EPRI | ELECTRIC POWER RESEARCH INSTITUTE

Ohio River Basin Water Quality Trading Project

Jessica Fox
Technical Executive, EPRI

June 18, 2014

EPRI Overview

- The Electric Power Research Institute, Inc. conducts research, development and demonstration (RD&D) relating to the generation, delivery and use of electricity for the benefit of the public.
- An independent, nonprofit organization, we bring together scientists and engineers as well as experts from academia and the industry to help address challenges in electricity.

EPRI's Focus in WQT

- Based on research, EPRI identified opportunities to improve the implementation of WQT.
- A pilot project provides a platform to test approaches, engage stakeholders, and advance theoretical debates.

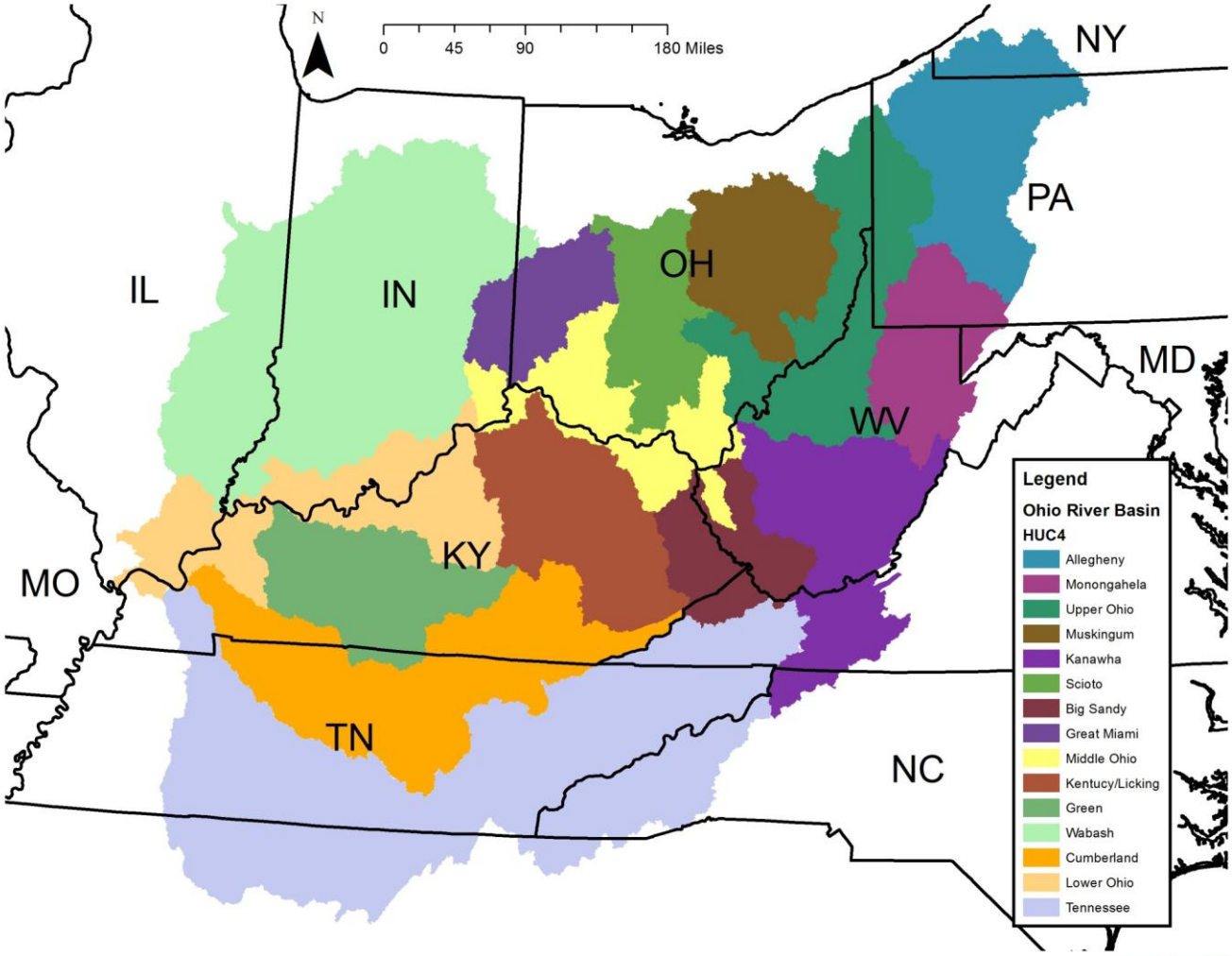
"Can WQT be a socially, ecologically, and economically viable?"

The outcome is still to be determined.

Ohio River Basin

Pilot Trades (2013-2015)

30+ farmer contracts
66,000 lbs N
30,000 lb P
KY, IN, OH



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This is What 66,000 lbs N Looks Like

x 2!

= 2,950

50-lb bags of fertilizer

ORSANCO Resolution – June 2011

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

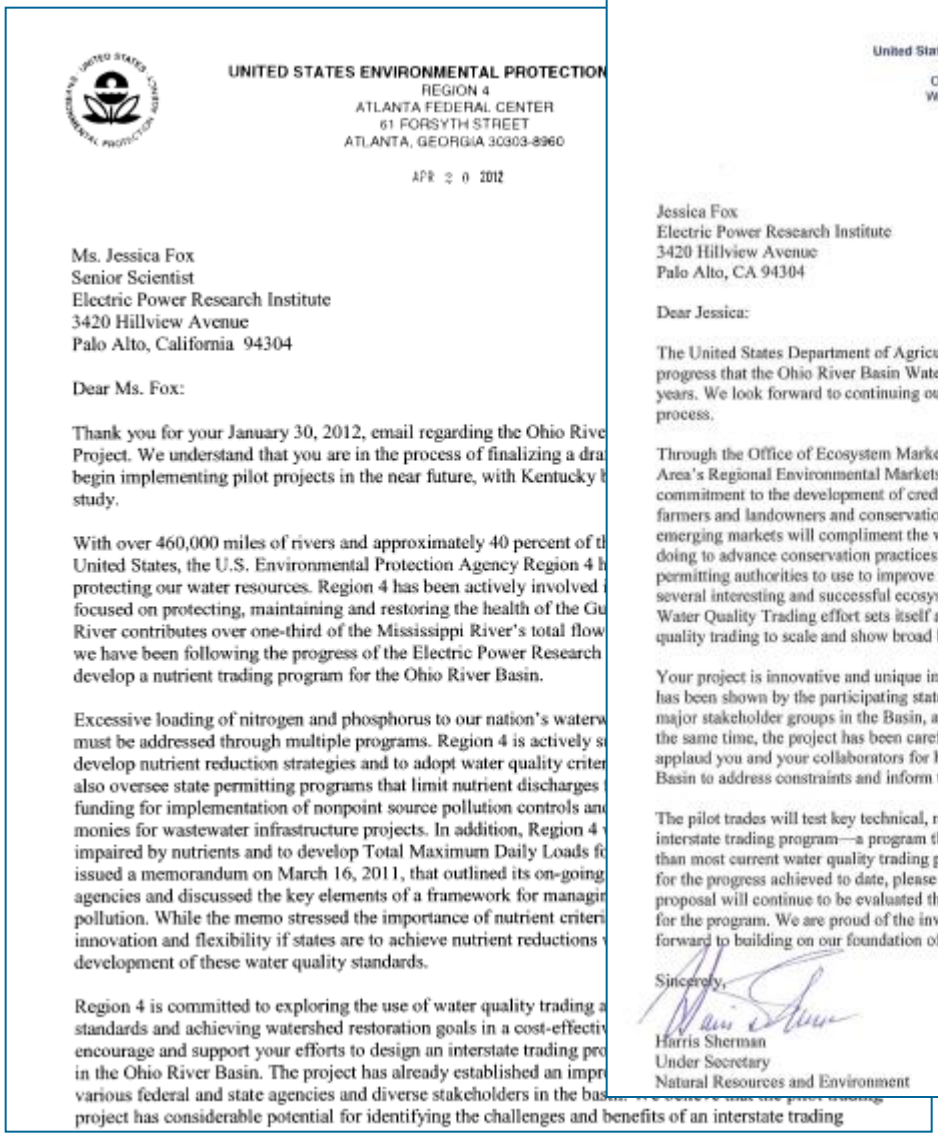
WHEREAS: the States recognize the need for additional mechanisms to facilitate nutrient reductions, including water quality trading; and

NARUC Adopts Resolution for EPRI WQT

NATIONAL ASSOCIATION OF REGULATORY UTILITY COMMISSIONERS

RESOLVED, The Board of Directors of the National Association of Regulatory Utility Commissioner, convened at its 2013 Summer Committee Meetings in Denver, Colorado commends EPRI for working to develop best practices in water quality trading, and encourages state governments to consider similar programs in other states, given the importance of water quality to the nation.

