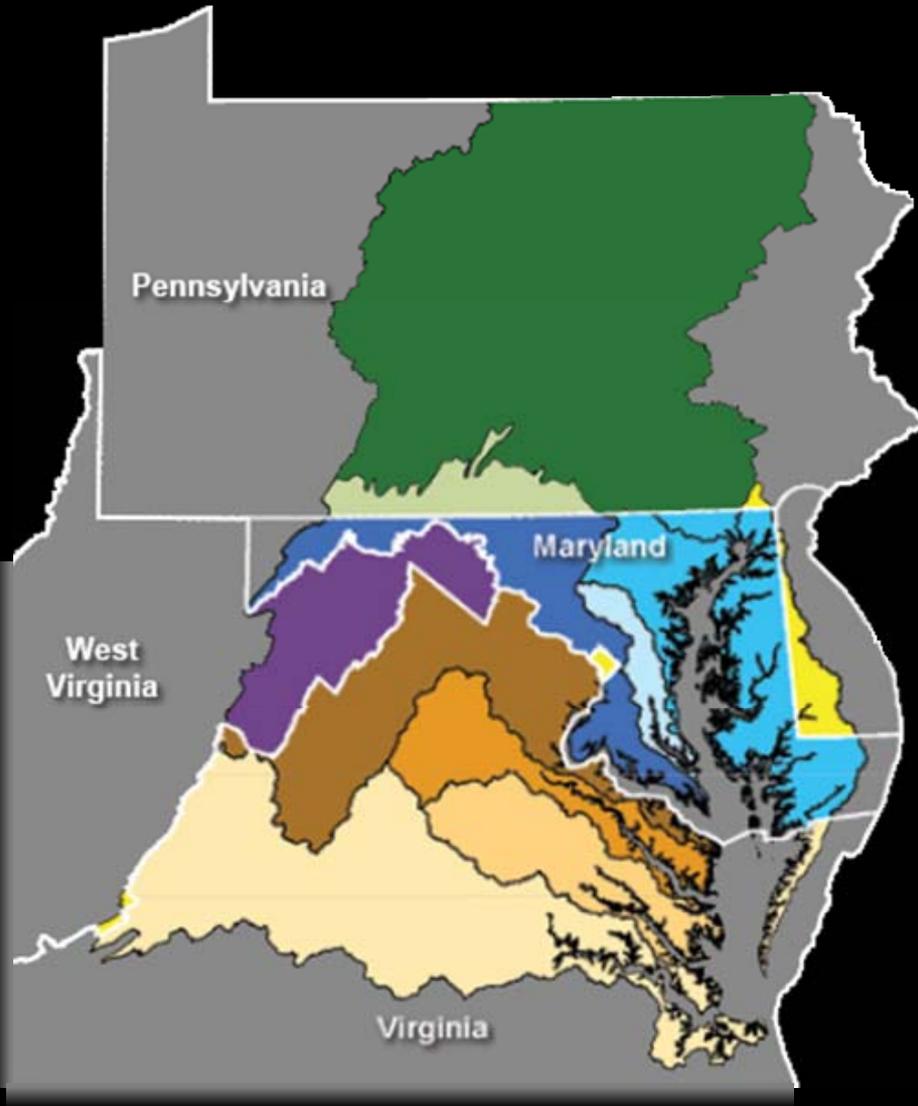


Virginia Nutrient Credit
Exchange Committee
June 16, 2011

State Nutrient Trading Programs and the TMDL

World Resources Institute



- 4 states
- 12 tables
- 43 design features

<http://www.wri.org/publication/comparison-tables-of-state-chesapeake-bay-nutrient-trading-programs>

WRI FACT SHEET

Comparison Tables of State Nutrient Trading Programs in the Chesapeake Bay Watershed

Evan Branosky, Cy Jones, and Mindy Selman

Version 1 | May 2011

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Over the last ten years, four Chesapeake Bay states—Maryland, Pennsylvania, Virginia, and West Virginia—introduced nutrient trading programs to provide wastewater treatment plants with flexible options for meeting and maintaining permitted nutrient load limits. At least one other bay state, Delaware, also convened a work group to discuss developing such a program. Through these programs, wastewater treatment plants may purchase credits or offsets generated by other wastewater treatment plants or farms that reduce the nutrients they release to impaired water bodies. States are also exploring options for construction and urban stormwater programs to buy and sell credits and offsets.

