Nutrient Trading & Targeted Watershed Projects:
Improving Water Quality Locally & in the Gulf of Mexico

Michelle Perez, PhD | EPA-USDA WQ Trading Conference | September 16, 2015
IMPROVING WATER QUALITY

Eliminating eutrophication thru insightful policy analysis, cost-effective solutions, & market-based approaches
KEY TAKE-HOME MESSAGES

• Economic feasibility of nutrient trading is likely there
• Demand signals aren’t there yet
• Many political, legal, technical, & culture hurdles to overcome
• If developing trading programs, make achieving local water quality improvements a priority (i.e. targeted watershed projects)
• If trading doesn’t materialize, make achieving local water quality improvements a priority (i.e., targeted watershed projects)
TARGETED WATERSHED PROJECTS
BENEFITS OF BUSINESS AS USUAL CONSERVATION

Solves individual water quality problems on individual farms

Before

After
Benefits of Landscape-Level Targeting

Achieves measurable water quality improvements in waterbodies

Before

After
BAU V. Targeting Conservation

Business As Usual: Solves individual farm water quality problems

Targeting Critical Sub-Areas: Solves landscape-scale water quality problems

WORLD RESOURCES INSTITUTE
EPA’s 558 NPS Success Stories

Nonpoint Source Success Stories

This Nonpoint Source Success Stories Web site features stories about primarily nonpoint source–impaired waterbodies where restoration efforts have led to documented water quality improvements. Waterbodies are separated into three categories of stories, depending on the type of water quality improvement achieved:

- Stories about partially or fully restored waterbodies
- Stories that show progress toward achieving water quality goals
- Stories about ecological restoration

To find stories, either follow the story category links above or choose a state from the map.

First-time visitors:
Do you need more information about Success Stories?
Do you need more guidance for using this site?
Visit our Basic Information page for answers.
Improving Water Quality Through Better Targeting of U.S. Farm Conservation Funds

MRBI Review

National Modeling Analysis

Overcoming Barriers

www.wri.org/water/water-quality-targeting
What is Nutrient Trading?

- Voluntary approach
- Market-based mechanism
- Finds most cost-effective nutrient reductions to help make progress towards a specific water quality goal
- **Credit buyers** – Regulated WWTPs who want to satisfy permits via purchase of credits or a combination of credits & on-site upgrades
- **Credit sellers** – WWTPs & unregulated farmers with cheaper nutrient reduction costs than buyers
Trading takes advantage of cost differentials between sectors

Source: U.S. EPA and Abt Associates, 2009; Wieland et al., 2009; MDNR, 2008; Stewart, E.A., 2006; WRI analysis using WWTP upgrade costs from MDE and VDEQ
Is large-scale interstate nutrient trading an economically & environmentally feasible tool to help reduce Gulf of Mexico hypoxia?

Partners:
MWRDGC (IL)
SD1 (KY)
USDA NRCS CEAP
Demand & Supply Locations

- 2nd, 7th & 11th largest dischargers
- 47th largest discharger
Agricultural Credit Supply Project Watersheds

AR project area:
2.8 million cropland acres

MS project area:
1.9 million cropland acres
Project Policy Framework

• **Water body of interest:**
  Gulf of Mexico hypoxic zone

• **Water quality goal:**
  45% N & P delivered load reduction to the Gulf is needed to achieve smaller, safer hypoxic zone (EPA SAB, ‘07)
Interviewed Stakeholders

- **WWTP & Regulatory Agencies**
  - MWRDGC & SD1
  - IL EPA & EPA Region 4, 5, & 7

- **Agricultural Stakeholders**
  - AR-FB, MS-FB, & Delta F.A.R.M.
  - AR-NRCS & MS-NRCS
  - ANRC & MSWCC
  - ADEQ & MDEQ
  - UAR & MSU
## On-Site Achievement of a 45% N and P Load Reduction to the Gulf