Project Letters



UNITED STATES ENVIRONMENTAL PROTECTION
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

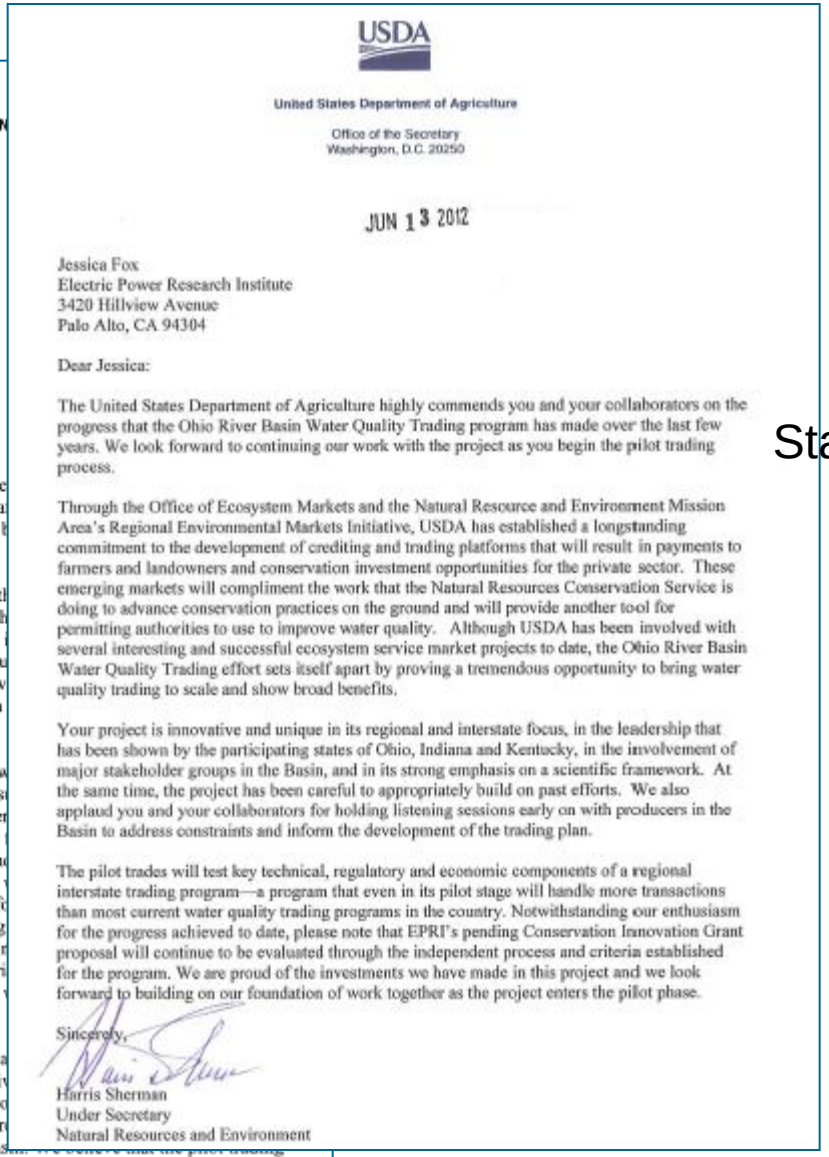
Dear Ms. Fox:

Thank you for your January 30, 2012, email regarding the Ohio Rive
Project. We understand that you are in the process of finalizing a dra
begin implementing pilot projects in the near future, with Kentucky
study.

With over 460,000 miles of rivers and approximately 40 percent of t
United States, the U.S. Environmental Protection Agency Region 4
protecting our water resources. Region 4 has been actively involved
focused on protecting, maintaining and restoring the health of the Gu
River contributes over one-third of the Mississippi River's total flow
we have been following the progress of the Electric Power Research
develop a nutrient trading program for the Ohio River Basin.

Excessive loading of nitrogen and phosphorus to our nation's waterw
must be addressed through multiple programs. Region 4 is actively s
develop nutrient reduction strategies and to adopt water quality criter
also oversee state permitting programs that limit nutrient discharges
funding for implementation of nonpoint source pollution controls an
monies for wastewater infrastructure projects. In addition, Region 4
impaired by nutrients and to develop Total Maximum Daily Loads f
issued a memorandum on March 16, 2011, that outlined its on-going
agencies and discussed the key elements of a framework for managi
pollution. While the memo stressed the importance of nutrient criteri
innovation and flexibility if states are to achieve nutrient reductions
development of these water quality standards.

Region 4 is committed to exploring the use of water quality trading
standards and achieving watershed restoration goals in a cost-effecti
encourage and support your efforts to design an interstate trading pr
in the Ohio River Basin. The project has already established an impr
various federal and state agencies and diverse stakeholders in the ba
project has considerable potential for identifying the challenges and benefits of an interstate trading



USDA

United States Department of Agriculture

Office of the Secretary
Washington, D.C. 20250

JUN 13 2012

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

Dear Jessica:

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

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

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

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

Sincerely,

Harris Sherman
Under Secretary
Natural Resources and Environment

USEPA
USDA
EPA R4
EPA R5
SWCDs
State Conservationists
Others

OH, IN, and KY Sign Trading Plan!

August 9th, 2012 in Cincinnati Ohio

The Economist June 22, 2012: A nutrient pollution article in The Economist mentions EPRI's Water Quality Trading Program.

Trading Plan, as Amended

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First Amendment

to Pilot Trading Plan 1.0

for the

Ohio River Basin Interstate Water Quality Trading Project

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

Background

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

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

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

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

Amendments

The Plan is hereby amended as follows:

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

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Signatories

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

Ohio

10/28/13
Karl Gebhardt, Chief and Deputy Director — Date
Division of Soil & Water Resources, Ohio Department of Natural Resources

10/10/13
Scott J. Nally, Director, Ohio Environmental Protection Agency — Date

Indiana

OCTOBER 10, 2013
Thomas W. Easterly, Commissioner, — Date
Indiana Department of Environmental Management

10/31/13
Gina Sheets, Director, — Date
Indiana State Department of Agriculture

Kentucky

10/10/13
R. Bruce Scott, Commissioner, — Date
Kentucky Department of Environmental Protection

10/28/13
Steve Hohmann, Commissioner, — Date
Kentucky Department of Natural Resources

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Our Farmers

U.S. NEWS

Trading System Tackles Waste

New Plan Pays Farmers to Curb Agricultural Runoff That Pollutes the Gulf of Mexico

By Mark Peters

NEW MADISON, Ohio—Kevin Hollinger planted radishes and oats last fall in his corn and soybean fields, but he isn't planning to harvest them. Instead, he is letting the crops die over the winter to improve the soil and keep fertilizer and other nutrients from running into nearby waterways.

"I could hardly go to town without someone asking 'What's that in your field?'" said Mr. Hollinger, a fourth-generation farmer.

Helping to foot the bill for his experiment is a pilot program set to launch fully next month. Farmers in the Ohio River basin are being paid to make changes—from what they plant to how they handle manure—in an effort to minimize runoff that can cause hypoxia, or low oxygen levels, in waterways.

Nutrient runoff plays a role, nearly 1,000 miles downstream from Mr. Hollinger's farm, in the formation of the so-called dead zone in the Gulf of Mexico—an area where fish and other aquatic life can't survive and which is considered one of the nation's biggest water-pollution problems.

Shrinking the dead zone—which was most recently the size of Connecticut—has challenged regulators. Nutrients that flow down to the Mississippi River and end up in the Gulf come from hundreds of thousands of sources across more than a dozen states.

"It takes a long time to address such a large watershed and such a significant problem," said Nancy Stoner, acting assistant administrator for water at the U.S. Environmental Protection Agency.

