Ohio River Basin Water Quality Trading Project

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KASMC Annual Meeting
Louisville, KY
12-12-19

Project Collaborators & Advisory Groups

Organizations:

- Electric Power Research Institute
- American Farmland Trust
- Ohio Farm Bureau Federation
- ORSANCO
- Tennessee Valley Authority
- American Electric Power
- Hoosier Energy
- Duke Energy

States:

- Ohio
- Indiana
- Kentucky

Agencies:

- USEPA
- USDA

External Advisory Groups:

- Electric Power Industry
- Environmental Groups
- Municipal Wastewater Treatment Plants
- Agriculture

EPRI's Unique Role in Addressing Nutrient Pollution

Independent

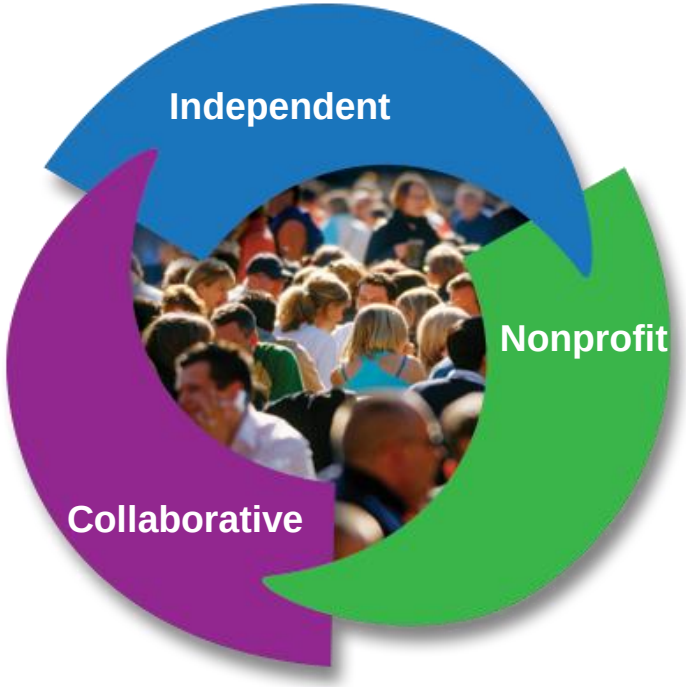
Objective, scientifically based results address reliability, efficiency, affordability, health, safety and the environment