To date, most credit transactions have occurred between buyers and sellers in the same state. Efforts to enact the recent Chesapeake Bay total maximum daily loads (TMDLs), however, could provide more opportunities for interaction by trading partners from different states. For example, regulated entities could seek credits or offsets from other states when the supply in their own state has been exhausted. In addition, entities in states that do not have a trading program could seek credits or offsets from entities in states that do have such a program.

Although the elements of many of the trading programs are identical or very similar, such as calculation platforms, included pollutants, and allowable participants, there are several differences as well. Examples are the time period that defines the life of a credit or offset and the varying types and values of trading ratios. States may need to address these and other differences before permitting more cross-state transactions. Regardless of how these differences are resolved, government regulations require credit transactions to be documented in the public record.

The World Resources Institute (WRI) has compiled into comparison tables the key design elements of the four state trading programs. The tables comprise a reference document for policymakers and others addressing the programs' differences. These design elements are grouped into twelve categories based on their common characteristics. All the information is current as of May 2011; was paraphrased directly from the statute, regulation, policy, or guidance documents; and has been reviewed by trading experts. Nonetheless, this information will undoubtedly change as the states refine their strategies for implementing the TMDLs.

Overview of Presentation

Notes on terminology...

- 1) Pollutants and general eligibility requirements
- 2) Point source participation requirements
- 3) Market functionality
- 4) Compliance and enforcement provisions
- 5) Risk management provisions
- 6) Registry vehicles
- 7) Trading ratios
- 8) Baseline requirements
- 9) Certification and verification processes
- 10) Types of projects credited
- 11) Credit and/or offset restrictions

Key issues

Notes on terminology...

Trading and its terms means different things to different states

Not until you've upgraded!



Best thing since sliced bread!



Two separate programs! (OK, three.)



Notes on terminology... (cont'd)

Definitions of trading terms vary among states

Example: Credit, Compliance Credit, Offset

WRI definitions

- Credit:** Unit of pollutant discharge expressed in the mass-per-unit time created when a discharger reduces its discharge of the pollutant below its baseline requirement (Jones et al. 2006). The mass-per-unit time used to define a credit in all the bay states' trading programs is one pound of nitrogen or phosphorus delivered to the bay's tidal waters each year.
- Offset:** A pound of reduction can be either a credit or an offset, depending on how it is used. Reductions used to offset discharges caused by new growth are frequently referred to as *offset credits*, or just *offsets*. Credits used to achieve a cap or to prevent year-to-year operational violations are usually known merely as *credits*.



1) Pollutants and general eligibility requirements

Pollutants that can be traded

Common features	State variations
<ul style="list-style-type: none">• Nitrogen• Phosphorus	<ul style="list-style-type: none">• MD, PA, and WV include sediment; VA does not

Eligible market participants

Common features	State variations
<ul style="list-style-type: none">• Agricultural operations (i.e., NPS, other landowners)• Nonsignificant PS• Significant PS• Third parties• All states are considering MS4 and stormwater construction and industrial permits	<ul style="list-style-type: none">• VA includes construction stormwater permits through ch. 364, 2009 VA Acts

1) Pollutants and general eligibility requirements (cont'd)

General eligibility requirements for credit purchases

Common features

- PS accommodate growth by purchasing PS or NPS offsets or WLA

State variations

- MD requires significant PS to have ENR in operation
- PA and WV allow PS to purchase PS or NPS credits to meet existing, permitted load limits
- VA allows PS to purchase PS credits to meet existing, permitted load limits and NPS/WLA to accommodate growth