The agency doesn't have the power to regulate most farms, and leaves controlling nutrient levels in lakes, rivers and streams largely to the states. Environmental groups, who argue the states have taken little action, have used the EPA to force it to set acceptable levels for nitrogen and phosphorus in the Mississippi basin.

Increasingly, several government and nonprofit groups, including the Electric Power Research Institute, the research arm of the U.S. utility industry, are trying an approach outside of traditional regulation. The institute is setting up a trading system, starting with about 30 farms across Indiana, Ohio, and Kentucky. Those farms create credits by keeping nitrogen and phosphorus from reaching the Ohio River. The credits can be sold to power plants, sewage plants and other facilities that release nutrients into local waterways.

"Our project is trying to set [illegible] winter should have killed the radishes and oats and he can sow his fields as usual.

"I feel like if we do a good job now, we can certainly head off the need for regulation," Mr. Hollinger said, though he says he will need to see better production or a reduction in costs to stick with it.

In total, the pilot projects are [illegible] conventional markets tried elsewhere in the country, according to a 2010 study by U.S. Department of Agriculture economists.

Now, "there is no regulatory backstop to the voluntary plans and since being worked on. You've got the speed limit sign without a number on it," said Brad Klein, a senior attorney at the Environ-

Ohio farmer Kevin Hollinger has planted winter crops to keep fertilizer from running into nearby waterways.

Wall Street Journal (2/20/2014)

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

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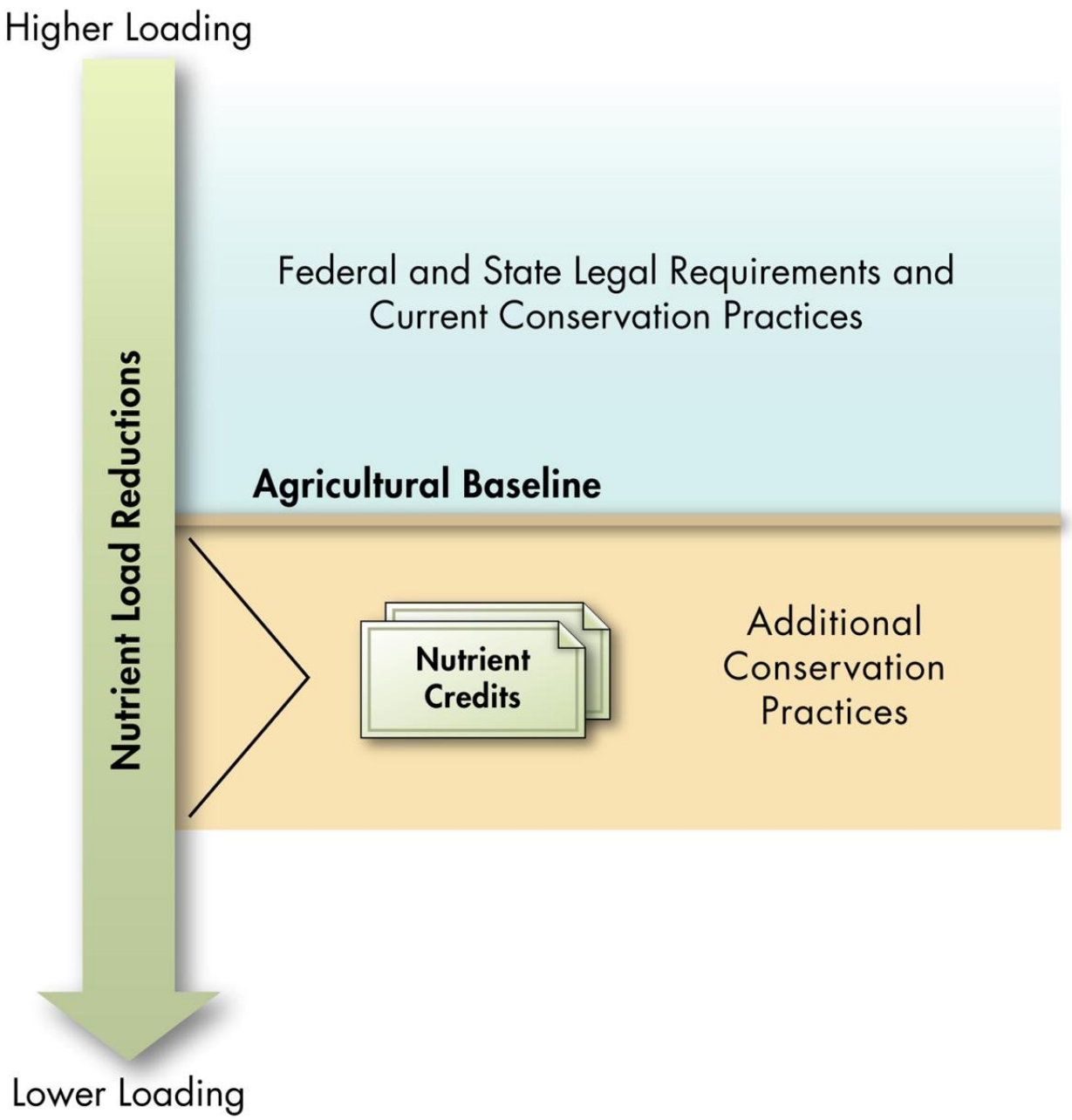
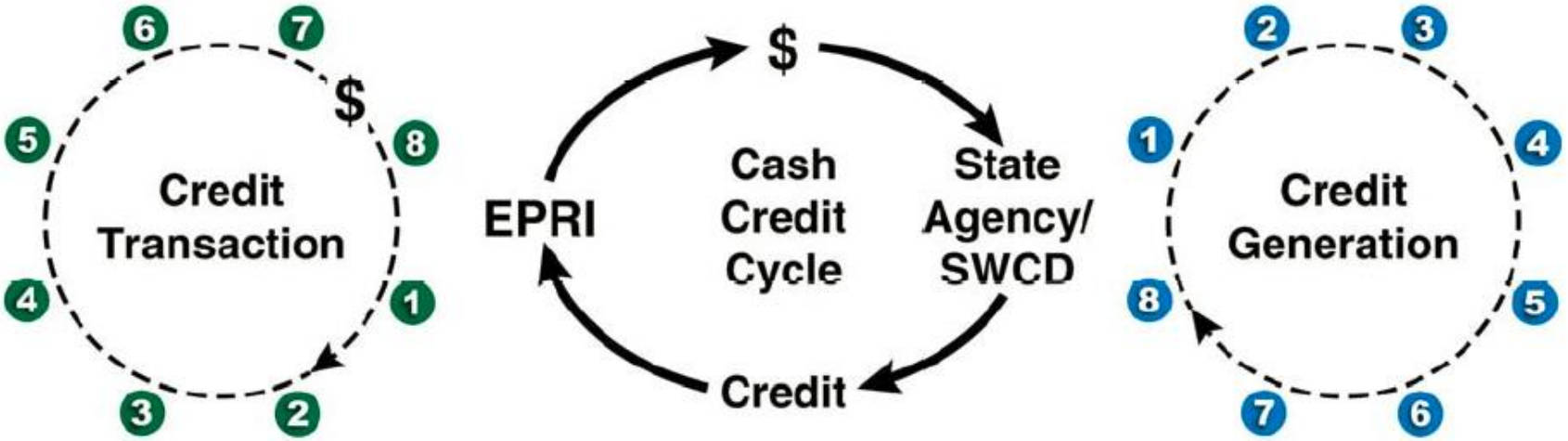
Example Project

Before
Runoff, erosion, sedimentation.

After
'Heavy Use Protection Area'
No erosion, no sedimentation, easier manure management, proud farmer.