Nonprofit

Chartered to serve the public benefit

Collaborative

Bring together scientists, engineers, academic researchers, industry experts

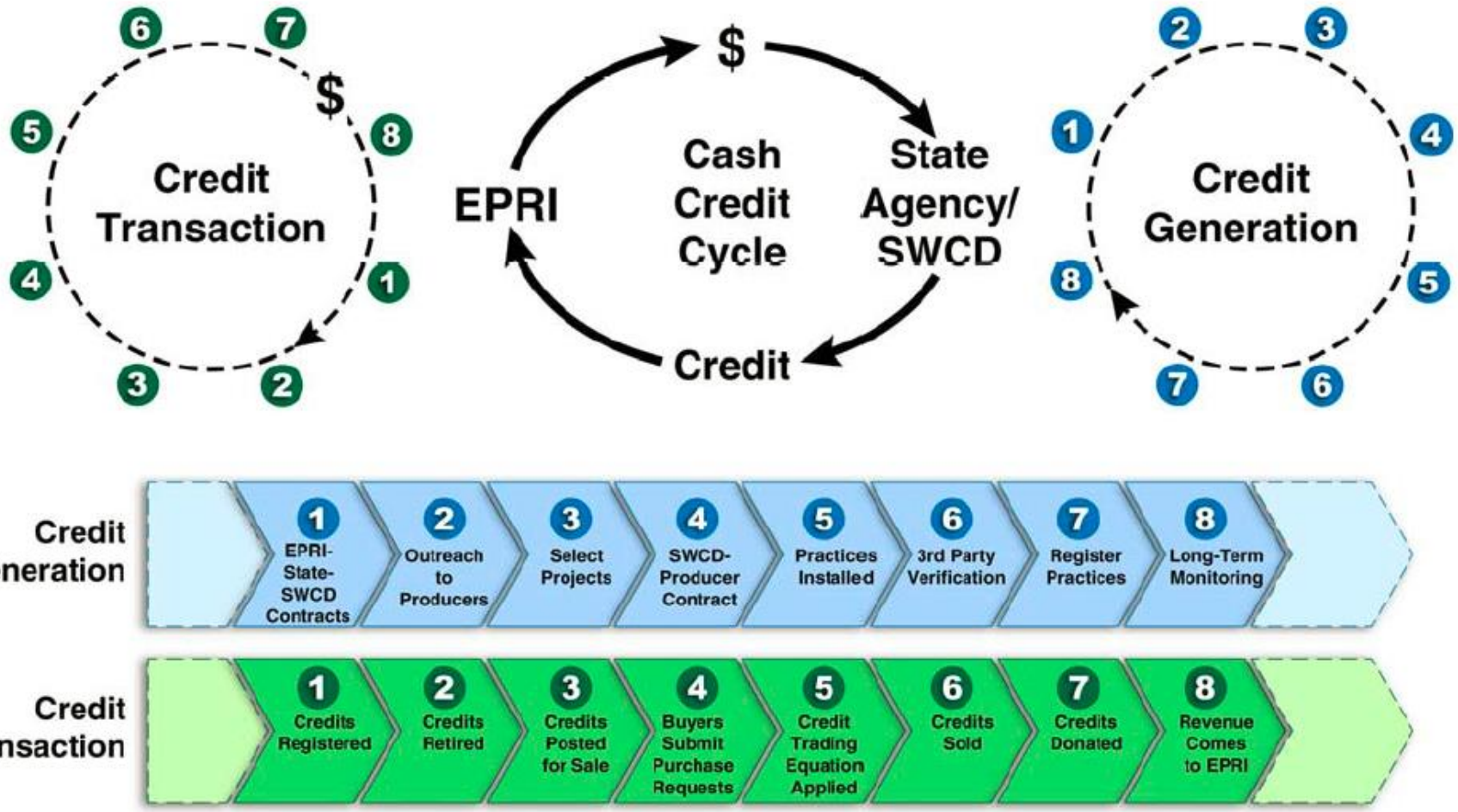


Nutrient Reduction at Lower Cost

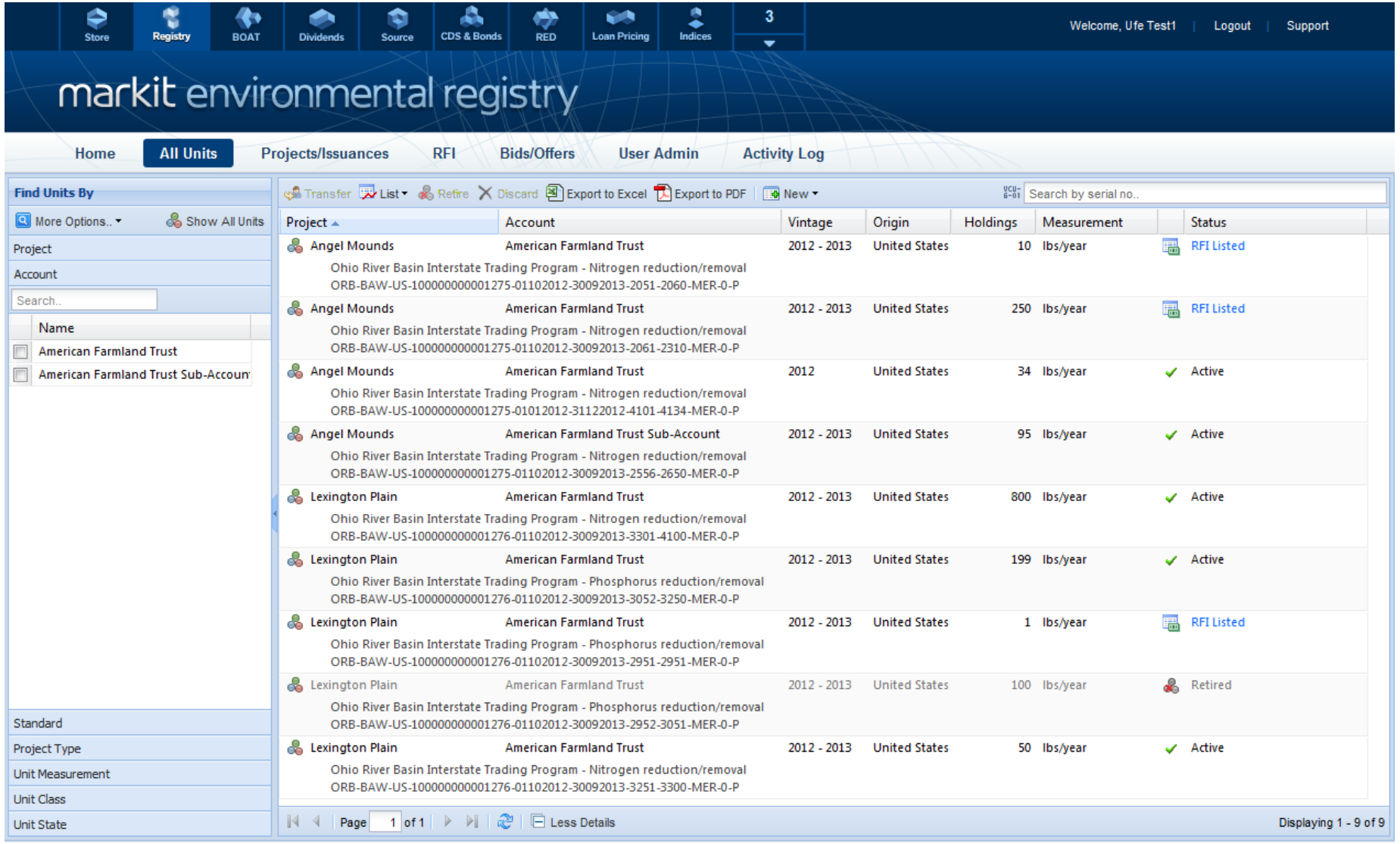
Ohio River Basin Water Quality Trading Project Timeline
2007 - 2015

