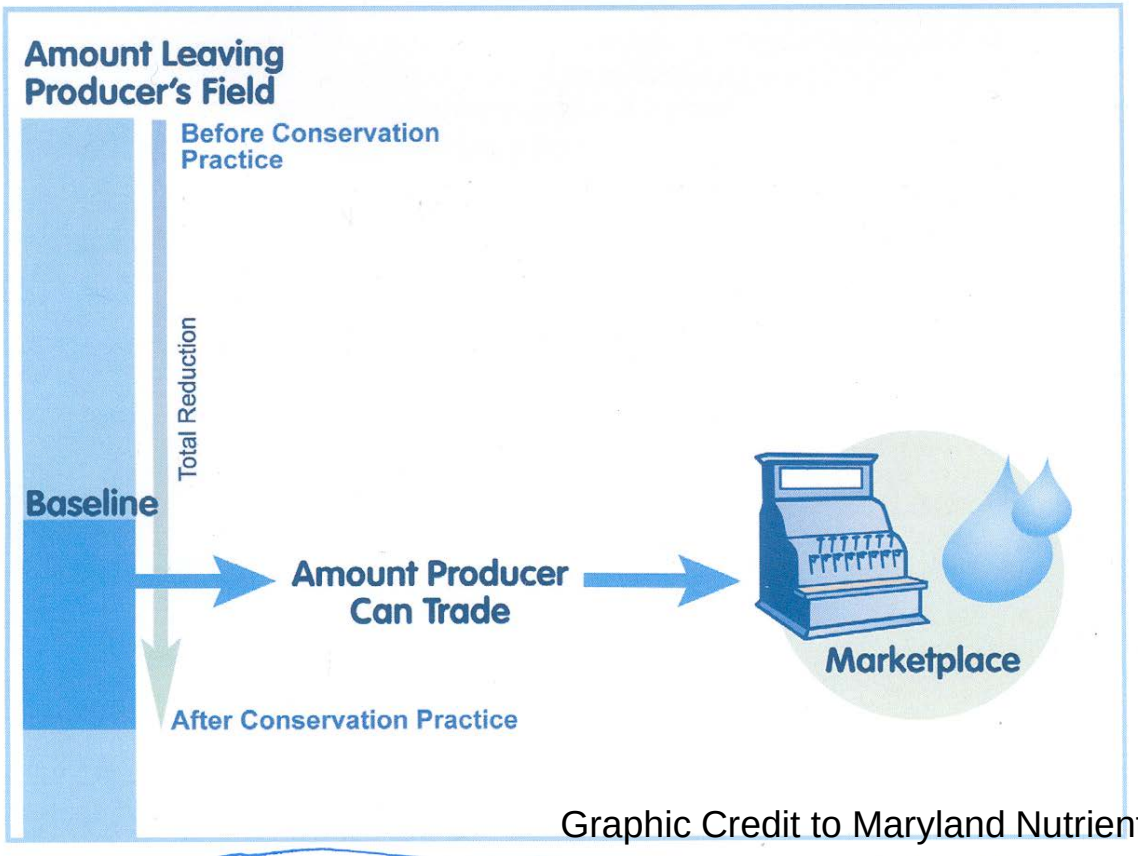
- Ohio (March)
- Indiana (April)
- Kentucky (April)

- Toured 9 counties
- Lots of projects
- More interest than funding
- Anticipating robust credit availability

Opportunities for BMPs

Baselines: Fundamental Policy Issue

- A baseline is the point at which conservation actions can generate credits.



Graphic Credit to Maryland Nutrient Trading Program

Draft Baseline Language

- "For a nonpoint source to generate a credit, it must reduce its loading of TN or TP below current conditions (i.e., existing land uses and management practices) and otherwise comply with presently-applicable legal requirements. Agricultural nonpoint sources will need to provide three years of farm practice history to document their current conditions. These terms constitute the baseline for nonpoint source credits."

Benefits for Early Adopters

- Defining “Early Adopter” is a challenge
- Reserve portion of project funds for Early Adopter BMPs
- **Idea**: Mark credits with “Ecosystem Stewardship” rating.
  - Higher Environmental Benefits Index
  - Carbon, habitat, wetlands, social benefits, etc.

Buyers Perspectives

- Currently, point sources are in compliance with NPDES permit limits for TN and TP.
- Anticipate more stringent nutrient criteria for P and N.
- Want to test trading program ahead of regulatory need.

Need Incentives for PS to buy credits.

Incentive For Pre-compliance Trading

- Recognition for proactive conservation of natural resources
- Experience with program
- Preferred access to credits for future compliance scenario
- Agency recognition of reductions toward future compliance obligation
- Possible NPDES compliance flexibility