2) Point source participation requirements

Types of PS permits	
<p>Common features</p> <ul style="list-style-type: none">• NPDES permits	<p>State variations</p> <ul style="list-style-type: none">• MD, PA, and WV include individual NPDES permits• VA uses general watershed VPDES permit

New and expanding point sources	
<p>Common features</p> <ul style="list-style-type: none">• New or expanding PS have no allocations	<p>State variations</p> <p>Threshold capacity for offset requirement</p> <ul style="list-style-type: none">• MD - 0.1 MGD• PA - > 0 MGD• VA - 0.001 MGD (new), 0.04 MGD (expanding)• WV - 0.05 MGD



3) Market functionality

Trading areas	
Common features	State variations
<ul style="list-style-type: none">Potomac	<ul style="list-style-type: none">MD – Patuxent, Potomac, “Everywhere Else”PA – Potomac, SusquehannaVA – Eastern Shore,* James,** Potomac, Rappahannock, York

- 2010 VA Acts allow VA Eastern Shore PS to purchase compliance credits from the Potomac and Rappahannock Basins
- There are additional restrictions on trading in the James



3) Market functionality (cont'd)

Credit and/or offset price setting mechanism

Common features

- The trading market sets the credit/offset price*

State variations

- PA uses PENNVEST bid mechanism
- VNCEA sets the price of PS credits exchanged within it
- VADEQ sets the price for last-resort compliance credits and offsets from the VAWQIF



3) Market functionality (cont'd)

Platform for calculating generated NPS credits and/or offsets

Common features

- All states have a procedure for calculating generated NPS credits

State variations

- MD uses WRI NutrientNet combined with USDA-NRCS Nutrient Tracking Tool
- PA and WV use NutrientNet
- VA uses lookup tables

Note: WRI is developing an interstate platform based on the MD model



3) Market functionality (cont'd)

Common features	State variations
<ul style="list-style-type: none">• Bilateral*	<ul style="list-style-type: none">• NutrientNet interface supports exchange model in MD, PA, and WV• PENNVEST serves as a clearinghouse for transactions in PA program• VNCEA serves as a clearinghouse for PS credits in VA program

Aggregators can buy or sell NPS credits or offsets, regardless of market structure

* In VA, transactions conducted through the VAWQIF or outside the VNCEA are bilateral

4) Compliance and enforcement provisions

Liability for credit and/or offset implementation

Common features

- Permit holders retain liability for compliance with NPDES permits

State variations

- MD, PA, and WV require contracts or sale/purchase agreements between sellers and buyers
- MD and PA trading policies suggest or require contract terms
- MD and WV suggest explicit actions by aggregators, including self-insurance (MD) and responsibility for ensuring credits are generated (WV)



4) Compliance and enforcement provisions (cont'd)

True-up period for credit purchases

Common features

- None

State variations

- PADEP may provide \leq 60-days
- WVDEP provides two-months
- VADEQ provides six-months

Minimum offset requirement

Common features

- None

State variations

- MD requires offsets for 10 years and plan for additional 10 years
- PA requires credits for at least 5 years
- VA requires credits for at least 10 years
- WV determines obligations on a case-by-case basis



5) Risk management provisions

Risk management provisions

Common features

- All states have risk management provisions

State variations

- MD requires risk management provisions in private contract
- PA and WV establish reserve ratio to capitalize reserve pool; PS may be granted reserve credits if unforeseen circumstances cause BMP to fail
- VA has VAWQIF to serve as creditor of last resort



6) Registry vehicles

Registry vehicles	
<p>Common features</p> <ul style="list-style-type: none">• All states use registry vehicles	<p>State variations</p> <ul style="list-style-type: none">• MD, PA, and WV use NutrientNet registry• VA uses VPDES permit and VADEQ records