Pilot Credit Process



Crediting Equation: Attenuation Factors

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

Watershed Model

U.S. ENVIRONMENTAL PROTECTION A

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)

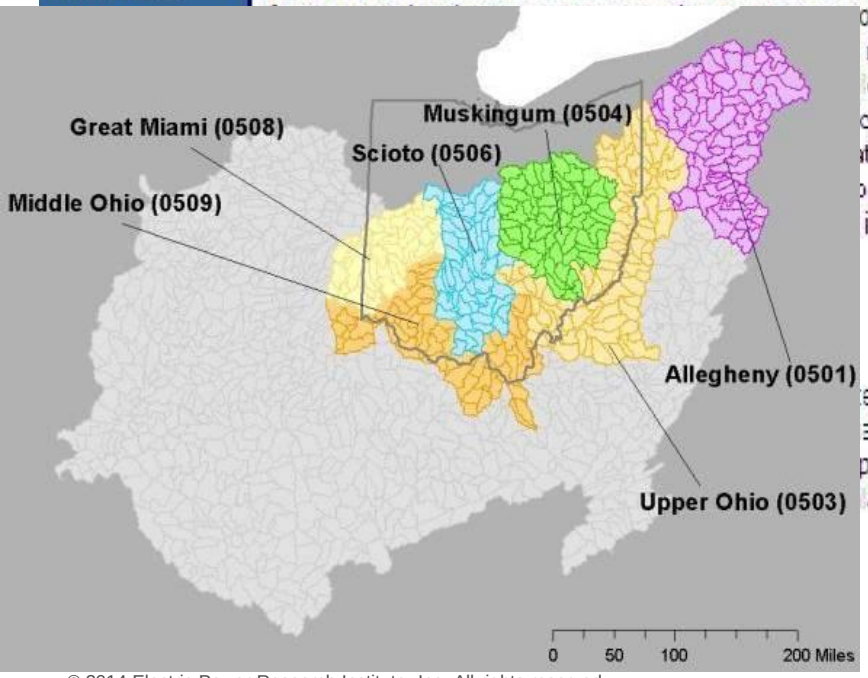
Watershed Analysis Risk Management Framework (WARM

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

ershed model that calculates daily runoff, shallow ality of a river basin. A river basin is divided into a by and soil layers), stream segments, and lake ations. Land surface is characterized by land use /

WWQTCS Info

- WWQTCS Home
- Technical Support
- Tools
  - Watershed Mode
    - Basins
    - LSPC
    - WAMView
    - SWMM
    - WARMF
  - Water Quality M
    - WASP
    - QUAL2K
    - Aquatox
    - EPD-RIV1
  - Hydrodynamic M



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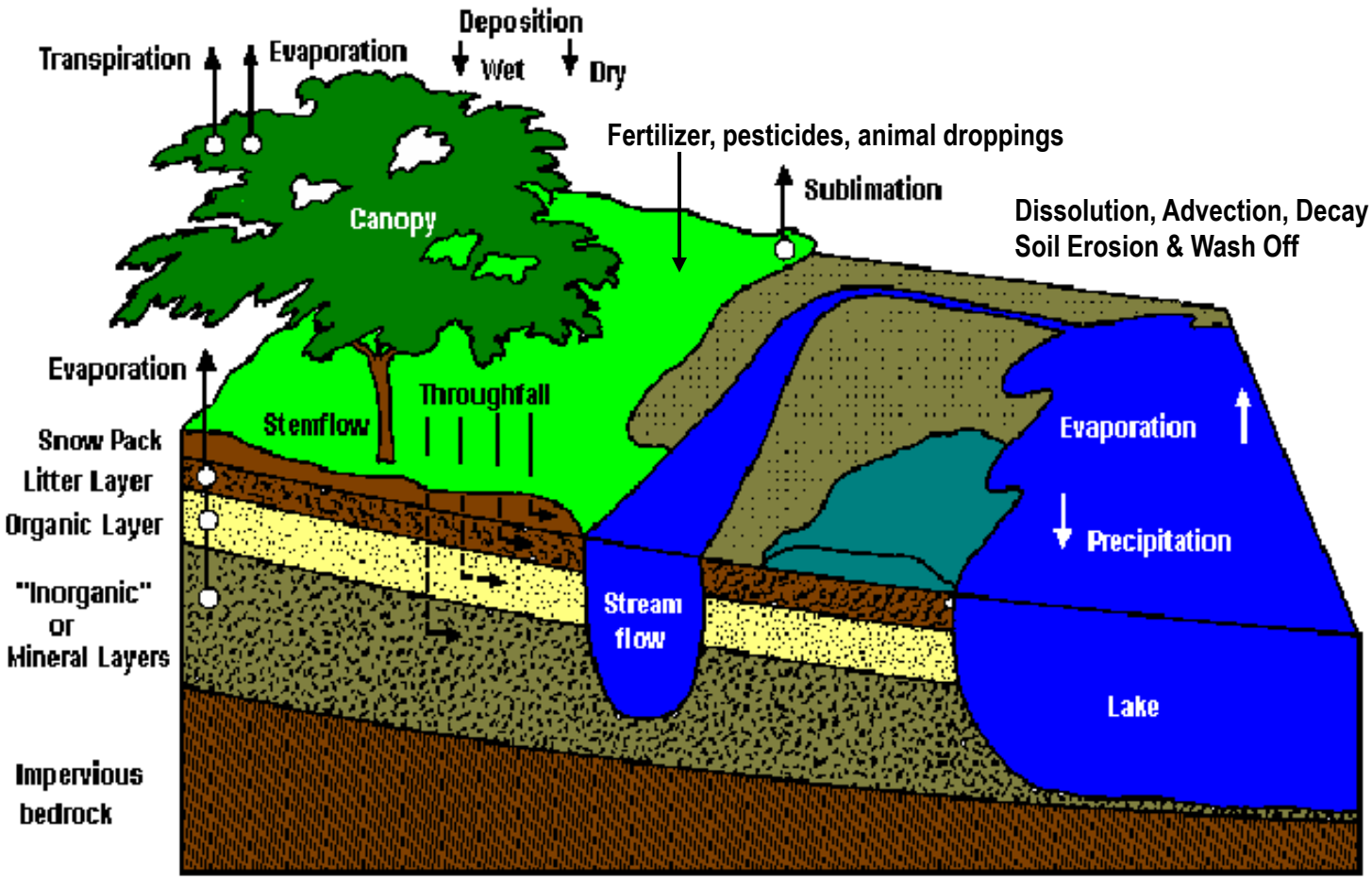
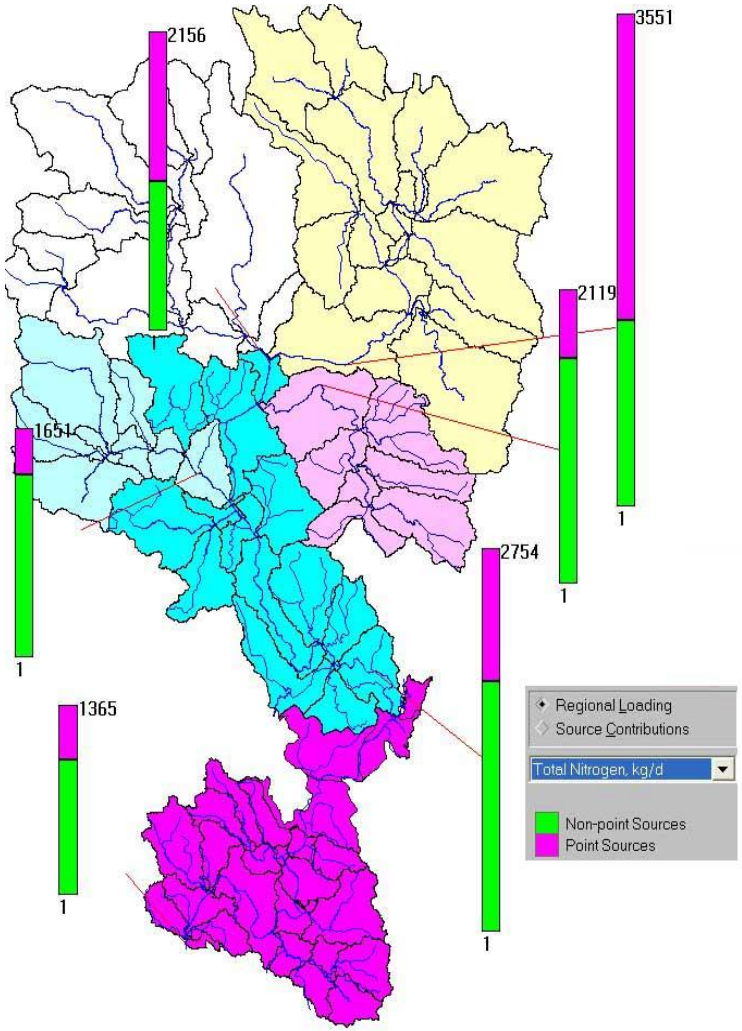
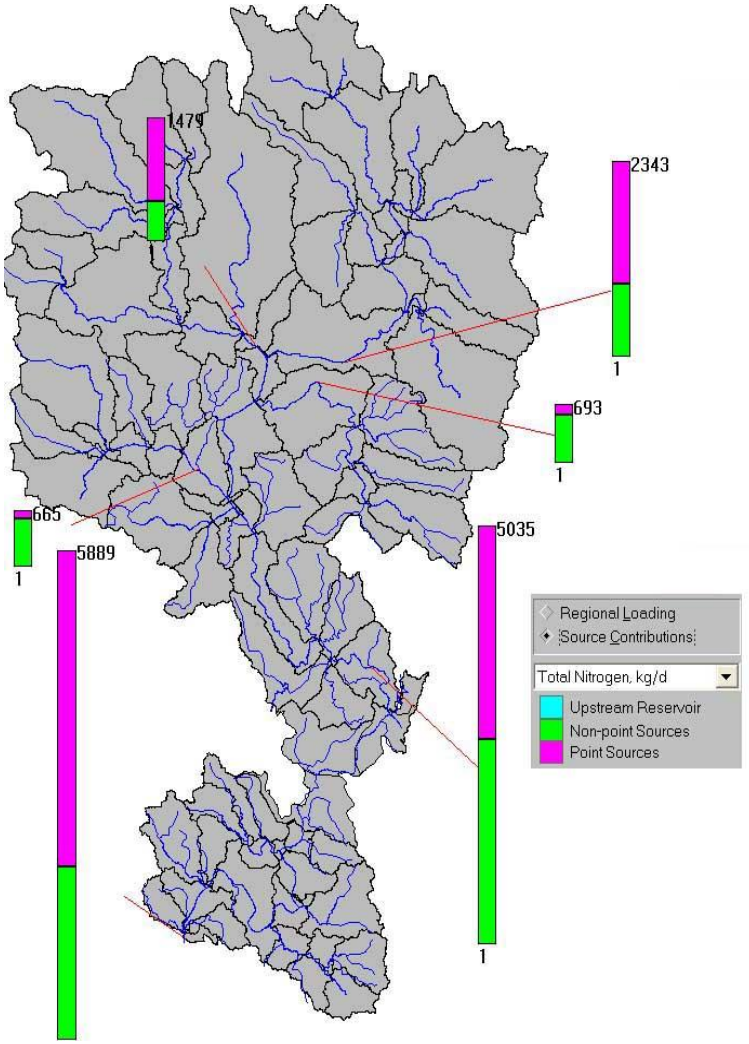
Watershed Processes in WARMF