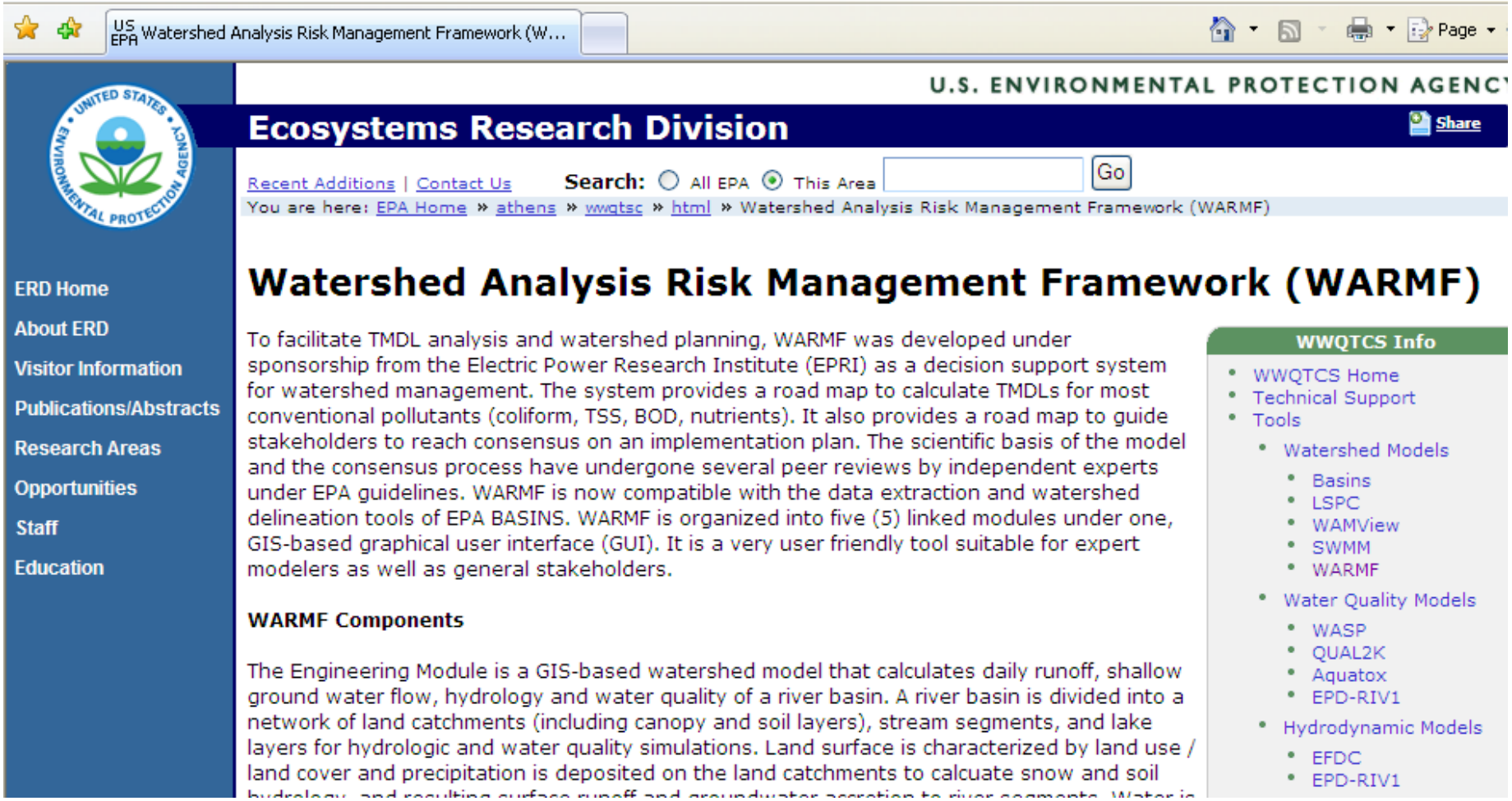
Draft NPDES Permit Language

- 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.

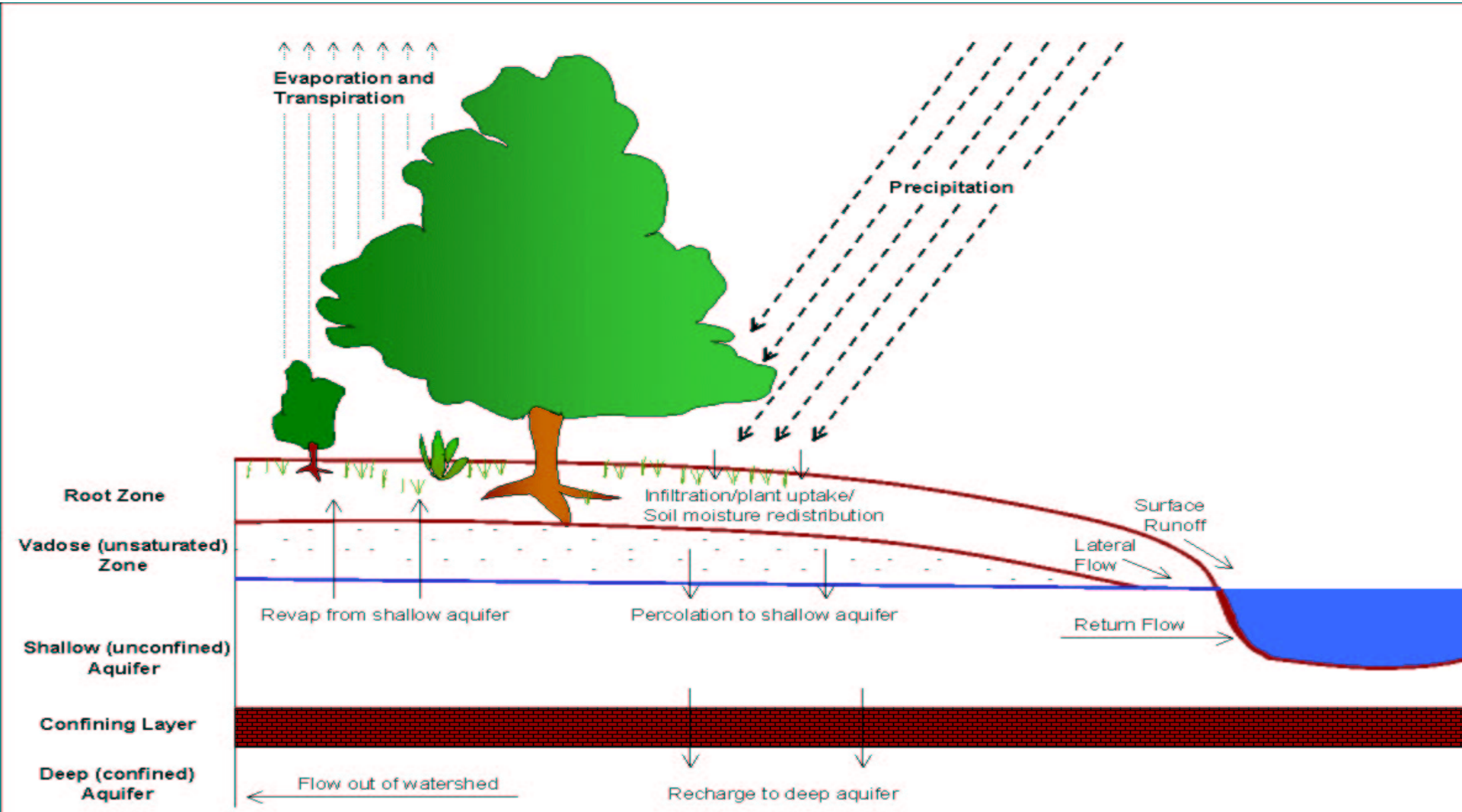
The Science Questions

- What BMPs can be considered?
- What will be the nutrient load reduction from widespread adoption of BMPs?
- How many acres of farmland for a given trade?
- Trading distances
  - How far can a trade be made?
  - Local, regional, basin-wide?
  - Timing issues
- How to handle different forms of N & P?
- How to handle “hot spots”?