7) Trading ratios

Delivery ratio

Common features	State variations
<ul style="list-style-type: none">The CBWM provides delivery ratios	<ul style="list-style-type: none">N/A

Edge-of-segment ratio

Common features	State variations
<ul style="list-style-type: none">The CBWM provides edge-of-segment ratios	<ul style="list-style-type: none">N/A

Reserve ratio

Common features	State variations
<ul style="list-style-type: none">None	<ul style="list-style-type: none">PA requires 10% for all certified creditsWV requires 10% for PS credits and 20% for NPS credits



7) Trading ratios (cont'd)

Retirement ratio

Common features

- None

State variations

- MD requires 5% for PS credits and 10% for NPS credits

Uncertainty ratio

Common features

- None

State variations

- MD and WV can require $\geq 10\%$ NPS credits generated by BMPs that are not approved by the CBP
- VA requires 100% (i.e., 2:1 ratio for NPS offsets)



8) Baseline requirements

Basis for determining PS baseline	
Common features <ul style="list-style-type: none">• Refer to fact sheet	State variations <ul style="list-style-type: none">• Refer to fact sheet

Baseline for agricultural operations	
Common features <ul style="list-style-type: none">• Agricultural operations must comply with all applicable laws and regulations	State variations <ul style="list-style-type: none">• MD and WV farms must meet performance-based, per acre annual loading rates• VA must implement practice-based BMPs• PA requires practices or 20% load reduction• PA uses a tradable load cap

9) Certification and verification processes

General credit/offset certification

Common features

- States review credit generation proposals and certify credits upon approval

State variations

- MD - MDA for NPS credits
- PA - PADEP
- VA - VADEQ and VADCR
- WV - WVDEP

General credit/offset verification

Common features

- Annual verification of credit/offset generation required
- Third-party verification authorized

State variations

- MD - MDA annual spot check of 10 percent of ag projects



10) Types of projects credited

Available BMPs

Common features

- BMPs with nutrient and/or sediment reduction efficiencies approved by the CBP are eligible to generate credits and/or offsets
- States may authorize new BMPs or technologies on a case-by-case basis

State variations

- MD establishes three categories of practices:
 - 1) BMPs with approved load reductions;
 - 2) BMPs requiring technical review; and
 - 3) Other BMPs



10) Types of projects credited (cont'd)

Septic hook-up provisions	
Common features	State variations
<ul style="list-style-type: none">• None	<ul style="list-style-type: none">• MD OSDS in critical areas generate 12.2 lbs TN per year, within 1,000 feet of perennial waters generate 7.5 lbs, and other generate 4.6 lbs• PA provides PS offsets from 25 lbs reduction at on-lot systems• WV provides 9.5 lbs for failed systems and 5.7 lbs for functioning systems

11) Credit or offset restrictions

Credit for BMPs financed through state and/or federal cost share

Common features	State variations
<ul style="list-style-type: none">• Cost-shared BMPs may be used to meet baseline requirements	<ul style="list-style-type: none">• PA and WV allow cost-shared BMPs to generate credits and/or offsets; not allowed in MD and VA

Farmland preservation measures

Common features	State variations
<ul style="list-style-type: none">• None	<ul style="list-style-type: none">• MD and PA do not allow credit generation through idling whole or substantial portions of farms• MD and WV do not allow credit generation through farmland conversion• MD allows credit generation through conversion to other agricultural operations

Key issues

- Requirements and restrictions
 - Baseline definitions (practice- or performance-based)
 - Restrictions on buyers and sellers
 - Trade ratios
 - Geographic scale
 - Types of projects that can generate credits
- Market issues
 - Market infrastructure
 - Supply and demand
 - Credit prices and price discovery
 - Role of banks, brokers, and aggregators
 - Trading registries
 - Risk management
- Regulatory issues
 - Transparency
 - Compliance and enforcement
- New horizons
 - Trading in the stormwater sector
 - Interstate trading