- 2007 – Initial efforts begin
- 2012 – OH, IN, & KY sign the trading plan
- 2014 – 1st transactions
- 2015 – Project team wins US Water Prize

Components: Credit Tracking Process



Components: Credit Trading Registry



Components: Calibrated Watershed Models (WARMF)

U.S. ENVIRONMENTAL PROTECTION A

Ecosystems Research Division

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

Watershed Analysis Risk Management Framework (WARM

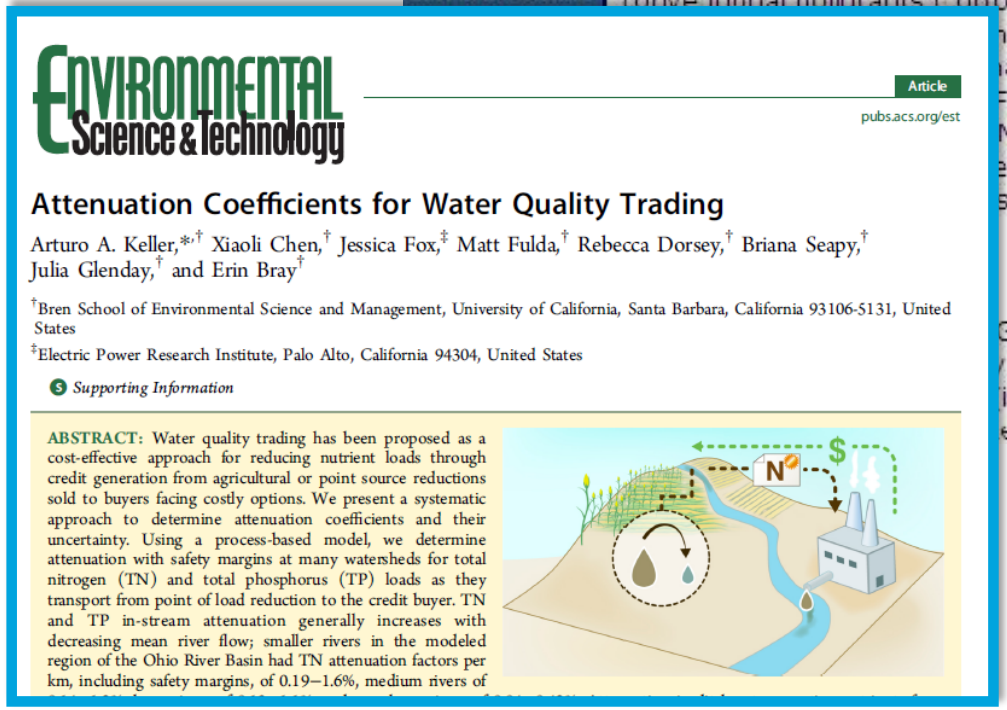
To facilitate TMDL analysis and watershed planning, WARMF was developed under sponsorship from the Electric Power Research Institute (EPRI) as a decision support system for watershed management. The system provides a road map to calculate TMDLs for most conventional pollutants (coliform, TSS, BOD, nutrients). It also provides a road map to guide consus on an implementation plan. The scientific basis of the model have undergone several peer reviews by independent expe F is now compatible with the data extraction and watershe NS. WARMF is organized into five (5) linked modules under erface (GUI). It is a very user friendly tool suitable for exper stakeholders.