Watershed Model



Model Processes



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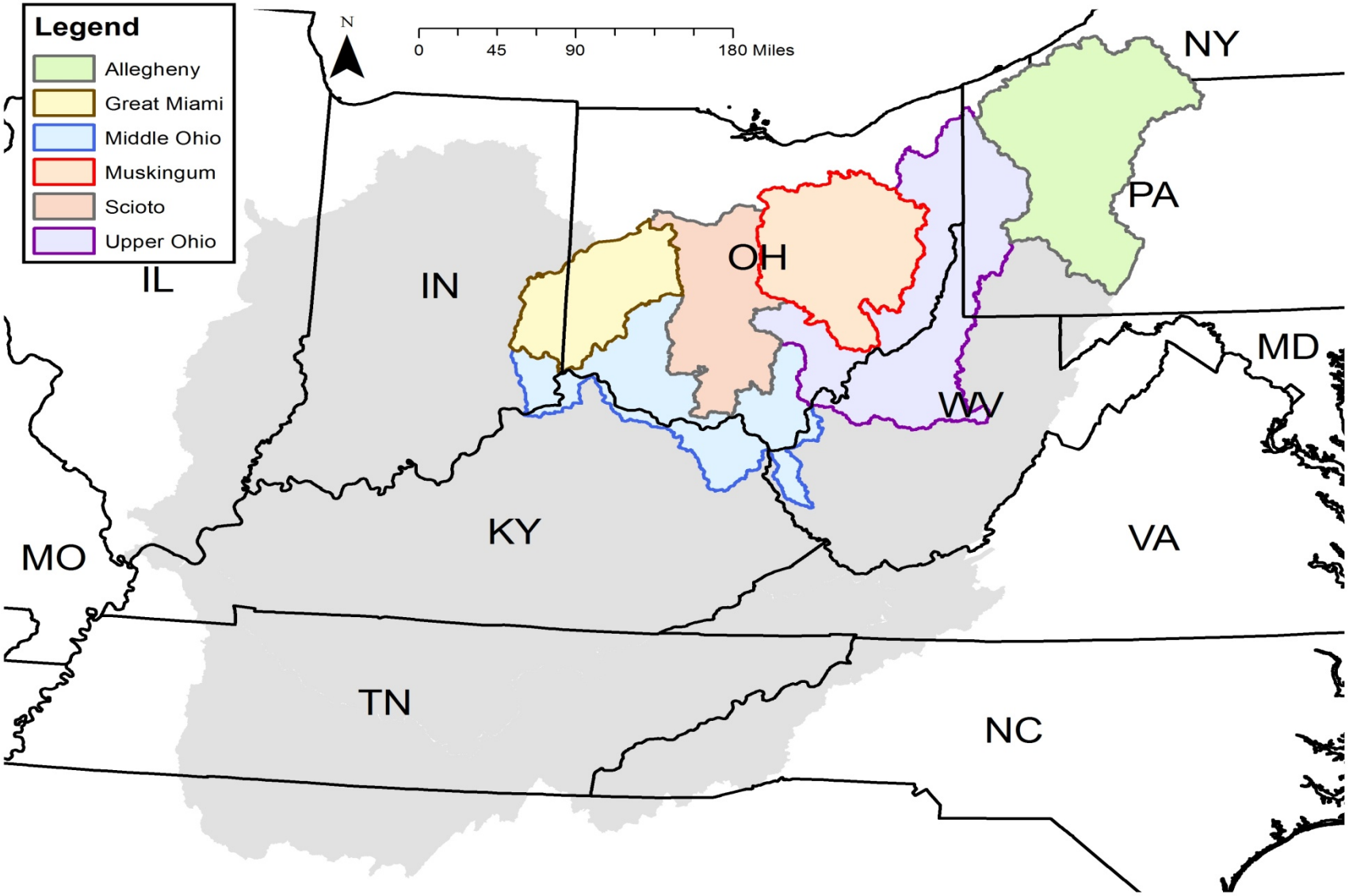
Watersheds already modeled