Subsurface Processes
Mineral Weathering
AMD
Septic Systems
Organic Matter Decay
Nitrification
Cation Exchange
Plant Uptake



TN Load





First Journal paper on Credit Calculation Methods. Just Published! June 2014

Environmental Science & Technology

Article

pubs.acs.org/est

Attenuation Coefficients for Water Quality Trading

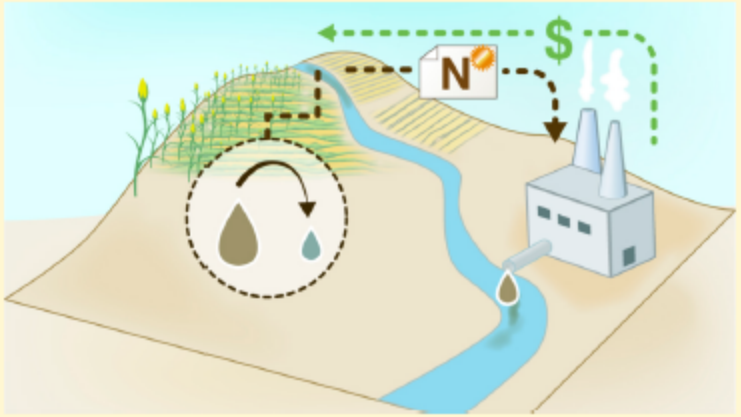
Arturo A. Keller,*[,†] Xiaoli Chen,[†] Jessica Fox,[‡] Matt Fulda,[†] Rebecca Dorsey,[†] Briana Seapy,[†] Julia Glenday,[†] and Erin Bray[†]

[†]Bren School of Environmental Science and Management, University of California, Santa Barbara, California 93106-5131, United States

[‡]Electric Power Research Institute, Palo Alto, California 94304, United States

Supporting Information

ABSTRACT: Water quality trading has been proposed as a cost-effective approach for reducing nutrient loads through credit generation from agricultural or point source reductions sold to buyers facing costly options. We present a systematic approach to determine attenuation coefficients and their uncertainty. Using a process-based model, we determine attenuation with safety margins at many watersheds for total nitrogen (TN) and total phosphorus (TP) loads as they transport from point of load reduction to the credit buyer. TN and TP in-stream attenuation generally increases with decreasing mean river flow; smaller rivers in the modeled region of the Ohio River Basin had TN attenuation factors per km, including safety margins, of 0.19−1.6%, medium rivers of



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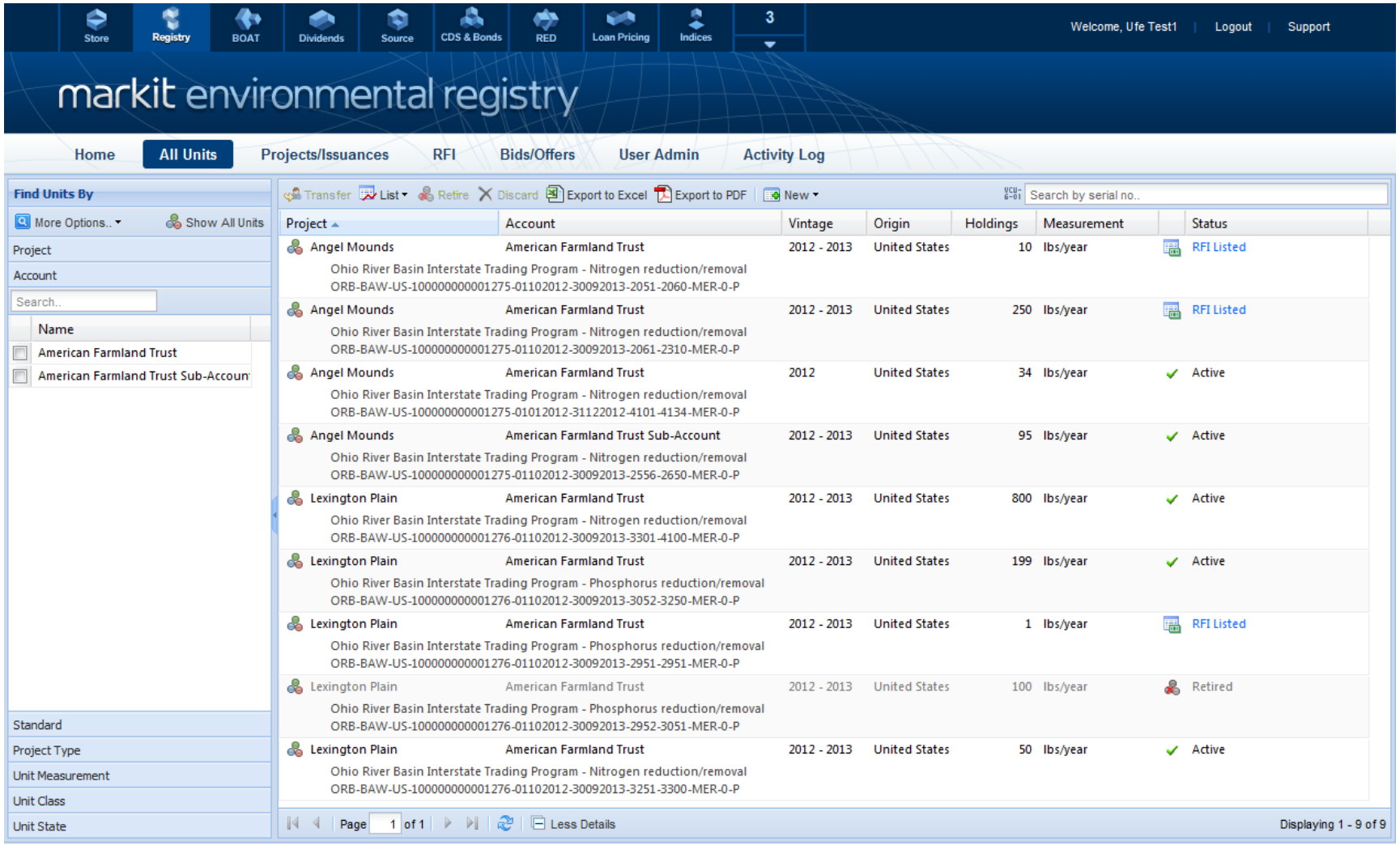
Credit Reserve / Assurance

- 10% credits move to Reserve Pool
- 10% retired by EPRI

- 80% of credits can be transacted, if approved.