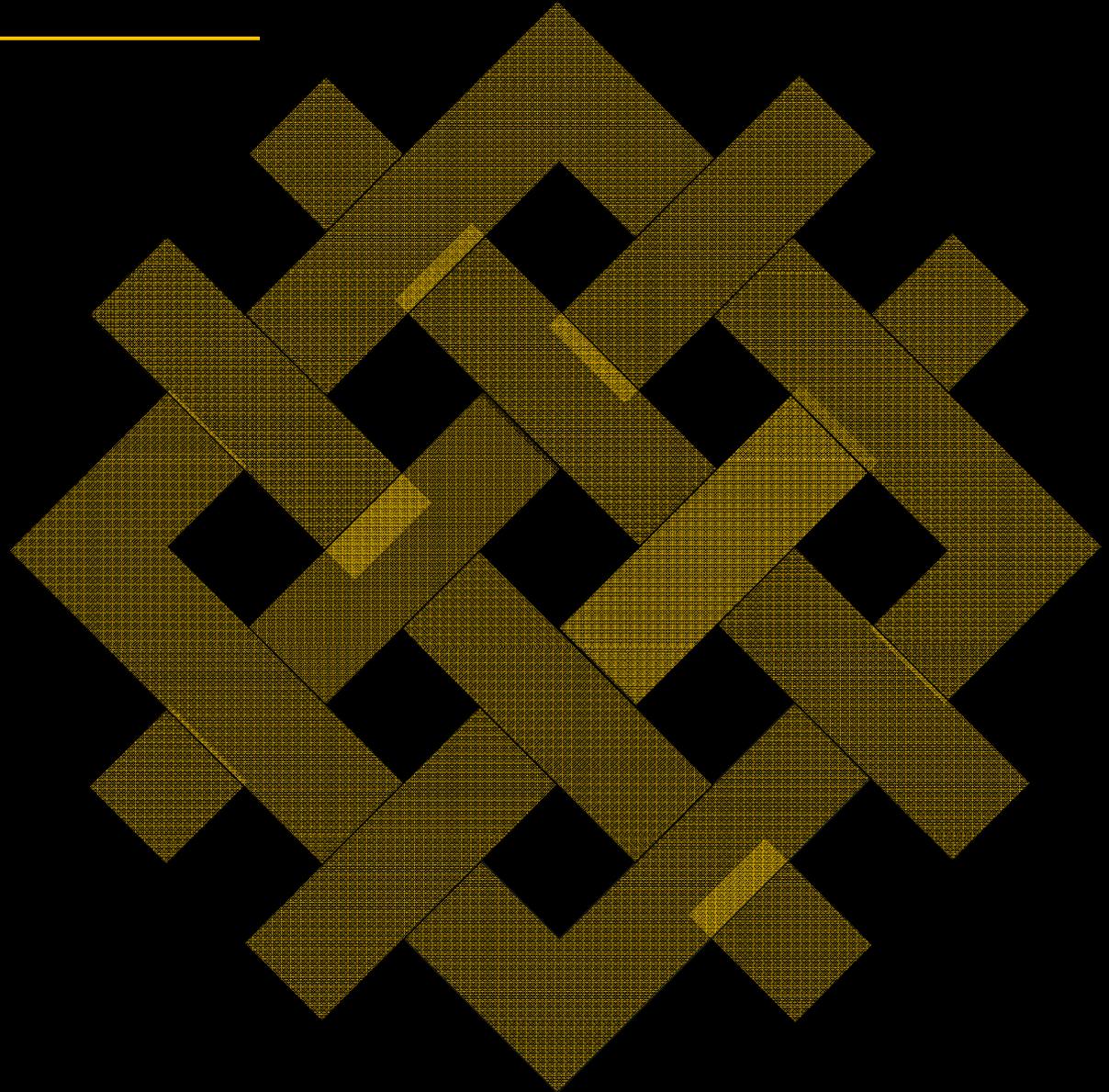
Thank you

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Appendix



Potential gross revenues from single practices to generate nutrient credits in Virginia