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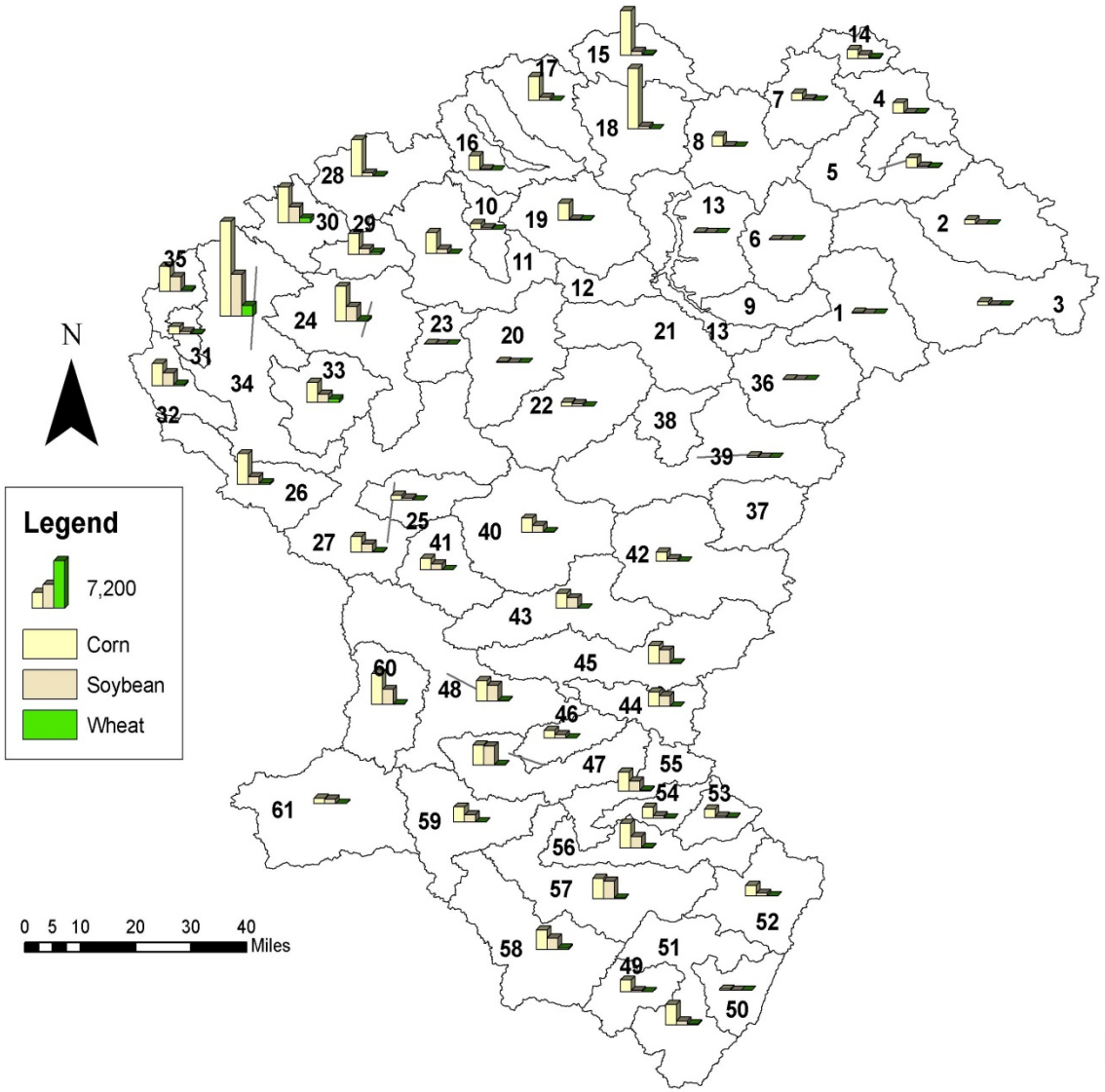
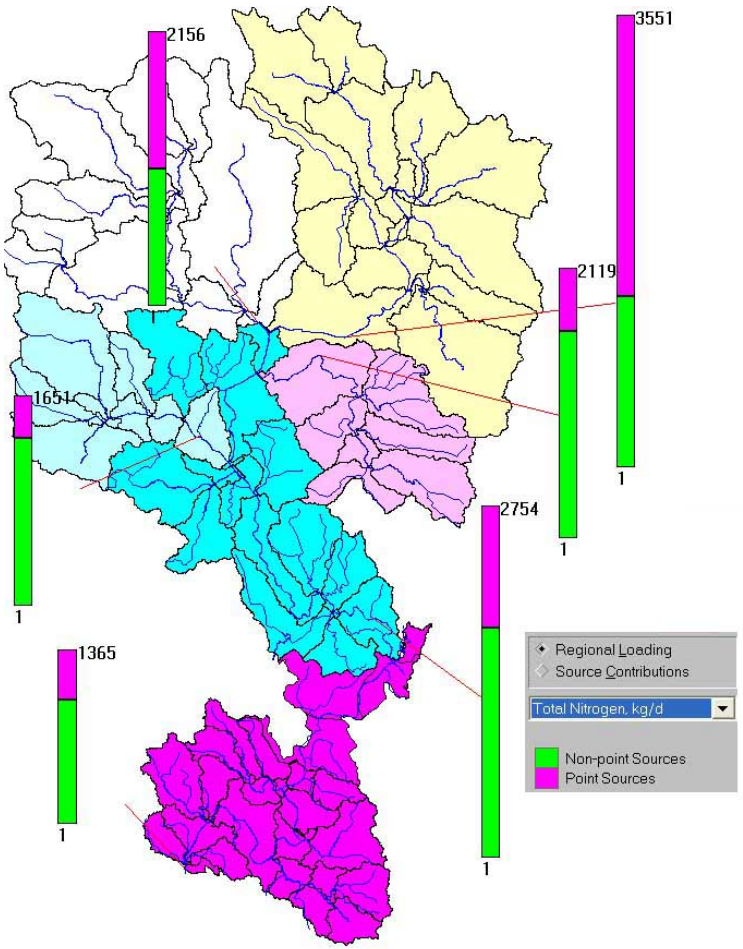
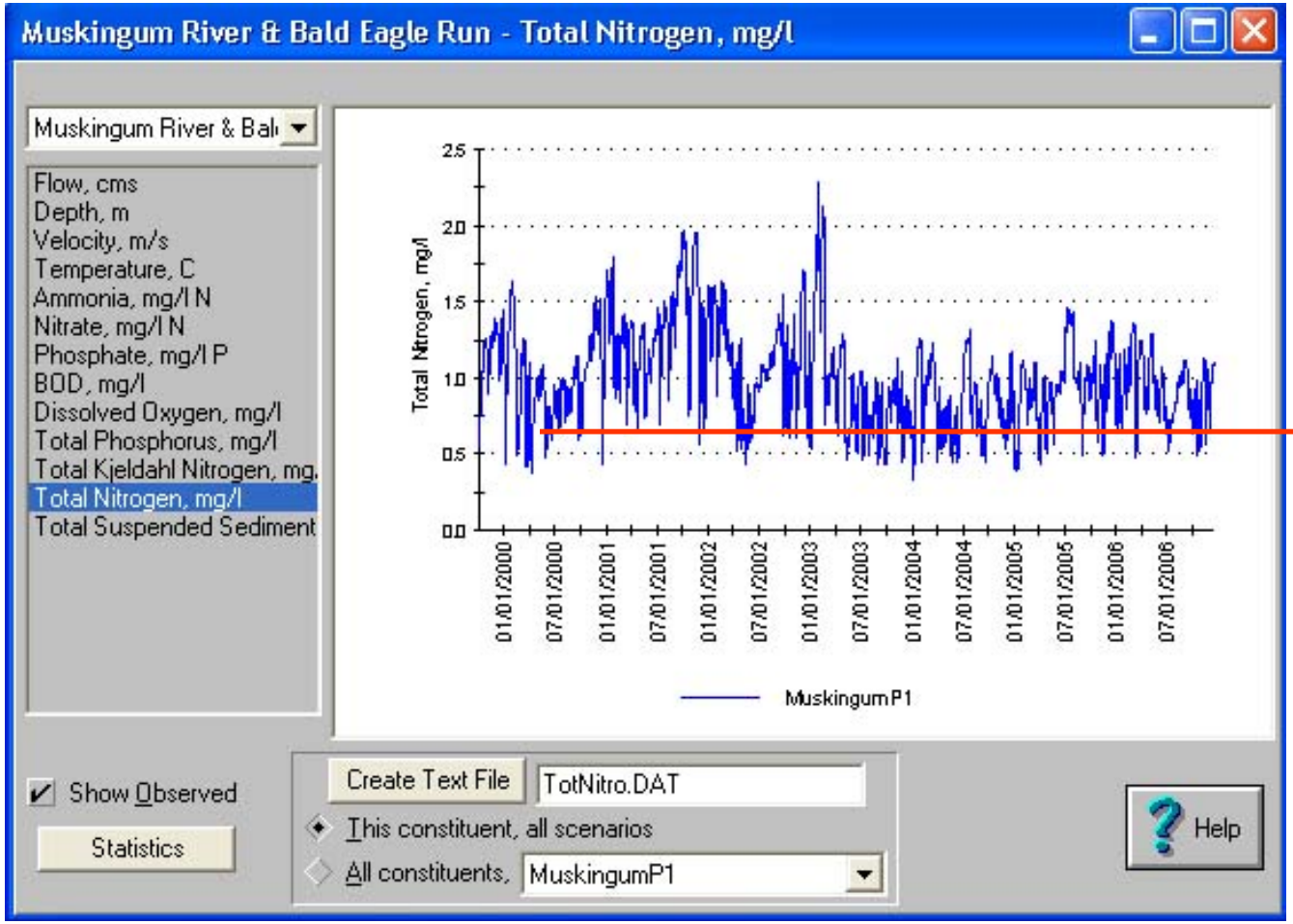
Watershed Characteristics