GIS-based watershed model that calculates daily runoff, sh and water quality of a river basin. A river basin is divided including canopy and soil layers), stream segments, and la er quality simulations. Land surface is characterized by lan

WWQTCS Info
- WWQTCS Home
- Technical Support
- Tools

EPRI REPORT:
3002011868

Nov 2017



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

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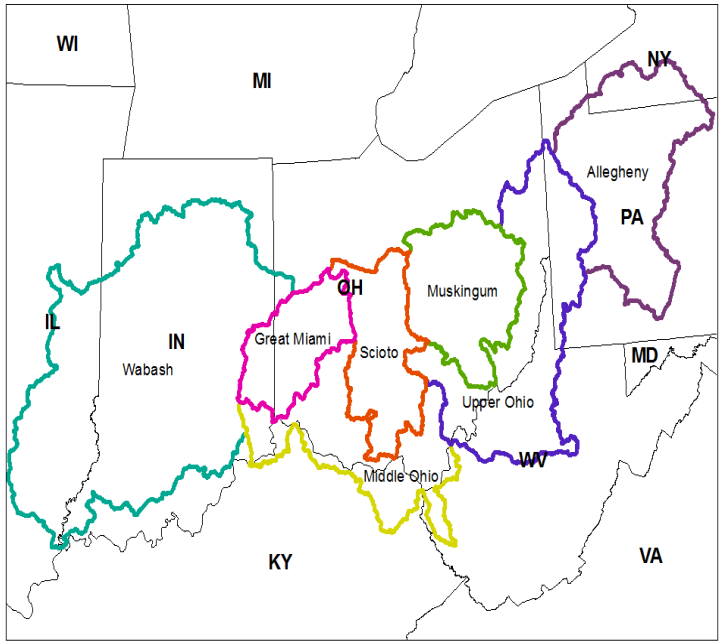
Supporting Information

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

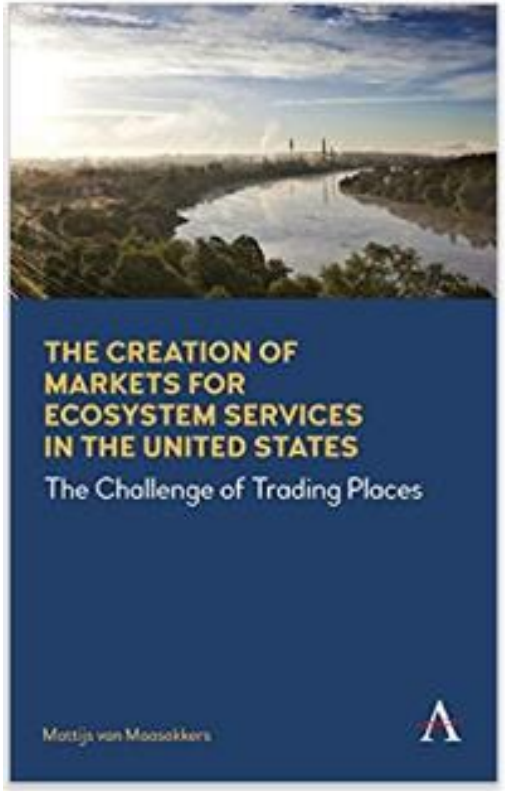


2017 - $1.5 M: US Endowment of Forestry and Communities

EPRI Team will:

- Fund landowners in OH, IN, KY for Forestry-focused projects.
- Conduct science/modeling to quantify WQT credits from Forests.
- Register WQT credits in the name of US Endowment for sale.
- Demonstrate landowner benefits to maintain forests.

Provides important ecosystem services benefits



Keller AA & Fox J (2019) **Giving credit to reforestation for water quality benefits.**

PLoS ONE 14(6): e0217756.

University of Connecticut Collaboration

Dr. Pengfei Liu and Professor Stephen Swallow

AGU PUBLICATIONS

Water Resources Research

RESEARCH ARTICLE

10.1002/2015WR018130

Key Points:

- We incorporate public co-benefits value to purchase WQ credits
- Individuals reveal the lowest value with a real choice under incentive compatibility treatment
- Incorporating public co-benefits value leads to a substantial welfare improvement

Integrating cobenefits produced with water quality BMPs into credits markets: Conceptualization and experimental illustration for EPRI's Ohio River Basin Trading

Pengfei Liu[1] and Stephen K. Swallow[2]

[1]Department of Agricultural and Resource Economics, University of Connecticut, Storrs, Connecticut, USA, [2]Center for Environmental Sciences and Engineering and Department of Agricultural and Resource Economics, University of Connecticut, Storrs, Connecticut, USA

"Our results suggest the presence of cobenefits can significantly increase individuals' willingness to pay for a water quality credit."