  Then Credit Trading Ratio is applied based on buyer location.

Credit Trading Registry Operational



Credit Purchase Receipt

nsfer Pending Notification

Transfer Details:

Source Account ID: 100000000026540
Source Account Name: EPRI Holdings Account
Project Name: TEST ORB PROJECT 09162013
Standard Name: Ohio River Basin Water Quality Interstate Trading Program
Vintage Year: 2014
Quantity: 20.00000
Credit Type: TP lbs/year
Serial number: ORB-BAW-US-100000000033830-01102013-30092014-1680154.001-1680174-MER-0-P
Watershed (HUC4): Scioto
Sub Watershed (HUC10): Headwaters Scioto River

Additional Information:

Nutrient Type: Nitrogen
Calculation Methodology: EPA Region 5 Model
Best Management Practice: Cover Crops & Buffer Strips
Potential Ancillary Benefits*: Carbon Sequestration, Pollinator Habitat, Soil Health, Erosion Control

March 11, 2014: First Transactions

EPRI ELECTRIC POWER RESEARCH INSTITUTE

Purchase of Stewardship Credits

Ohio River Basin Trading Project EPRI ELECTRIC POWER RESEARCH INSTITUTE

Ohio River Basin - Water Quality Trading Project

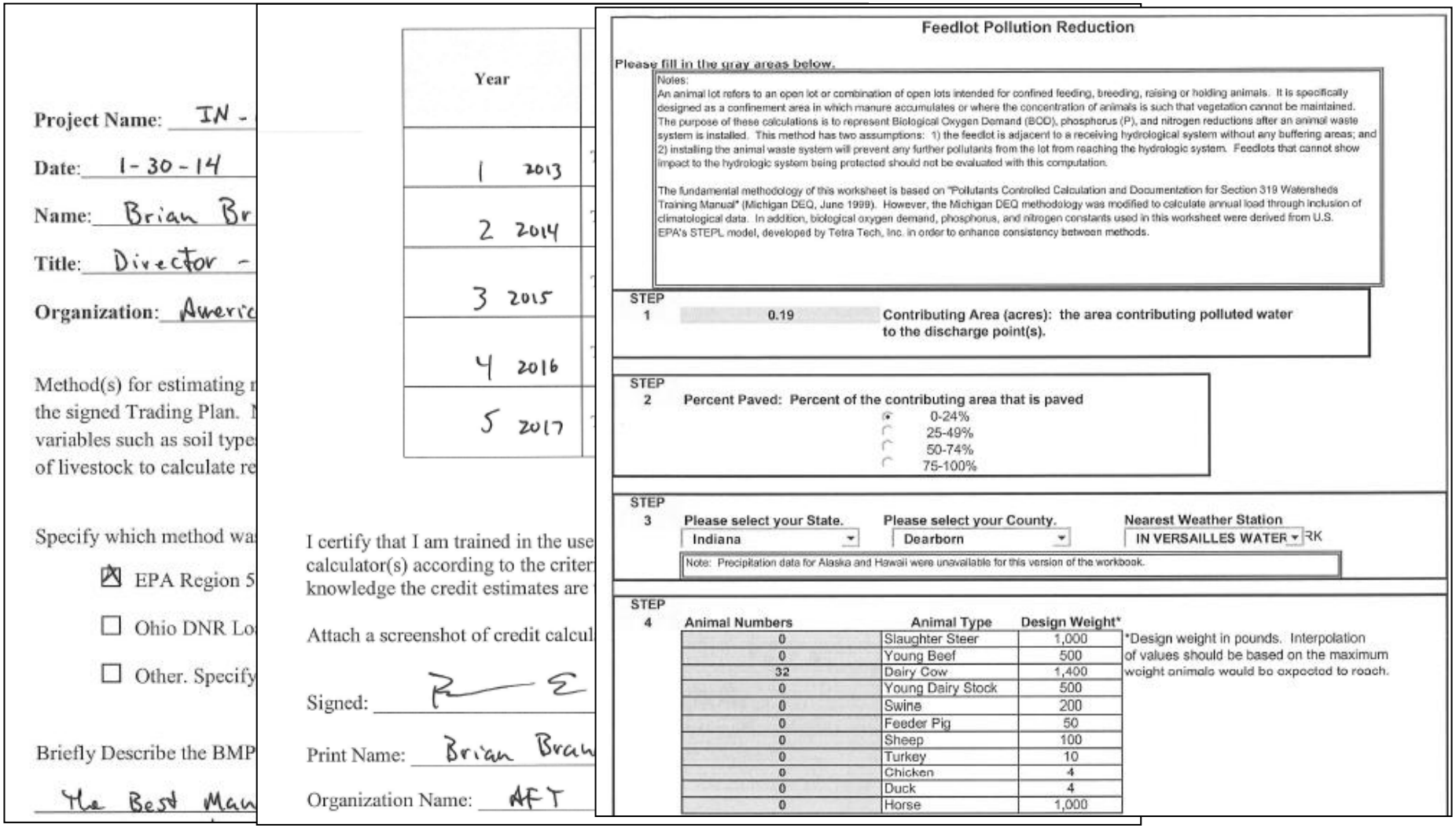
9,000 credits purchased and retired

Clear Search:

Account Holders | Projects | Issuances / Listings | Holdings | Retired Credits

Retirement Date	Vintage	Project	Account	Project Type	Retirement Quantity	Measurement	Type	Details
06 Mar 2014	2013	IN-177-2013-111	AEP	Phosphorus Reduction	403	TP lbs/year	UNIT	View
Serial No.: ORB-BAW-US-103000000005902-01122012-30112013-183599.001-184002-MER-0-P								
06 Mar 2014	2013	IN-177-2013-111	AEP	Nitrogen Reduction	809	TN lbs/year	UNIT	View
Serial No.: ORB-BAW-US-103000000005902-01122012-30112013-184103.001-184912-MER-0-P								
06 Mar 2014	2013	OH-029-2013-104	AEP	Nitrogen Reduction	338	TN lbs/year	UNIT	View
Serial No.: ORB-BAW-US-103000000006082-01122012-30112013-191270.001-191608-MER-0-P								
06 Mar 2014	2013	IN-115-2013-108	AEP	Nitrogen Reduction	91	TN lbs/year	UNIT	View
Serial No.: ORB-BAW-US-103000000005550-01122012-30112013-177677.001-177768-MER-0-P								
06 Mar 2014	2013	IN-137-2013-105	AEP	Phosphorus Reduction	59	TP lbs/year	UNIT	View
Serial No.: ORB-BAW-US-103000000005898-01122012-30112013-180588.001-180647-MER-0-P								
06 Mar 2014	2013	IN-137-2013-102	Duke Energy	Phosphorus Reduction	22	TP lbs/year	UNIT	View
Serial No.: ORB-BAW-US-103000000005895-01122012-30112013-182758.001-182780-MER-0-P								
06 Mar 2014	2013	IN-115-2013-108	Duke Energy	Nitrogen Reduction	46	TN lbs/year	UNIT	View
Serial No.: ORB-BAW-US-103000000005550-01122012-30112013-177768.001-177814-MER-0-P								
06 Mar 2014	2013	IN-137-2013-103	Duke Energy	Nitrogen Reduction	19	TN lbs/year	UNIT	View
Serial No.: ORB-BAW-US-103000000005896-01122012-30112013-183237.001-183256-MER-0-P								
06 Mar 2014	2013	IN-029-2013-106	Duke Energy	Nitrogen Reduction	374	TN lbs/year	UNIT	View
Serial No.: ORB-BAW-US-103000000005996-01122012-30112013-174927.001-175301-MER-0-P								

Credit Calculation Report



Project Name: IN -

Date: 1-30-14

Name: Brian Br

Title: Director -

Organization: Americ

Method(s) for estimating r
the signed Trading Plan. N
variables such as soil type
of livestock to calculate re

Specify which method wa

☒ EPA Region 5

☐ Ohio DNR Lo

☐ Other. Specify

Briefly Describe the BMP

The Best Man

Year
1 2013
2 2014
3 2015
4 2016
5 2017

I certify that I am trained in the use
calculator(s) according to the criter
knowledge the credit estimates are

Attach a screenshot of credit calcul

Signed:

Print Name: Brian Bran

Organization Name: AFT

Feedlot Pollution Reduction

Please fill in the gray areas below.