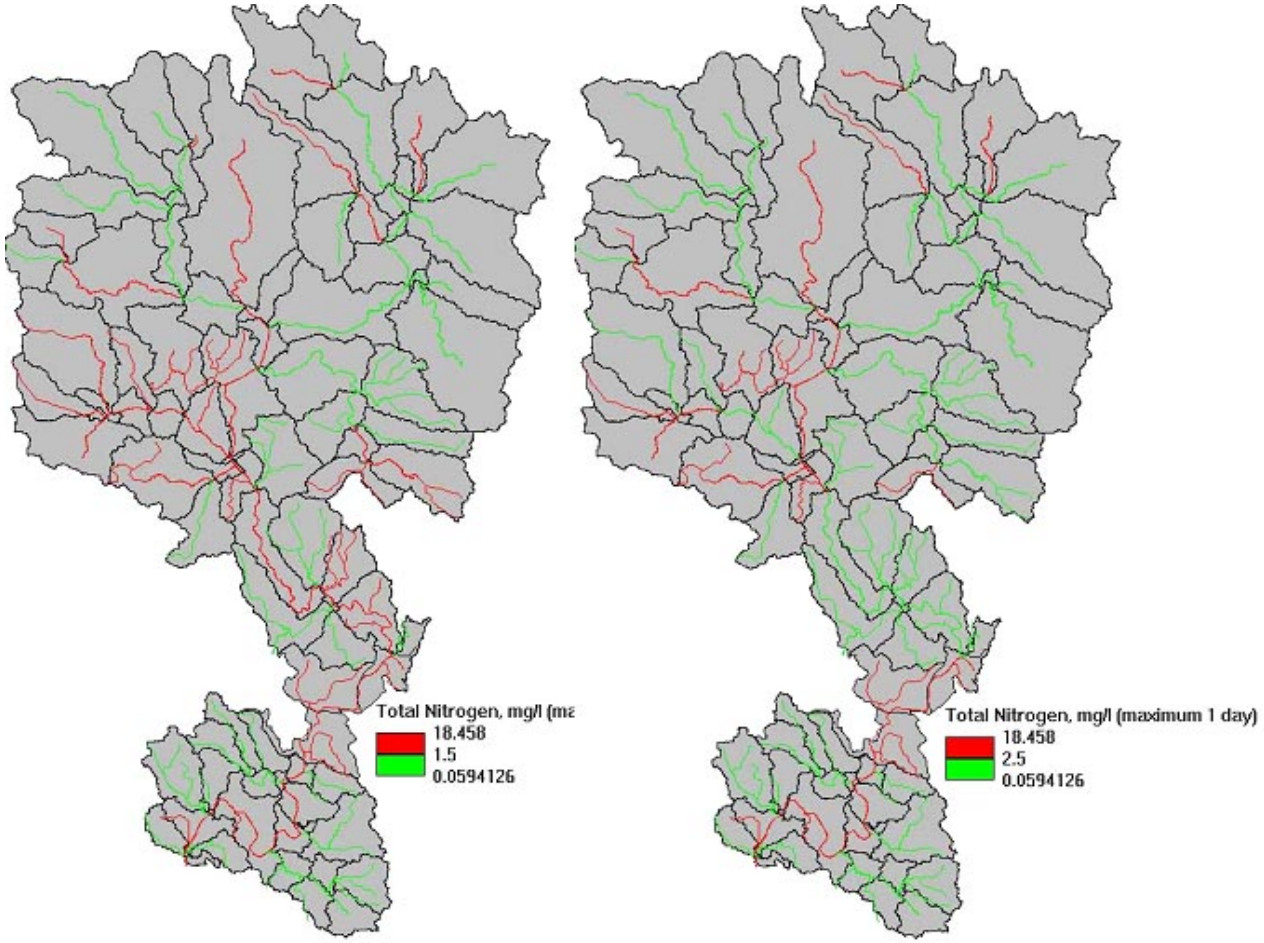
TN Load



Temporal Pattern of WQ Exceedance



WQ Hot Spots



Reference level = **1.5 mg/L** **2.5 mg/L**

Crediting Equation: Attenuation Factors

Credit = (F_{field} x F_{river} x $F_{instream}$ x $F_{equivalence}$ x F_{safety}) Load Reduction

Attenuation Factors

Credit = (F_{field} x F_{river} x $F_{instream}$ x $F_{equivalence}$ x F_{safety}) 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 ($F_{equivalence}$)** – 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)

Attenuation Factors

Credit = (F_{field} x F_{river} x $F_{instream}$ x $F_{equivalence}$ x F_{safety}) Load Reduction

- Theoretical Example
  - In-stream load reduction of 100 lb nitrate/day
  - Purchase of credit 2 river segments below with a 25% discount, for nitrate
  - Edge of field = Edge of river = Equivalence = 100%
  - Safety factor = 15%
  - Credit = (1 x 1 x 0.75 x 1 x 0.85) 100 lb/d= 64 lb/d