NEXT: 3 year USDA grant to apply lessons from EPRI WQT Project to informing willingness to pay for ecosystem services.

2019

1-100 Water Quality Credits	101-500 Water Quality Credits	>500 Water Quality Credits
$14,00	$13,00	$12,00

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firstclimate
Green Energy, Climate Neutral, Water

GRI Empowering Sustainable Decisions

United States Water Prize

Sustainable Development Goals

CDP Disclosure Insight Action

UN Global Compact The CEO Water Mandate

Credits in Ohio River Basin Water Quality Trading Project Go International!

USEPA RFP - APPROACHES TO REDUCE NUTRIENT LOADINGS FOR HARMFUL ALGAL BLOOMS MANAGEMENT

Water Quality Trading to Reduce Harmful Algal Blooms in the Ohio River Basin: Pilot Study – East Fork of the Little Miami River (OH)

1. Apply the Ohio River Basin WQT framework to realize rapid and effective nutrient reductions in local and regional waterbodies.

2. Model the conditions that lead to HABs to prioritize WQT activities incorporating spatial analysis of watershed and farm-level conditions.

3. Measure the effectiveness of certain BMPs using robust edge-of-field and instream monitoring designs

4. Conduct spatial analysis of farm-level conditions to optimize WQT activities

5. Demonstrate the usefulness of remote sensing and satellite imagery to determine the presence of certain agricultural BMPs

Activities

1. High resolution modeling in the Ohio River Basin to guide management actions to cost-effectively reduce the likelihood of harmful algal blooms
2. Conduct land-owner surveys to determine the adoption of agricultural BMPs
3. Coordinate with landowners in the EFLMR Basin to implement 10 BMP projects
4. Conduct edge-of-field and instream monitoring to confirm nutrient reductions estimated by models
5. Use remote sensing technology (e.g., satellite imagery) to determine presence of agricultural BMPs and relieve burden of annual on-field verifications

http://wqt.epri.com

Together...Shaping the Future of Electricity

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APPENDIX

Communications

National Public Radio Spot – 2016-2017

WaterWorld

Twitter Results:

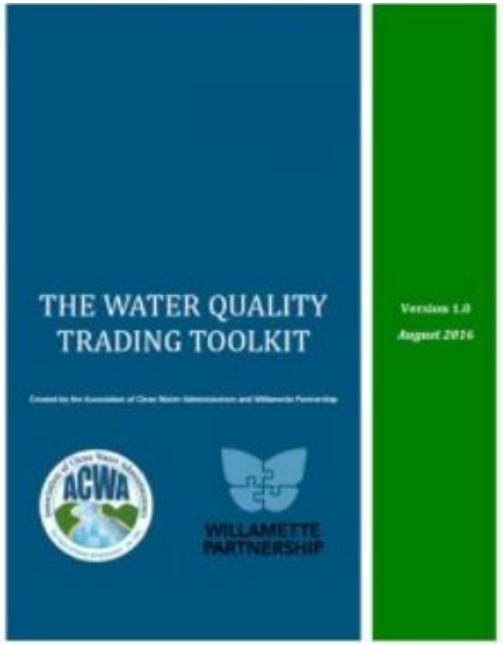
- Impressions: 43,862
- Media Views: 1066
- Media Engagements: 94
- Likes: 91

From the Field: Candid Comments from our Farmers

"My grandpa used to catch catfish in the area. The only thing I've seen was a little minnow. I know that someday I'm not gonna be here and somebody else will deal with whatever I leave them. This is a much better way to leave my legacy than some people in the past have done."

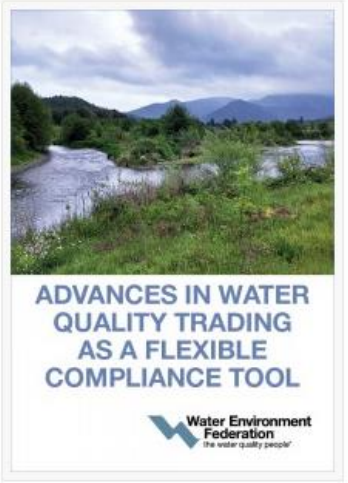
A Few National WQT Resources

- National Network on Water Quality Trading
  - http://nnwqt.org/



- National Alliance on Water Quality Trading
  - http://www.wqtalliance.com/

- Water Envi ederat



NWQTA
National Water Quality Trading Alliance