Notes:
An animal lot refers to an open lot or combination of open lots intended for confined feeding, breeding, raising or holding animals. It is specifically designed as a confinement area in which manure accumulates or where the concentration of animals is such that vegetation cannot be maintained. The purpose of these calculations is to represent Biological Oxygen Demand (BOD), phosphorus (P), and nitrogen reductions after an animal waste system is installed. This method has two assumptions: 1) the feedlot is adjacent to a receiving hydrological system without any buffering areas; and 2) installing the animal waste system will prevent any further pollutants from the lot from reaching the hydrologic system. Feedlots that cannot show impact to the hydrologic system being protected should not be evaluated with this computation.

The fundamental methodology of this worksheet is based on "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual" (Michigan DEQ, June 1999). However, the Michigan DEQ methodology was modified to calculate annual load through inclusion of climatological data. In addition, biological oxygen demand, phosphorus, and nitrogen constants used in this worksheet were derived from U.S. EPA's STEPL model, developed by Tetra Tech, Inc. in order to enhance consistency between methods.

STEP 1 — 0.19 — Contributing Area (acres): the area contributing polluted water to the discharge point(s).

STEP 2 — Percent Paved: Percent of the contributing area that is paved
- (•) 0-24%
- ( ) 25-49%
- ( ) 50-74%
- ( ) 75-100%

STEP 3 — Please select your State: Indiana; Please select your County: Dearborn; Nearest Weather Station: IN VERSAILLES WATER RK

Note: Precipitation data for Alaska and Hawaii were unavailable for this version of the workbook.

STEP 4

Animal Numbers	Animal Type	Design Weight*
0	Slaughter Steer	1,000
0	Young Beef	500
32	Dairy Cow	1,400
0	Young Dairy Stock	500
0	Swine	200
0	Feeder Pig	50
0	Sheep	100
0	Turkey	10
0	Chicken	4
0	Duck	4
0	Horse	1,000

*Design weight in pounds. Interpolation of values should be based on the maximum weight animals would be expected to reach.

SWCD Installation Report

SWCD Installation Report

Before

After

Date of confirmation by S

Name of SWCD Person d

COORD.

Signed: Deborah Wirth

Print Name: Heather Wirth

EPRI ELECTRIC POWER RESEARCH INSTITUTE

Verification Report – State Ag Agency

Credit Verification Report

The completion of this report must be done during or after

Project Name: IN-

Verifier Information

Organization Name:

Project Docume

☑ Proje

☑ Cred

☑ Sign

☑ SWC

☑ Othe

Additional Req

☑ On-s

☑ New Credit Calculation Report, if it was re-

1 of 5

Verification Opinion IN-029-2013-106

Based on confirmation of Edge-of-Field nutrient load reductions calculations as specified in the alculation Report, the Indiana State Department of of the specified BMP Practice(s) will result in the

l site investigations conducted in accordance

ORB Program eligibility requirements;

plemented and maintained in accordance with dards or approved modifications;

antified using appropriate metrics and RB Trading Plan;

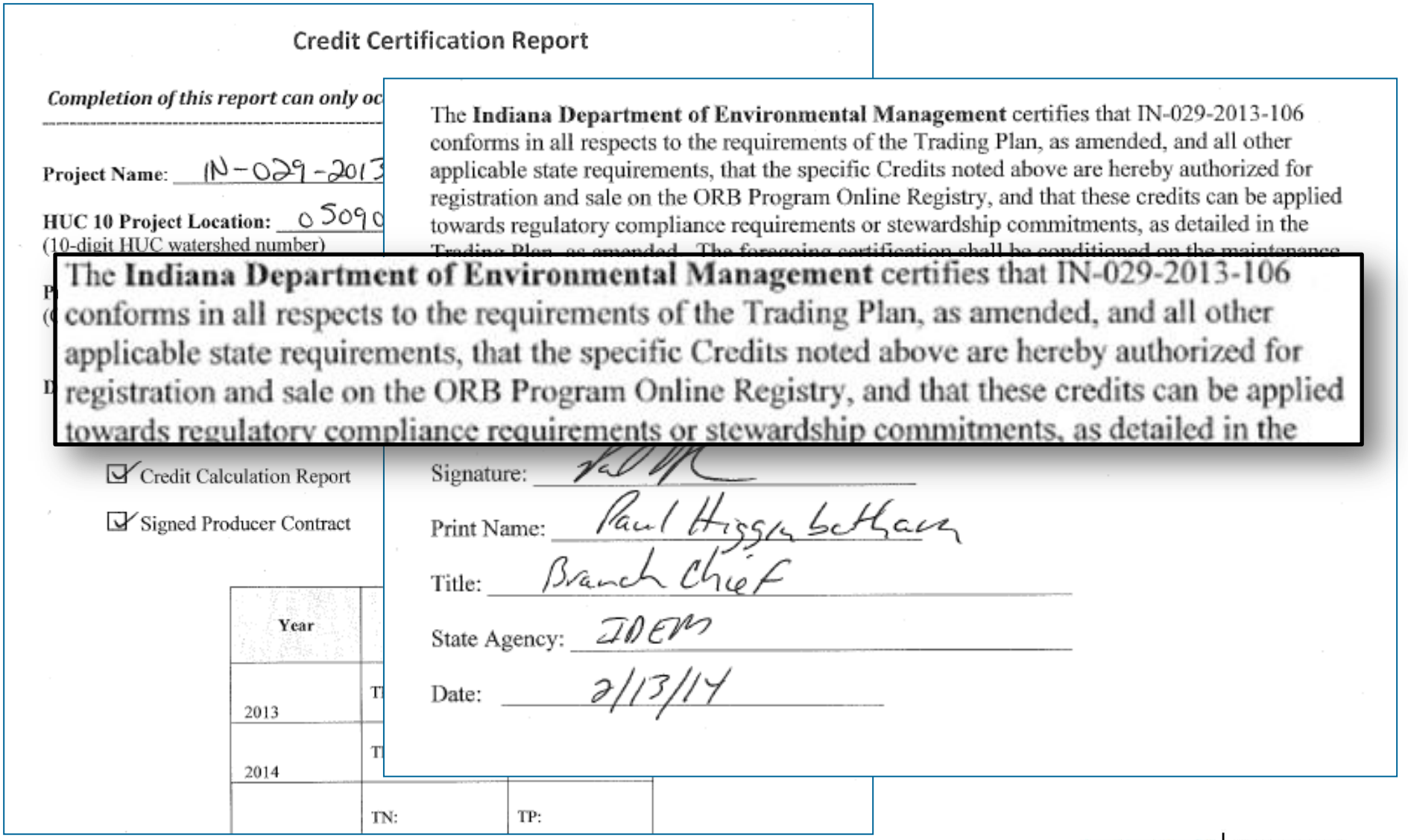
ntained and are performing as designed; and

ace to ensure the specified BMPs are ntract.