  TRADE RATIO: 1.64 to 1 to get 100 pounds for Buyer

Attenuation Factors

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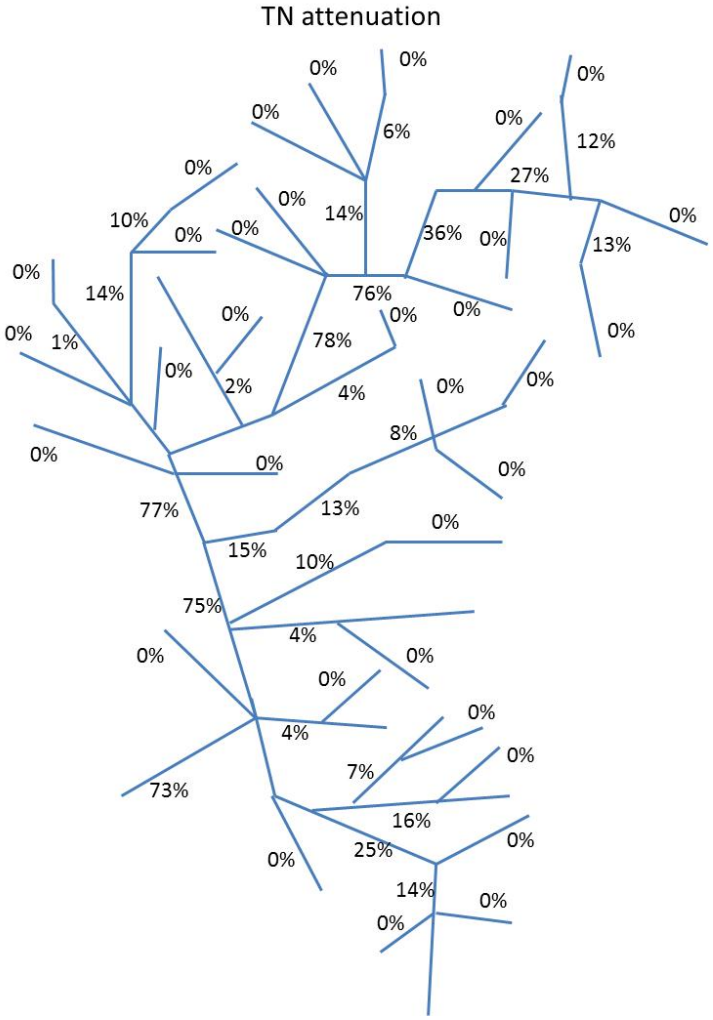
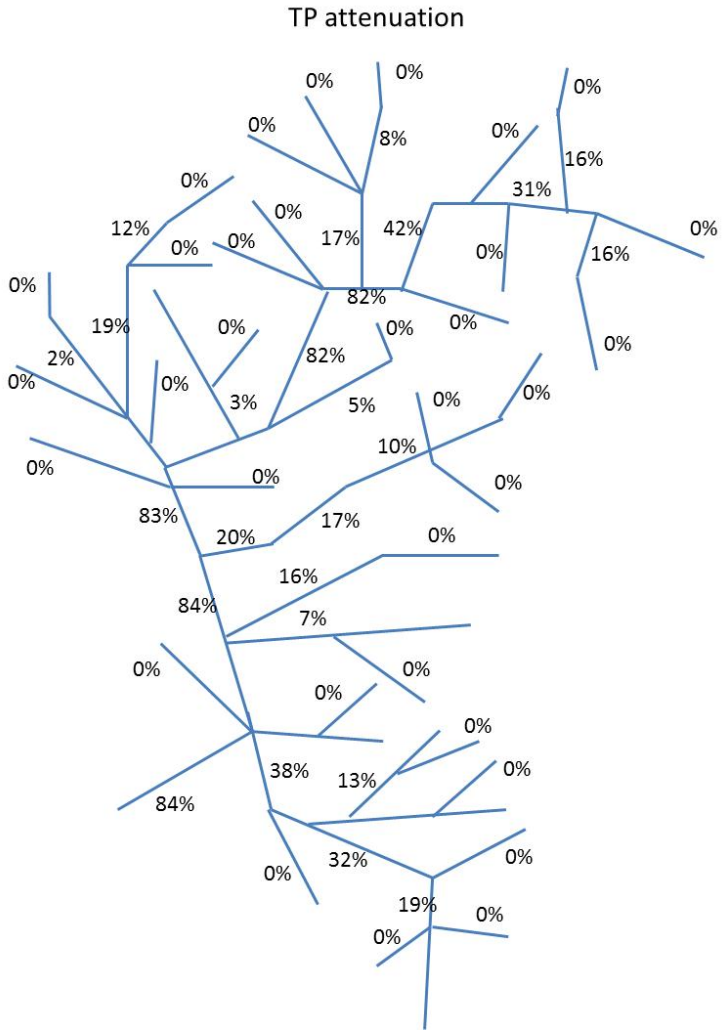
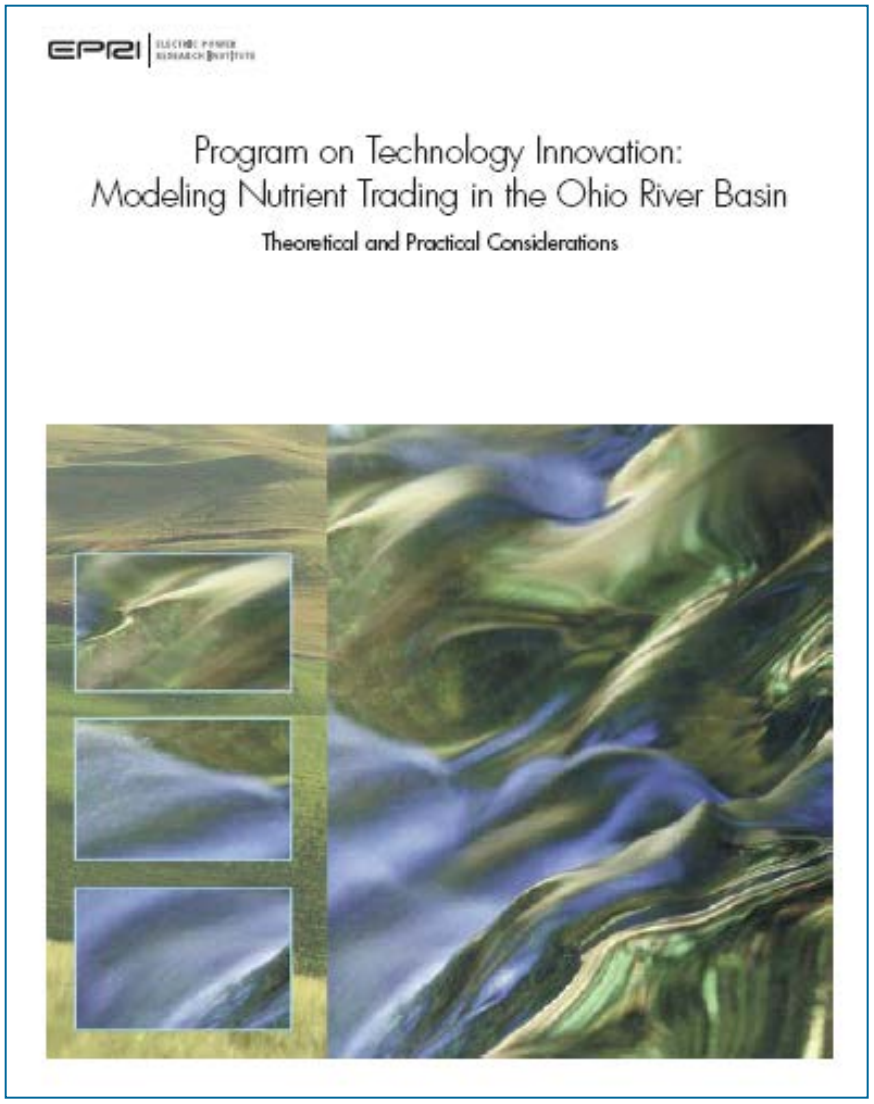
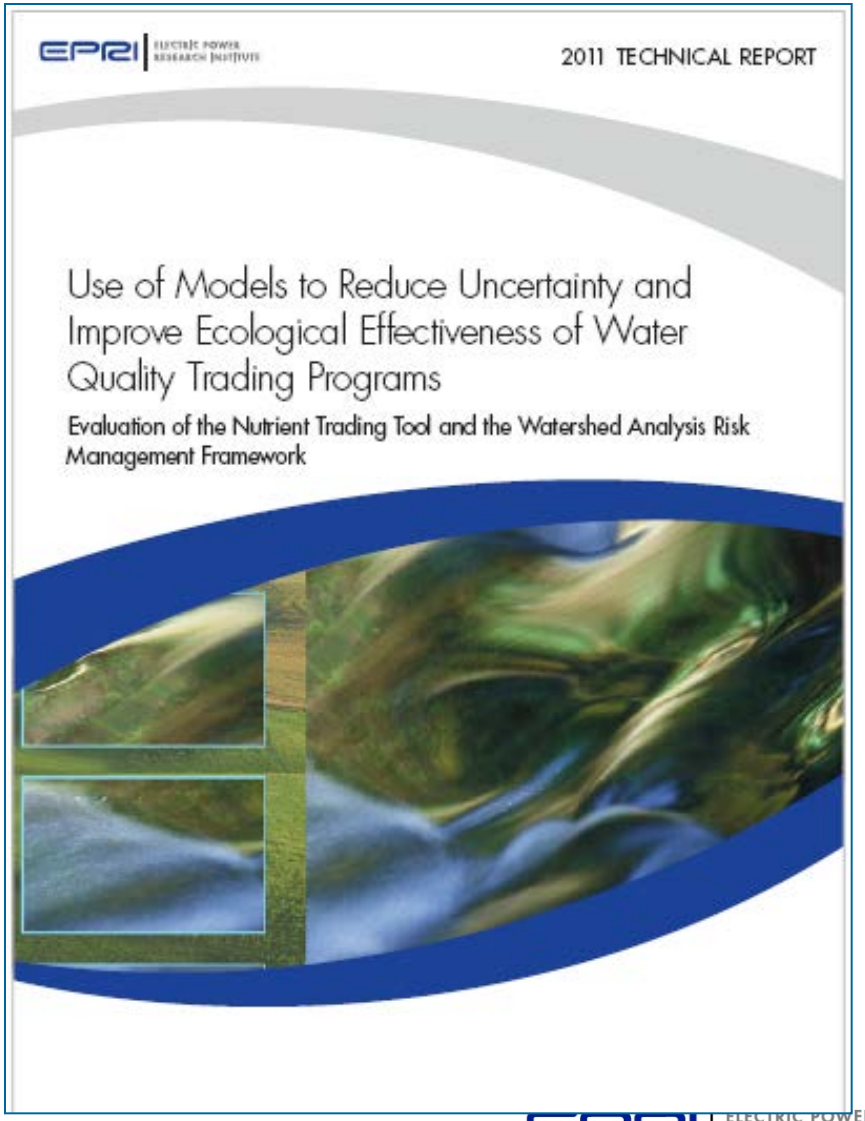