<table>
<thead>
<tr>
<th></th>
<th>MWRDGC (Calumet &amp; Northside)</th>
<th>SD1 (All 3 Plants)</th>
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</thead>
<tbody>
<tr>
<td><strong>Annual Average (Delivered To Gulf)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TN</td>
<td>7,733,613</td>
<td>1,193,517</td>
</tr>
<tr>
<td>TP</td>
<td>1,153,517</td>
<td>203,803</td>
</tr>
<tr>
<td><strong>Annual Average Cost</strong></td>
<td>$46,782,390</td>
<td>$16,303,184</td>
</tr>
<tr>
<td><strong>Annual Average Cost/lb</strong></td>
<td>$6.05</td>
<td>$15.98</td>
</tr>
<tr>
<td><strong>Nutrients Removed Over 20 Years (lbs)</strong></td>
<td>154,672,254</td>
<td>20,407,296</td>
</tr>
<tr>
<td><strong>20-Year Present Value (Capital Cost Payments and O&amp;M)</strong></td>
<td>$696,003,835</td>
<td>$242,205,205</td>
</tr>
<tr>
<td><strong>20-Year Present Value Cost/lb</strong></td>
<td>$4.50</td>
<td>$11.89</td>
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**Utility Price Ceiling for Credits**
AGRICULTURAL CREDIT SUPPLY ANALYSIS
CEAP modeled six conservation treatments

- Drainage Water Management (DWM)
- Cover Crops (CC)
- Structural Erosion Control (SEC)
- Erosion & Nutrient Management (ENM)
- ENM & Drainage Water Mgt (E-DWM)
- ENM & Cover Crops (E-CC)
AG COST-EFFECTIVENESS FINDINGS
Net costs per lb are cheaper in Mississippi (when getting all able acres to achieve TES)

<table>
<thead>
<tr>
<th></th>
<th>Arkansas Watersheds</th>
<th>Mississippi Watersheds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Cost/lb N</td>
<td>$3.18</td>
<td>$0.90</td>
</tr>
<tr>
<td>Net Cost/lb P</td>
<td>$21.76</td>
<td>$9.55</td>
</tr>
<tr>
<td>Net Cost/acre</td>
<td>$42.29</td>
<td>$46.65</td>
</tr>
</tbody>
</table>
Even without trading, conservation pays on 12–19% (500–900k) acres

On some acres, savings outweigh cost of conservation practices
FINDINGS ABOUT TRADING’S ECONOMIC FEASIBILITY
Both utilities could satisfy all N credit needs by offering prices that are just 25% of onsite costs.
KY utility could satisfy all P credit needs from project watersheds at 25% of its onsite costs but IL utility can’t (even if offered 75% onsite costs)
N trading could save utilities $900M (2/3 the cost) to meet N Gulf goal & earn $700M in farmer profits
Interview Highlights

**WWTPs**

- Trading an option but no policy signal
- Uncertain about legal authority to trade
- Political challenge to convince ratepayers & policy makers to allow credit purchases outside of jurisdiction
- Concerned about fairness of CWA’s lack of NPS regulation & effect on trading
- Numeric P criteria turns interest in trading for a GOM N goal

**Regulatory agencies**

- Interested but due to shrinking budgets, administrative capacity to assist in trading program development & implementation is constrained
Producer profits from trading sufficient

“You’ll get some takers”

- In response to N credit prices, profits ranged from $25 to $60 per acre
- In response to P credit prices, profits ranged from $18 to $42 per acre
- Farmer participation could occur on 12 to 40% of the project crop acres
Interview Highlights

Agricultural community

- Trading an option but no policy signal
- Interested in anything that achieves more conservation & brings funding to farmers
- Need field-level credit calculation tools & watershed-level planning tools
- Need both tools to be calibrated to current farm & conservation practices
- Need farmer buy-in to tools & to trading
- Concerned about fairness issues, i.e. shouldering burden for others
Trading can be one tool in the tool box

Sources of nutrients delivered to the Gulf of Mexico

**PHOSPHORUS**
- 80% ag
- 25%
- 18%
- 12%
- 8%
- 37%

**NITROGEN**
- 71% ag
- 52%
- 16%
- 14%
- 9%
- 5%
- 4%

**Sources**
- Corn and soybean crops
- Other crops
- Pasture and range
- Urban and population-related sources
- Atmospheric deposition
- Natural land

http://water.usgs.gov/nawqa/sparrow/gulf_findings/primary_sources.html
Suggestions for State Stakeholders

1. Gather all the “right” stakeholders to design targeting and/or trading programs to achieve specifically stated WQ goals

2. Identify ideal watersheds for achieving local water quality goals
   a) Ag-only targeted watershed projects
   b) Point Source – Nonpoint Source targeted watershed projects
   c) Point Source – Nonpoint Source trading projects

3. Develop needed datasets, models, & tools for quantifying agricultural baseline, nutrient reductions, & cost-effectiveness

4. Dedicate portion of federal, state, & other funds for targeting or trading projects
   a) Prioritize funds by watershed & cost-effectiveness
   b) Ask charitable foundations & private sector to support efforts
Thank You!

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