Assumes interbasin and interstate trading

Credit Generating Options (After Meeting Baseline)	Nitrogen Reduction (lbs/ac/yr)	Single Practice Acres on 200 Acre Farm	Potential Credits per Year	Annual Gross Revenues at \$20/lb
Early plant cover crops	0.83	196	163	\$3,260
Pasture conversion to conservation cover	3.13	5	16	\$320
Pasture conversion to forest buffer (upland)	3.53	3	11	\$220
Crop conversion to conservation cover	5.79	3	17	\$340
Crop conversion to forest buffer (upland)	9.02	3	27	\$540
Restored wetland	38.12	5	191	\$3,820

Note: Nutrient reduction factors are statewide averages for each practice published in Virginia's nutrient trading manual. Practices that could be implemented in concentrated animal production areas are not addressed in the manual, and so the list of practices here only considers those applicable to crop or pasture production areas.

Source: Nutrient Net, 2010. Figures may not add up precisely due to rounding.

Source: Talberth, John, et al. 2010. "How Baywide Nutrient Trading Could Benefit Virginia Farms." WRI Working Paper. World Resources Institute, Washington, DC. Available at: <http://www.wri.org/publication/how-baywide-nutrient-trading-could-benefit-virginia-farms>



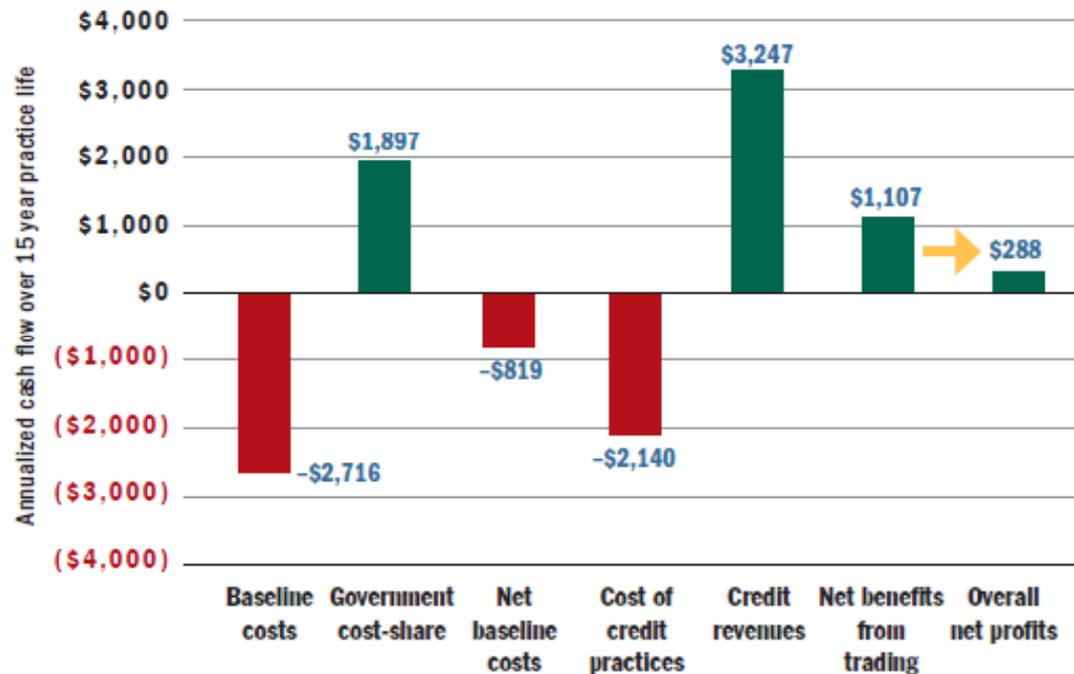
Potential economic benefit of nutrient trading to a farm with 200 acres of pasture in the Potomac-Shenandoah Basin

Assumes interbasin and interstate trading

Key assumptions

(practice acres):

- Credit price: \$20/lb N.
- Practices to meet baseline include riparian buffer (3.4), nutrient plan (197), livestock exclusion (3.4), and tree planting on erodible soils to meet "T" (1).
- Credit-generating practices include upland forest buffer (3), conservation cover (3), and wetland restoration (5).