Watershed Modeling Reports





Challenge . . .

How do we institutionalize this complex approach into a workable, functional, efficient market?

Credit Trading Registry

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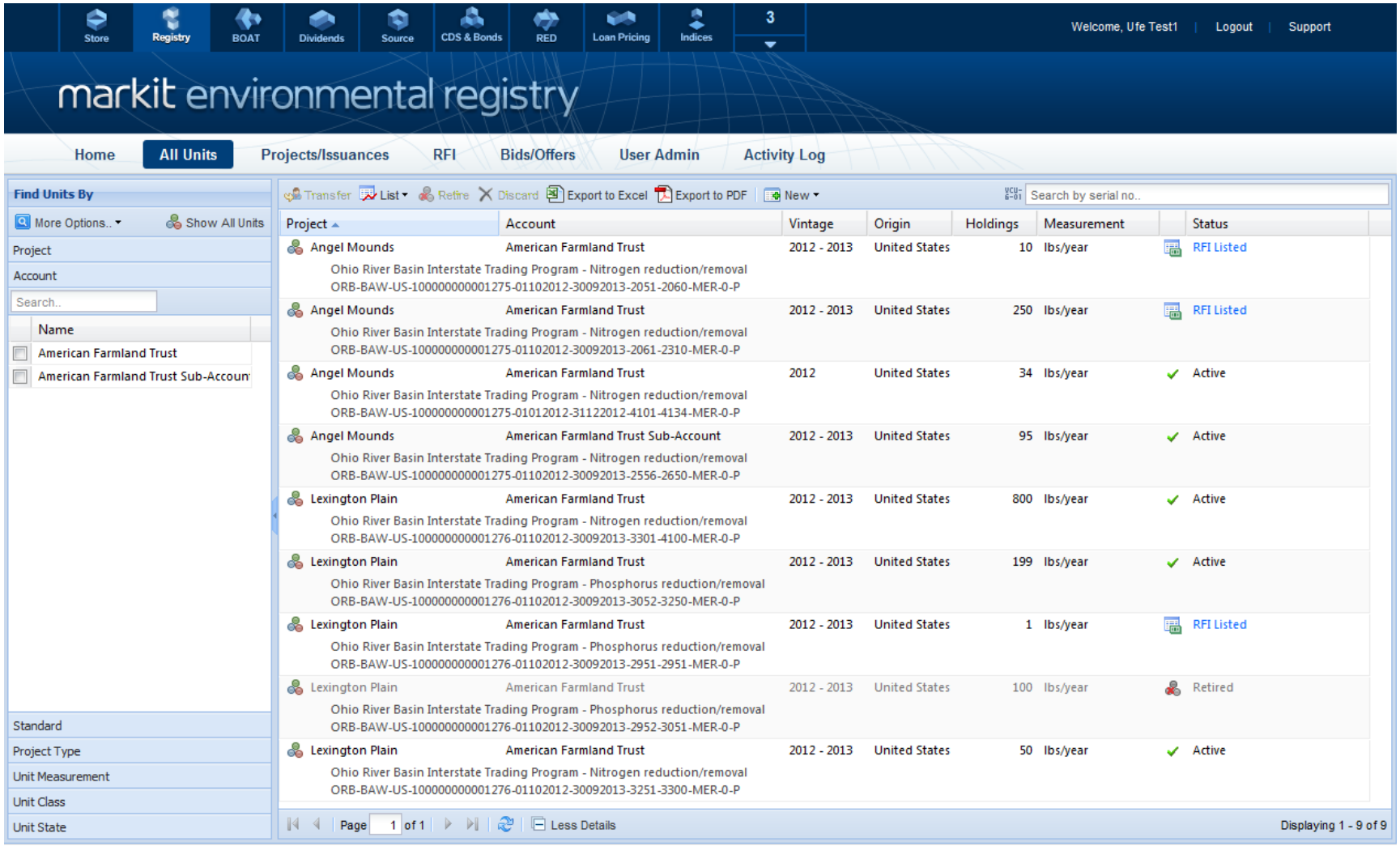