Date: 10/9/2013

Agency: Indiana State Dept. of Agriculture

Credit Certification Report – State Permit Authority



Credit Certification Report

Completion of this report can only oc

Project Name: IN-029-2013

HUC 10 Project Location: 0 5090
(10-digit HUC watershed number)

The **Indiana Department of Environmental Management** certifies that IN-029-2013-106 conforms in all respects to the requirements of the Trading Plan, as amended, and all other applicable state requirements, that the specific Credits noted above are hereby authorized for registration and sale on the ORB Program Online Registry, and that these credits can be applied towards regulatory compliance requirements or stewardship commitments, as detailed in the Trading Plan, as amended. The foregoing certification shall be conditioned on the maintenance

The **Indiana Department of Environmental Management** certifies that IN-029-2013-106 conforms in all respects to the requirements of the Trading Plan, as amended, and all other applicable state requirements, that the specific Credits noted above are hereby authorized for registration and sale on the ORB Program Online Registry, and that these credits can be applied towards regulatory compliance requirements or stewardship commitments, as detailed in the

☑ Credit Calculation Report

☑ Signed Producer Contract

Signature: Paul Higginbotham

Print Name: Paul Higginbotham

Title: Branch Chief

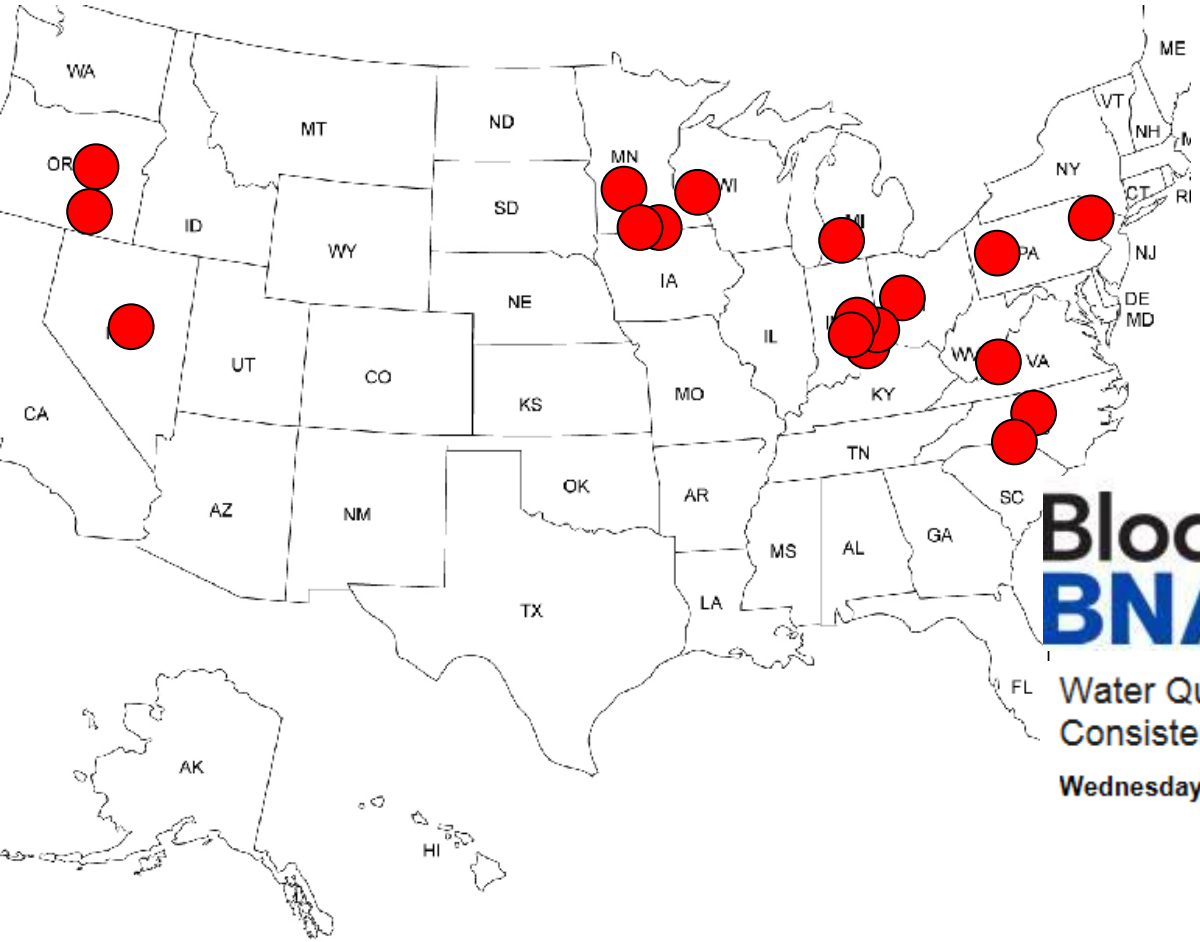
State Agency: IDEM

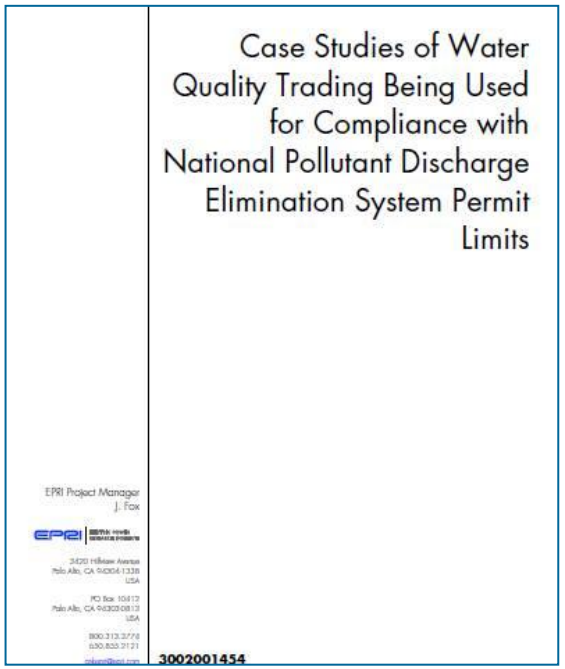
Date: 2/13/14

Year		
2013	T	
2014	T	
	TN:	TP:

New Report - Case Studies of NPDES Compliance

- EPRI Technical Report: 3002001454
- Summarizes18 case studies




Case Studies of Water Quality Trading Being Used for Compliance with National Pollutant Discharge Elimination System Permit Limits

EPRI Project Manager
J. Fox

3002001454

Bloomberg BNA

Water Quality Trading Network Will Seek To Promote Consistency Among Programs

Wednesday, January 22, 2014

EPRI ELECTRIC POWER RESEARCH INSTITUTE

Advisory Committees

- Wastewater Treatment Plants
- Power Plants
- Agriculture
- Environmental Groups
- State & Federal Agencies

Looking Ahead

- More BMPs in KY and OH
- Credit Auction Fall 2014 for Stewardship Credits
- Testing Credit Stacking with Carbon

- Top of Mind:
  - Transition from EPRI to another seller/aggregator
  - Citizen's enforcement provision under CWA
  - Quantification of credits: Models vs. measure

The Ohio River Basin Water Quality Trading Project

Excess nutrients in the Ohio River Basin can lead to algal blooms that deplete oxygen and lead to "dead zones"

30% of the nitrogen loading in the larger Mississippi watershed comes from the Ohio River.

Source: Goolsby et al, 1999

THE PROBLEM

Nutrients come from many sources, such as...

- Farm runoff from fertilizer and manure
- Urban runoff from stormwater, septic systems, and end-of-pipe dischargers
- Air deposition from cars and other emissions

A SOLUTION

Water Quality Trading

is a market-based approach to achieving water quality goals by allowing permitted dischargers to generate or purchase pollution reduction credits from another source.

HOW IT WORKS

1 **A facility such as a power plant** or wastewater treatment plant needs to meet nutrient limits for its water quality permit. Water quality trading is one option.

2 To reduce nutrients in the watershed, **Facility A pays Farmer B to do one of a number of things**, such as reduce fertilizer use, plant stream side buffers with trees or keep livestock manure from getting into streams. Each conservation practice is verified.

3 **Nutrient reductions are quantified as credits** (for example equal to one pound of nutrient reduction). Credits are then reviewed and approved by a regulatory agency.

4 Finally, **Facility A can use those credits** to meet permit requirements.

Benefits

Cost-effective pollutant reductions

Ancillary benefits, such as:
- Improved soils
- Carbon sequestration
- Improved wildlife habitat
- Additional income to farmers

Water Quality Trading Project – Ohio River Basin

First-of-its-kind interstate program spans Ohio, Indiana, and Kentucky to evaluate the use of trading by industries, utilities, farmers, and others to meet water quality goals while minimizing costs.

Find more information at: wqt.epri.com

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The pilot trading period, from 2013-2015, is expected to reduce nutrients by . . .

30,000 lbs of Phosphorous

66,000 lbs of Nitrogen

That's equivalent to keeping 2,950 50-lb bags of fertilizer out of the Ohio River.

Contacts & Questions

http://wqt.epri.com

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