Source: Talberth, John, et al. 2010. "How Baywide Nutrient Trading Could Benefit Virginia Farms." WRI Working Paper. World Resources Institute, Washington, DC. Available at: <http://www.wri.org/publication/how-baywide-nutrient-trading-could-benefit-virginia-farms>



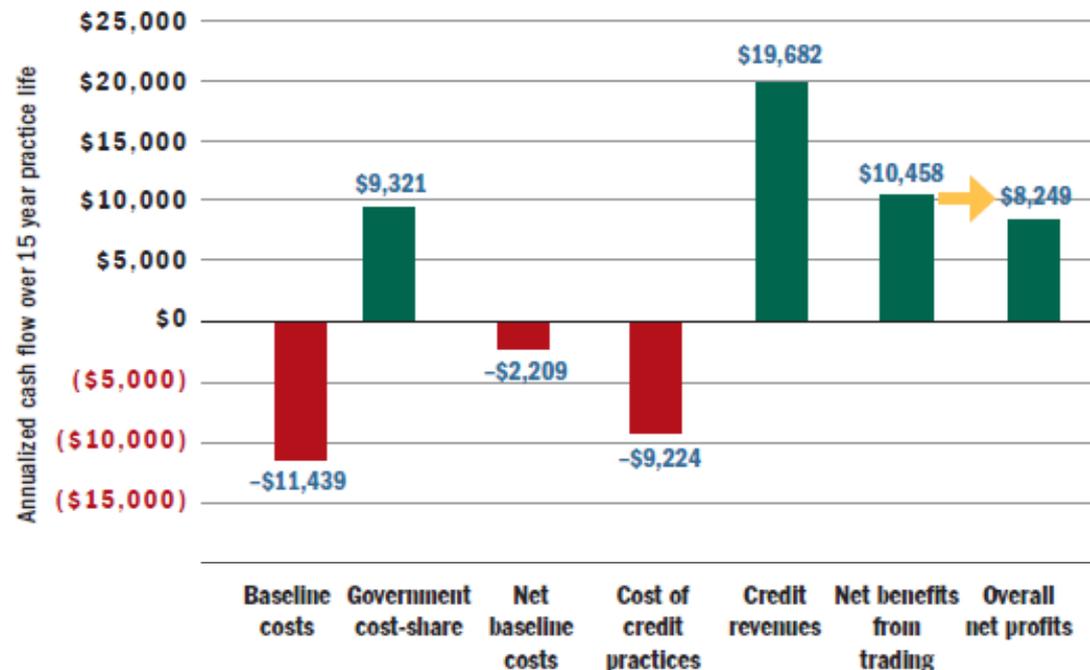
Potential economic benefit of nutrient trading to a farm with 200 acres of cropland in the Potomac-Shenandoah Basin

Assumes interbasin and interstate trading

Key assumptions

(practice acres):

- Credit price: \$20/lb N.
- Practices to meet baseline include cover crops (197), riparian buffer (3.4), nutrient management plan (197), and conservation tillage (197) plus buffer strip cropping (10) to meet "T".
- Credit-generating practices include early planting of cover crops (186), upland forest buffer (3), conservation cover (3), 15% nutrient reduction (186), and wetland restoration (5).



Source: Talberth, John, et al. 2010. "How Baywide Nutrient Trading Could Benefit Virginia Farms." WRI Working Paper. World Resources Institute, Washington, DC. Available at: <http://www.wri.org/publication/how-baywide-nutrient-trading-could-benefit-virginia-farms>