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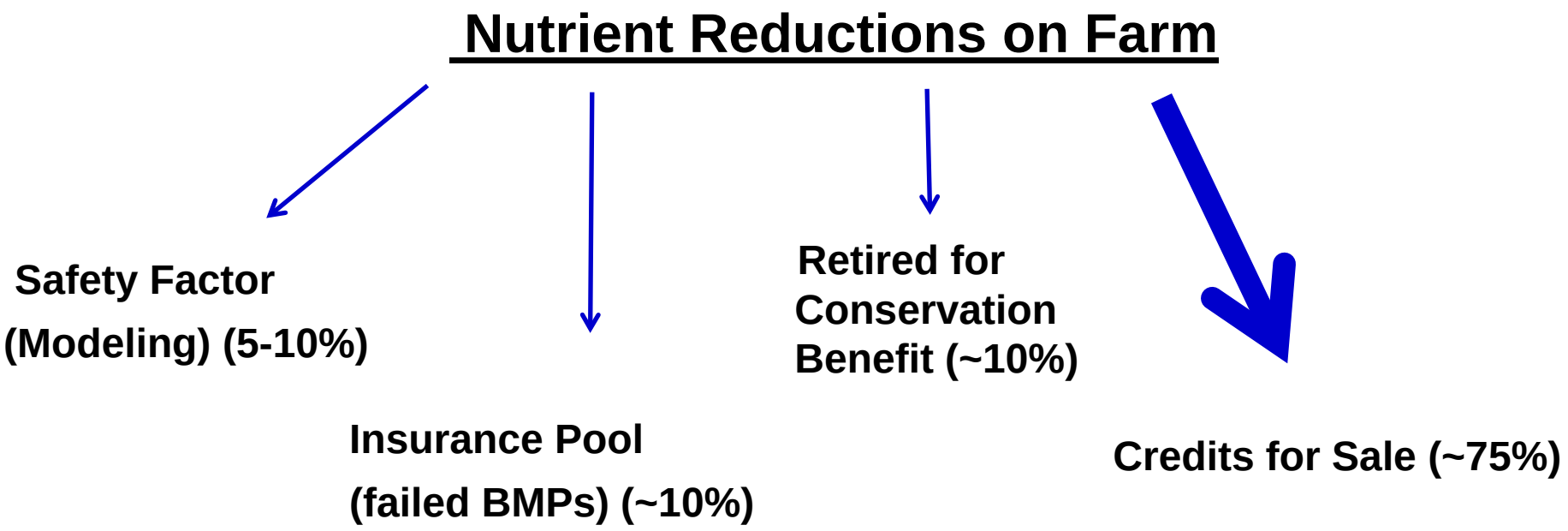
2012 USDA-NRCS CIG Proposal

A Credit Registry for the Ohio Basin WQT Program

- The purpose of this project is to deploy an innovative, secure and proven market infrastructure for pilot testing in the Ohio River Basin WQT Program.
- Requested $1M of funding, matching with $1M.
  - Ohio Environmental Protection Agency
  - Indiana Department of Environmental Management
  - Kentucky Dept. of Environmental Protection
  - Ohio River Valley Water Sanitation Commission (ORSANCO)
  - American Farmland Trust
  - Hunton & Williams

From Nutrient Reductions to Credits



Stacking with Carbon Credits

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GHG Emissions Offsets by Reducing N_20 Emissions in Agricultural Crop Production

VCS VOLUNTARY CARBON STANDARD

N Nitrogen
Atomic Number: 7
Atomic Mass: 14.01

Stacking Opportunities and Risks in Environmental Credit Markets

by Jessica Fox, Royal C. Gardner, and Todd Maki

Jessica Fox is Senior Project Manager, Electric Power Research Institute, Environment Division, Palo Alto, California. Royal C. Gardner is Professor of Law and Director, Stetson University College of Law, Institute for Biodiversity Law and Policy, Gulfport, Florida. Todd Maki is Project Manager, Electric Power Research Institute, Environment Division, Palo Alto, California.

Editors' Summary

Environmental credit markets for mitigating impacts to wetlands, endangered species, water quality, and carbon emissions have been established throughout the United States. Recently, there has been much debate about whether a conservation project should be allowed to produce credits for multiple markets, a

Environmental credit markets for mitigating impacts to wetlands, endangered species, water quality, and carbon emissions have been established throughout the United States. These markets offer economic incentives for private landowners to protect natural resources, and the credits generated through such conservation actions may more effectively offset impacts than traditional technological, fee-based, or project-by-project approaches.[1] While there are concerns regarding the ecological validation of these markets,[2] interest in market-based mitigation is growing, and regulatory agencies have developed policies that guide market practices. Recently, there has been much debate (and confusion) about whether a conservation project should be allowed to produce credits for multiple markets, a practice broadly referred to as credit stacking.[3] This Article presents results of a U.S. national survey on credit stacking, discusses several stacking scenarios, and offers thoughts on the need for agencies to provide clearer rules on transactions involving stacked credits.

Conservation on private lands can produce a suite of important ecosystem services. Restoring a wetland, for example, can result in waterfowl habitat, water filtration, and possibly carbon sequestration.[4] Understandably, a private landowner will likely want to maximize the economic returns associated with the full suite of ecosystem services that a conservation action generates. With the existence of four markets in which environmental mitigation credits can be sold, debate about credit stacking is intensifying.[5]

Authors' Note: Special thanks to the World Resources Institute and Morgan Robertson at the University of Kentucky for supporting the development of the national survey, and to Adam Diamant of Electric Power Research Institute (EPRI) for important comments and input. Royal Gardner's work on this Article was supported by a grant from Stetson University Col-

Jessica Fox, Royal Gardner, Todd Maki.
Feb 2011. Environmental Law Reporter.

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Signing Ceremony

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August 9th, 2012 in Cincinnati Ohio

- Invited Guests and Media Only
- Leaders from Ohio, Indiana and Kentucky
- Harris Sherman, Undersecretary USDA
- Bob Perciscepe, Deputy Administrator EPA
- Peter Tennant, Executive Director, ORSANCO

Acknowledgment for Pilot Period

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- Pilot is only possible due to innovation, collaboration, and commitment of **the states**.
- Represents teamwork across sectors, federal agencies, and states of **Ohio, Indiana, and Kentucky**.
- It won't be perfect. We will learn many lessons.
- However, collaborators are committed to addressing issues as they arise.
- Will be adaptively managed.

Trading Plan is Posted to Project Website

The Economist

June 22: A nutrient pollution article in The Economist mentions EPRI's Water Quality Trading Program.

Ohio River Trading Project Website
www.epri.com/ohiorivertrading

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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 tracing 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)

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